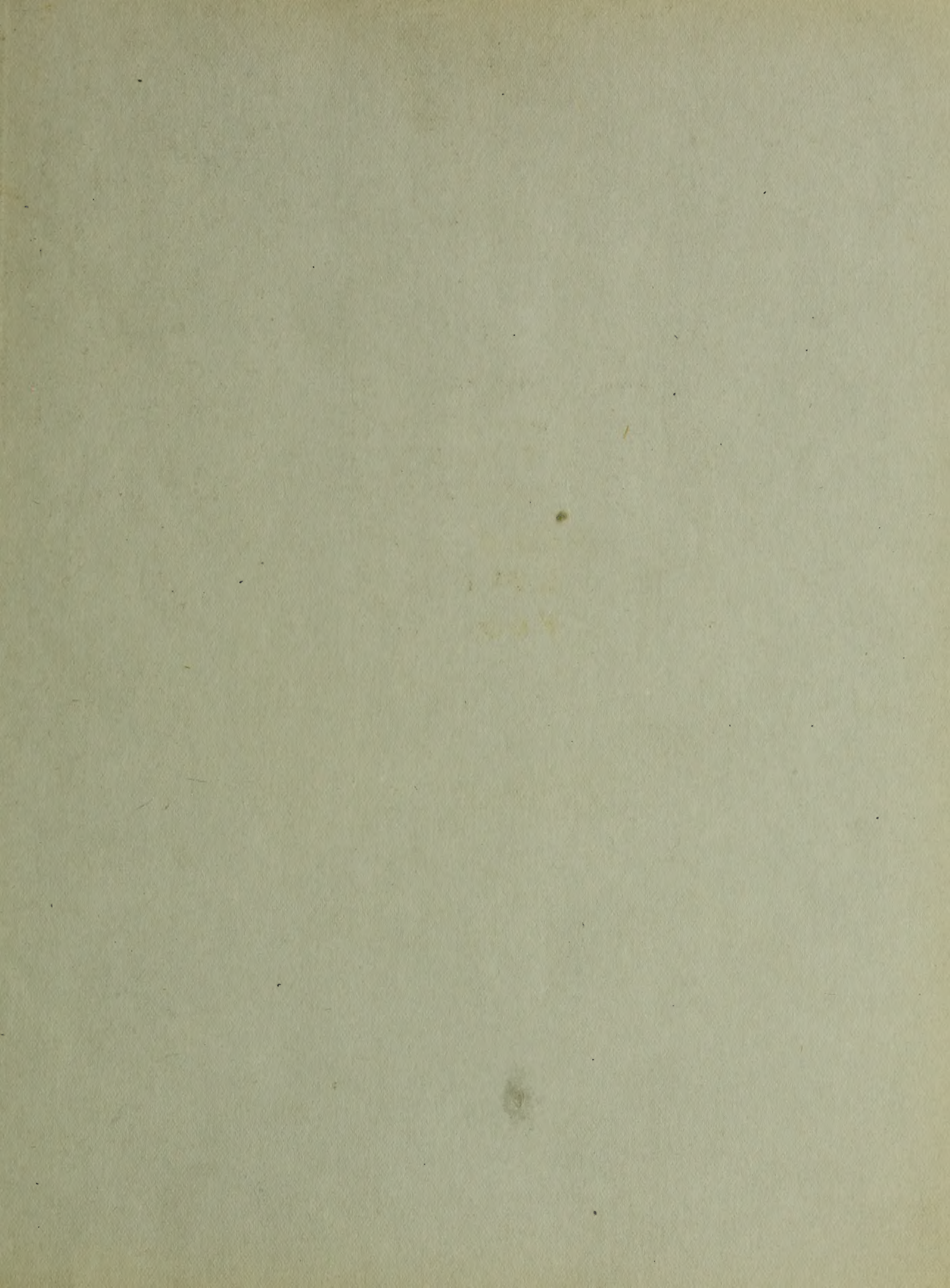




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CHEMICAL ENGINEER.

A WEEKLY NEWSPAPER DEVOTED TO

THE COMMERCIAL ASPECT OF THE CHEMICAL AND ALLIED INDUSTRIES.

Edited by

G. KEVILLE DAVIS, M.Sc.,

Chemical Engineer and Consulting Chemist.

VOLUME LXV.

[July to December, 1919.]

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CHEMICAL ENGINEER.

No. 1676.

LONDON, SATURDAY, JULY 5, 1919.

VOL. LXV.

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EDITORIAL NOTICES.

Readers are invited to forward items of intelligence, company reports and balance-sheets, or cuttings from local newspapers of interest to the trades concerned.

Articles, reports, and correspondence on all matters of interest to the chemical and allied industries, home and foreign, are solicited. Correspondents should condense their matter as much as possible, write on one side only of the paper, and in all cases give their names and addresses, not necessarily for publication. Sketches should be sent on separate sheets.

Communications for the Editor, if intended for insertion in the current week's issue, should reach the office not later than Wednesday morning.

CURRENT TOPICS.

ALCOHOL FOR POWER PURPOSES.

THE report of the Inter-Departmental Committee on Alcohol Motor Fuel, appointed in October last with the late Sir Boverton Redwood, Bart., as chairman, was issued on Monday. The Committee was appointed to consider: (1) The various available sources of supply of alcohol, the methods of manufacture, and the cost of the products; (2) the suitability of alcohol, either alone or in admixture with solid, liquid, or gaseous combustible substances, for use in internal-combustion engines, and the modification of the existing types of such engines which may be necessary to the attainment of efficiency; (3) the question of denaturing the alcohol, and the alterations to be made in the present Excise arrangements. In compiling the report, the Committee adopt as a jumping-off place the conclusion of a previous Departmental Committee whose report was published in 1905. The latter body was appointed primarily to consider the question of industrial alcohol in relation to its use in the arts and manufactures, and consequently the question of its employment as a motor-fuel was dealt with more or less perfunctorily. As, however, at that time the demand for motor-fuel was little more than in its infancy, and easily supplied by imported petrol at a price which put substitutes out of court, the summary dismissal of alcohol for such purposes occasioned little concern. Owing to the enormous increase in the world's consumption of petrol during the past decade, and the accompanying increase in the selling price, the question of providing efficient substitutes has assumed a totally different aspect, and this the present Committee rightly emphasise. The report is surprisingly brief, but the Committee's con-

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NEW ARRANGEMENTS.

The "Chemical Trade Journal" will be published in future a day earlier.

SUBSCRIBERS to whom the Journal is posted direct will therefore receive it each week on Friday.

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clusions and recommendations are to the point. Research work on the behaviour of the various types of alcohol-mixture vapours under varying conditions is in progress, and commercial-scale trials of alcohol-benzole and alcohol-benzole-petrol mixtures, to extend over a period of six months, are proceeding. The results will, of course, have an important practical bearing upon the matter, and will be awaited with a considerable amount of interest. In the course of their inquiry, the Committee considered the practicability of producing alcohol synthetically, by first extracting ethylene from coal and coke-oven gas, and converting this into ethyl alcohol. This is regarded as an important potential source of power-alcohol available in this country, though it is pointed out that further investigations are necessary before definite figures as to quantities and price can be given. Vegetable sources of alcohol naturally have received very close attention, and molasses, mahua flowers, maize and other cereals, and peat are favourably regarded as affording ample scope for further utilisation. On account of their comparatively poor yields of alcohol, the commercial use of potatoes, sugar-beet, and mangold crops is not considered practicable except under a system of State subvention. The Committee are of opinion, however, that so far as vegetable sources of raw material for the manufacture of power alcohol are concerned reliance must be placed mainly, if not entirely, on increased production in tropical and sub-tropical countries. Commenting upon the effect of denaturing alcohol on the price of the product, the Committee state that since the denaturing process now in use admittedly increases the cost, sometimes by as much as sixpence per gallon, the increase should be restricted as much as possible by reducing the proportion of the principal denaturant, wood-naphtha. In all cases of approved use for power or traction purposes, where the user gives bond, the proportion of wood-naphtha in the power alcohol might be substantially diminished, the difference being made up, wholly or partially, by petrol, benzole, or other nauseous substance, supplemented by a small quantity of methyl violet as colouring, but in their opinion a further deterrent can be provided by the imposition of much heavier penalties than those now sanctioned by law for evasion of the spirits duty in any case of illicit purification of power alcohol to render it potable. They further recommend that every effort should be made to provide a denaturant or alternative denaturants—*e.g.*, formaldehyde, pyridine, and tobacco oil,—the employment of which would be effective in the smallest possible quantities and at the lowest possible cost per gallon of power alcohol. Other recommendations of an essentially practical nature relate to the provision of adequate storage facilities at the ports of arrival for power alcohol shipped from abroad; the employment of tank-wagons for inland transportation; and the exemption from excise and import duties respectively of home-produced and imported power alcohol. Finally, the Committee recommend that an organisation should be established by the Government to initiate and supervise experimental and practical development work, at home and overseas, on the production and utilisation of power alcohol, and to report from time to time for public information on all scientific, technical, and economic problems connected therewith. This organisation should be permanent, have at its disposal the funds necessary for its investigations, be in close relation with the various Governments of the Empire, and be so constituted as to be able to deal with alcohol in conjunction with other fuels which are or may become available as a source of power.

CHEMICAL ENGINEERS AND GAS PRODUCTION.

THE works of the Birmingham Gas Department were visited on Friday of last week by the members of the Society of Chemical Industry (Birmingham and Midland section). Dr. Morrell (chairman), with a large and representative attendance of chemists and chemical engineers, attended.

The magnitude of the operations and the introduction of end producers on ranges of seven-ton retorts at the Windsor Street Gas Works greatly interested the visitors. Interest centred too on a 20-ton per day dehydrating plant, on which prepared tar is made for the Birmingham roads; a cyanide plant (Williams' process) capable of dealing with 10 million c.f. of gas per day, containing $3\frac{1}{2}$ lb. of ammonium and sulphur cyanide, and having an efficiency of 90%; and the continuous working Woodall-Duckham's vertical retort. The last of the horizontal retorts are being dismantled. In 1912 the department installed two ranges of 5-ton retorts, and these proved eminently successful. During the war a further range of 5-ton retorts were installed, as well as a range of 7-ton retorts with end producers, and two further ranges of 5-ton retorts are in course of construction. The waste gases from each of the new ranges are passed through waste heat boilers of the Babcock-Wilcox multitubular type. There appears to be no difficulty in evaporating 7,000 lbs. per hour per boiler through each range of retorts. Steaming on the retorts is in full operation and it is found that under normal conditions the make of gas per ton of coal may be increased to about 17,000 c.f. The yield of ammonia and tar is also increased. Seven-ton retorts are not novel to Birmingham, though only one other works possess them. These large retorts (7 tons of coal through each per day) are working with great smoothness, and, but for the war, the extensions would have all been seven ton retorts. With the new use of end producers the gas is distributed to each of the beds of retorts, thus effecting great administrative economies.

Dr. Morrell (Wolverhampton), the chairman of the Birmingham section, warmly thanked Dr. A. W. Smith, the chief chemist at the gas works, and Mr. J. Foster and Mr. G. C. Pearson, engineer and works engineer respectively, for the arrangements for the visit.

On Thursday the Saltley Gas Works of the Birmingham Corporation were visited by the members of the Chemical Society of the University of Birmingham. The main point of interest was a new test installation of vertical retorts which are nearing completion, and built for the chief chemist with a view of improving on existing systems from the point of view of steaming and "put through." In the scientific gas world these features are of more than ordinary interest, and are the result largely of scientific co-ordination on the part of chemists and engineers.

IMPORTATION OF CHEMICALS.

A PROCLAMATION, dated June 25, has been issued under Section 43 of the Customs Consolidation Act, 1876, of which the following is the operative part:—"As from and after the date hereof, subject as hereinafter provided, the importation into the United Kingdom of the following articles is hereby prohibited, viz.:—Chemicals of all descriptions; scientific, mathematical, and optical instruments; tungsten powder and ferro-tungsten. Provided always, and it is hereby declared, that this prohibition shall not apply to any such goods which are imported under licence given by or on behalf of the Board of Trade, and subject to the provisions and conditions of such licence.

"This Proclamation may be cited as the Prohibition of Import (No. 32) Proclamation, 1919."

The Board of Trade give notice that whereas the above proclamation prohibits, *inter alia*, the importation of all chemicals, the terms of the prohibition have been thus widely drawn solely for convenience of administration, and that it is not the intention at present to do more than to control the entry into the United Kingdom of certain classes of chemicals of a high degree of purity. The Department of Import Restrictions will therefore almost immediately issue general licences for a large number of chemicals which are not of this description, and they will also issue licences in suitable cases and for limited quantities of the chemicals which are retained under control. For this purpose the Department will be assisted by a committee which is now in process of formation, and which will contain representatives of official, scientific, and trade bodies connected with the chemical industry.

CHEMICAL PLANT CONTROL.

THE DRAIN TEST.

(FROM A CORRESPONDENT.)

"I often say that if you can measure that of which you speak, and can express it by a number, you know something of your subject; but if you cannot measure it, your knowledge is meagre and unsatisfactory."—Lord Kelvin.

I SINCERELY hope that Dr. J. W. Mellor, of "refractory" fame, will forgive me. The other day I was perusing his admirable volume, "Modern Inorganic Chemistry," when the above quotation fixed my attention. Only the same morning an important leakage of acid, previously unnoticed, had been located through following up the chain of circumstantial evidence afforded by a highly acid drain test, and the question came to my mind, "How many acid plant managers know, even approximately, the amount of their product that is weekly, even daily, passing to the drains through leaks, minor accidents, careless cleaning down, or other causes?"

And it is not to acid plant managers alone that the plant effluent is important. On every large-scale chemical plant there is usually the possibility of hidden leaks or careless manipulation of materials, and even of "camouflaged" accidents, causing quite a serious loss of material which will ultimately affect the yield of the process. In many cases a mere glance at a sample of the drainage from the plant would tell its own story, while systematic samples, taken by day and by night, would often tell their story of the things that happen while some men are asleep. In other cases, a simple chemical test might disclose in the drainage an abnormal amount of some material used or produced in the process, which, by careful tracing to its source, might result in considerable saving.

My own experience of acid manufacture, on a large oleum plant, has impressed me with the high potential loss of acid represented by a comparatively low acidity of the drain effluent running to waste, hour after hour, every day. For instance, over a period of six weeks the average amount of real H_2SO_4 passing from this plant by the drain was 6.82 tons per week. Think of it! On a make of 340 tons per week, 2 per cent. went down the drain, while in one of the six weeks 13.2 tons, equal almost to 4 per cent. of the make, were lost in this way.

When a systematic drain test was first introduced on the plant, it was found that tests occasionally showed a strength of 2 to 3 per cent. acid in the drain effluent flowing from the plant at about 200 gallons per minute, while a daily average test of about 1,000 parts H_2SO_4 per 100,000—i.e., 1 per cent. acid—was a frequent occurrence.

The approximate estimation of the total acid loss on this plant is greatly assisted by the fact that the whole drainage of the plant area leaves by a main drain in which the effluent passes over a weir bridged by a graduated V-notch, so that the depth of flow being known, the volume of the effluent can be calculated. Actually, the volume of effluent in gallons per minute is worked out for each quarter-inch depth of flow, and when sampling the effluent the flow is simultaneously measured.

In the early days of the test, samples were taken hourly by day and bi-hourly at night; but when a considerable improvement occurred the samples were taken every two hours, by day and by night. All these, of course, were "snap" samples.

Later a Pohl lift was applied to the constant delivery of a sample of the effluent into a large bottle during each two hours, and the average depth of flow at the beginning and end of the two hours was taken as the average flow for that sample. An obvious improvement would be the installation of a continuous flow recorder, but this was rejected as a too expensive item.

The actual test is carried out by a trustworthy boy of fourteen, who takes his own samples in the day-time, and tests the evening and night samples taken by the plant foreman the first thing in the morning. For this purpose a dozen 6oz. stoppered bottles, each painted with the hours for sampling, are supplied, each bottle in a special compartment of a box with a convenient handle for carrying. The following approximate method of estimation is used:—

50cc. of the sample are placed in a clean, conical flask of 150-200cc. capacity, and about 50cc. of distilled water are added. The mixture is titrated with N/10 Na_2CO_3 solution using methyl orange as indicator. The number of cc. of

standard solution used, multiplied by ten, gives roughly the parts of H_2SO_4 per 100,000 present in the sample. It is convenient to return the value in this form, and as the test is mainly a comparative one this practical method of calculation is sufficient. For instance, where 50cc. of the drain sample are neutralised by 49.2cc. of N/10 Na_2CO_3 solution, the value is entered as 492 parts H_2SO_4 per 100,000.

A daily record is kept on the plan shown in the following diagram, which illustrates the value of the test in the detection of leaks and waste.

D. y. Date.	Time of Sampling.	Drain Test in Parts H_2SO_4 /100,000.				Action Taken or Cause of Leakage.
		Main Drain.	Dip.	Frying Tower Drain.	Absorber House Drain.	
	9-0 a.m.	101	9½"	18	0	Reported to No. 1 Foreman.
	10-0 a.m.	113	9"	21	0	Reported to No. 1 Foreman.
	11-0 a.m.	110	9½"	124	95	Spill in Absorber House.
The day.	12-0 midday	90	8½"	152	3	No. 11 Drying Tower Leak.
6th May.	2-0 p.m.	70	7½"	112	7	No. 11 Drying Tower Leak.
1919.	3-0 p.m.	210	6"	306	5	No. 9 Drying Tower Leak.
	4-0 p.m.	116	6½"	250	9	No. 2 Drying Tower Leak.
	5-0 p.m.	73	7"	12	10	Normal after-effect.

The above is a typical record of a bad day for leakages. It should be explained that the main drain is the direct drain of the Glover and wash towers, and at 9-0 and 10-0 a.m. on the above date the absorber house and drying tower drains being good, the Glover and wash tower drainage was open to suspicion.

Every twenty-four hours the titration values and depths of flow are averaged, and the result calculated to tons of 100 per cent. H_2SO_4 per day by the following formula, in which the specific gravity of the effluent is taken as that of water for ease in calculation:—

$$\left. \begin{array}{l} \text{Average daily drain} \\ \text{test in tons of 100} \end{array} \right\} = \frac{x}{1,000} \times \frac{y \times 10 \times 60 \times 24}{2.240 \times 100}$$

per cent. H_2SO_4

where x = average test on flow in parts H_2SO_4 /100,000;
where y = volume of flow, in gallons per minute, corresponding to the daily average dip.

This drain test figure is entered and filed along with other results, on the summary of daily tests record.

But on the plant the matter does not end there. In the first place, a minimum drain test figure is fixed, actually 60 parts H_2SO_4 per 100,000, and whenever, by day, the drain test exceeds this figure, the tester has to report the fact to the plant foreman, who must either state the cause or discover it.

If the drain test is very high and no leakage can be found, spot tests are done on subsidiary drains, feeding the main drain until the guilty section of the plant is located, when a thorough search usually exposes the cause. As regards the evening and night tests, the shift foremen are asked to account to the best of their ability for high drain tests at definite times on their shifts, and in necessary cases are censured if carelessness has been shown.

The general result of the institution of these tests has been an increased keenness on everybody's part to cut down waste, quickly stop and repair leakages, and keep a more vigilant eye for the unexpected than was previously the custom. And the controllers of the plant have the satisfaction of knowing that the gap between the theoretical and practical efficiencies of the plant has been reduced, perhaps not by a large amount, but certainly by a significant one.

It would be impossible here even to indicate the method by which this test could profitably be employed on all varieties of large-scale chemical plant, but if the consideration of this subject causes just a little more interest to be shown in drain effluents it will be a sign of progress. Frequently no chemical test may be required, and simple observation of the

appearance and odour of the sample may be sufficient to show the absence or presence of valuable products.

Only the other week it was stated at the Thames Police Court that from the bond and storage warehouses of the Port of London alone, thousands of gallons of wine, etc., ran to waste yearly through leakages and spills. And this is no doubt true, to a certain extent, of all liquid storage areas, of whatever magnitude, from the stack of acid carboys in the yard of the small works to the bond warehouses of the largest port.

Now there is no doubt that much of this leakage could be stopped by prompt repairs or replacements, or by special draining arrangements in the case of valuable liquids, and it is on these lines that progress is desirable.

Years ago Great Britain annually ran to waste by-products of enormous value. To-day we watch our by-products (or should do) with the eye of an eagle. To-morrow let us watch our drain effluents that even the fragments may be recovered and nothing lost.

ESTIMATION OF ZINC AS SULPHIDE.

THE precipitation of zinc from solutions of formic acid by means of hydrogen sulphide has been studied by H. A. Fales and G. M. Ware (*J. Amer. Chem. Soc.*) with special reference to the conditions affecting the accuracy of the estimation. It is shown that the range of hydrogen ion concentration of between 10^{-2} and 10^{-3} is the most favourable for quantitative precipitation of zinc sulphide in a form suitable for rapid filtration and washing. The concentration of hydrogen ions may be kept within this range by the use of ammonium citrate solution and a mixture of ammonium sulphate, ammonium formate, and formic acid. A high concentration of an ammonium salt of a strong acid also favours the formation of a granular precipitate, as does a volume of at least 100c.c. for every 0.1grm. zinc present and a temperature of 95° to 100° C. The passing of hydrogen sulphide under pressure is desirable for rapid saturation and for avoidance of loss of formic acid by evaporation.

The zinc solution, freed from interfering elements, such as copper and cadmium, is evaporated to about 125c.c., and ammonia added until a slight permanent precipitate results. Twenty-five c.c. of citric acid solution (200grms. per litre) are next added, and the mixture made neutral to methyl orange by addition of moderately strong (15 molar) ammonia. Twenty-five c.c. of a mixture, containing 30c.c. ammonia (15 molar), 200c.c. formic acid (23.6 molar), and 250grms. ammonium sulphate per litre, are next added, and the volume is made up to 200c.c. or more if more than 0.2grm. zinc is present. The solution is heated to 60° C., and the flask connected with a hydrogen sulphide generator, so that the air is slowly displaced by hydrogen sulphide as the heating continues. At 90° to 100° C., when steam issues from the flask, the exit is closed, and the solution, as it cools, is saturated with hydrogen sulphide under increasing pressure. A Kipp generator provided with a pressure bulb is used for the supply of hydrogen sulphide. The generator is connected in series with a wash bottle which contains a manometer bulb, with a stem of such length that when the liquid level reaches the bottom of this bulb the pressure in the precipitation flask is approximately a third of an atmosphere. The flask is shaken frequently to ensure saturation, which is usually complete, when the precipitate settles rapidly, in about thirty minutes. The precipitate is filtered and washed with a cold, aqueous solution about 0.1 molar with formic acid (4cc. of 23.6 molar formic acid per litre) saturated with hydrogen sulphide. The precipitate is transferred to a porcelain crucible and the paper charred, preferably by standing the crucible on a quartz plate heated strongly by a Meker burner. The ignition of the filter-paper is very slowly and carefully completed in an oxidising atmosphere over a Bunsen burner. The reaction should proceed only to the formation of sulphate, not of oxide. After cooling, the precipitate is carefully moistened with concentrated sulphuric acid, and the crucible heated in an air-bath until the excess of acid is driven off. If zinc sulphide adheres firmly to the flask, as often happens, it must be dissolved in hot dilute sulphuric acid, the solution neutralised with ammonia, then made faintly acid with formic acid, saturated with hydrogen sulphide under pressure, heated to boiling to coagulate the precipitate, and filtered through the filter containing the already washed zinc sulphide. Further washing is unnecessary.

The method as described serves for the precipitation of zinc where only small amounts of the usual interfering metals are

present. Not more than 0.2mgrm. of manganese is carried down even when manganese is present in amount equal to that of zinc. Iron and nickel, however, require more acid to hold them up, if present in concentrations equal to one-tenth that of the zinc; in such cases 20c.c. excess formic acid (23.6 molar) must be present to secure a clean separation. Cobalt cannot be separated from zinc by one precipitation.—*The Analyst.*

CONJOINT BOARD OF SCIENTIFIC SOCIETIES.

THE second annual report of the Conjoint Board of Scientific Societies for the year 1918 has now been issued. The total number of constituent societies is now 54, and includes the following: The Royal Society, the Royal Society of Arts, the Institute of Chemistry, the Society of Chemical Industry, the British Association, the Chemical Society, the Institution of Petroleum Technologists, the Faraday Society, the Institution of Mining and Metallurgy, the Royal Microscopical Society, the Institute of Metals, the Biochemical Society, the Society of Public Analysts, and the Institute of Brewing.

Scientific Literature.

The enlarged committee mentioned in the first annual report was requested by the Conjoint Board to consider the question of the inclusion of applied science in any catalogue of scientific literature which might be recommended. Certain of the technical societies were requested to nominate members, and eventually the committee was constituted as follows: Mr. E. B. Knobel (convener), Dr. F. A. Bather, Professor W. M. Bayliss, Professor F. J. Cheshire, Professor A. Fowler, Mr. E. Heron-Allen, Dr. A. Holt, Dr. B. Daydon Jackson, Professor C. H. Lees, Professor A. E. H. Lowe, Lieut.-Colonel H. G. Lyons, Dr. P. Chalmers Mitchell, Dr. Norman Moore, Mr. W. M. Mordey, Professor J. C. Philip, Mr. F. Hamlyn Price, Professor A. Schuster, Professor C. G. Seligman (resigned July, 1918), Dr. L. J. Spencer, Dr. C. T. Hagberg Wright, Professor W. W. Watts (secretary).

Since the issue of the last report five meetings have been held. The constituent societies were circularised on certain points, and an interim report was drawn up for submission to the Executive Committee at its June meeting, with the request that the resolutions might be conveyed to the Royal Society, which, it was understood, was considering the subject in relation to the Inter-Allied Conference on Scientific Organisations about to be held in Paris. The Executive Committee acted accordingly without expressing an opinion on the report, which, for the present, they regard as final.

Glue and Other Adhesives.

At the instance of Colonel O'Gorman, the question of the supply of glue and other adhesives for aircraft manufacture was brought before the Executive Committee, and a committee was established to deal with the matter. Certain names were subsequently added, and the committee is constituted as follows: Lieut.-Colonel M. O'Gorman (convener), Professor W. W. Watts (secretary), Sir Dugald Clerk, Professor W. E. Dalby, Professor J. B. Farmer, Professor P. Groom, Mr. J. S. Highfield, Sir Herbert Jackson, Captain G. W. C. Kaye, Dr. J. C. Kernot, Professor W. H. Lang, Major A. Robertson, Mr. C. J. Wilson, Captain G. J. Woods. A deputation from the committee waited on Sir William Weir of the Air Ministry, and made a statement to the effect that the supply of raw materials was likely to be precarious, and that scientific research into adhesives would result in improving the product and standardising the methods of testing and manufacture. The Air Group of the Ministry of Munitions made a grant of £1,000. for the work, and empowered the committee to undertake this research on behalf of the Government. The work was placed in the hands of Professor S. B. Schryver at the Biochemical Laboratory of the Imperial College of Science and Technology. A staff was got together, and work began in August, 1918. Several important results have already been obtained, including improved methods of preparing casein adhesive; new glues either of remarkable properties, or made from materials of which there was no shortage, have been made, and the properties of adhesives are being standardised, so that waste of raw material and uncertainty in product will probably be minimised. The committee has completed its first report, which is being communicated to the Air Group, Ministry of Munitions.

SPONTANEOUS COMBUSTION OF CHEMICAL PRODUCTS.*

By Watson Smith, F.C.S., F.I.C.

SO-CALLED "spontaneous combustion" arises by reason of such chemical and physical changes in bodies mostly consisting of or containing carbon (carbonaceous substances), and under the influence of atmospheric oxygen, that sufficient heat is generated to give rise ultimately to combustion.

In order that the heat developed shall accumulate, and not be carried off by the surrounding air or other media, the matter inclined to "spontaneous combustion" must, as a rule, be a bad conductor of heat. Molecular changes by disturbance of the equilibrium of the smallest integral particles, mechanically fine subdivision of particles, moisture, and external heat, play the most prominent part, in the case of easily oxidisable substances, in the generation of this so-called "spontaneous combustion." With rising temperature, naturally, increased oxidation rises *pari passu*, and increases until the combustion point is reached.

Charcoal.

Aubert found that finely-ground charcoal placed in a barrel attained a temperature of 75° C. after fifteen hours; after twenty hours, ignition took place. The charcoal was found to have absorbed oxygen and a certain quantity of water. Having once had the management of a wood-distillery, I can testify to the need of great precautions to avoid the danger of outbreaks of fire in the charcoal sheds. Water is always used to quench the hot charcoal after raking it out from the ovens and shovelling it into the underground vaults, just before letting down the lids upon these vaults; and I can easily conceive that the addition of a certain excess of water might cause eventually a tendency to rise of temperature in the charcoal, albeit perfectly cold when raised from the vaults and wheeled to the sheds where it is stocked. In the two or three years I had charge here, there were two outbreaks of fire, promptly quenched, the stocks not being large in each shed. From all I could gather, it appeared almost like caprice that the charcoal in most cases kept cold, and yet on the single occasions referred to would heat up even to redness. Doubtless a slight counterbalance of moisture was the apparently capricious cause.

Aniline Dyestuffs, Lakes, etc.

In 1888, Hirsch observed that when the acid for nitration of benzene was passed through the S-tube, through which by mistake toluene had been allowed to run, the acid instantly became hot, and white vapours arose. A workman in this case tore out the tube, and as soon as he had thrown it away combustion broke out. Similar combustion may also arise if the agitator does not work when the acid for nitration runs into the apparatus. This unagitated acid falls to the bottom of the vessel, and when later on the agitator begins to work again, the violent chemical action ensuing raises sufficient heat possibly to lead to combustion, and if several vessels are connected together the effect may become one of explosion (*Journ. Soc. Chem. Ind.* 1888, 563).

Arlsberg, of New York, relates cases with the beautiful lakes of lead and eosine (tetrabromofluoresceine). These lakes have been very extensively used, and especially the mixtures with red lead (Pb_3O_4). Owing to their comparatively low price, they had supplanted in 1895 the mercuric sulphide and vermilion, and hence are known as "vermilion substitutes." On three different occasions, Arlsberg says, such mixtures of red lead and eosine took fire during transference from one cask to another. In vain did he seek for an explanation, although once he suspected a burning cigar or match to have caused the fire, but he could prove nothing, all the less as it was impossible to save any of the contents of either barrel owing to the extreme rapidity of the combustion.

When the second case of combustion occurred, Arlsberg failed to trace the cause to the use of either cigars or gas-pipe (used for stirring), but discovered that a burning gas-jet about five feet away from the barrel was guilty. The lake in question is very liable to raise a dust, whenever exposed to a very slight draught, which dust readily fired at the gas-jet. The Pb_3O_4 acted as a carrier of oxygen, and the combustion, once started at the gas-jet, set the whole case on fire with lightning rapidity. Since illumination by electric light had been established no further trouble arose.

The rapidity of combustion with such lakes (in the above case 95 per cent. of Pb_3O_4 with 5 per cent. of lake) is equalled,

* *Journal of the Royal Society of Arts.*

if not surpassed, says Arlsberg, by that of the ferro-ferricyanides which frequently take fire when being powdered. In such cases a spark, generally produced by a bit of iron (a nail), is the cause of ignition, the atmosphere furnishing the oxygen.

Endemann and Stebbins reported cases of combustion of copper and iron-lakes of logwood, for which they could not account (*Journ. Soc. Chem. Ind.* 1895, 947).

Zinc Dust.

L. Häpke records a serious case of zinc-dust firing, fully reported in the *Pharm. Centralhalle* of May 24, 1877, which occurred at Liverpool. In outline it was as follows:—

On December 11, 1876, twenty casks of so-called "zinc-dust" were shipped on board the *Lord Clyde* steamer. They were declared to contain "Dyestuff," and bore a ticket marked "To be kept dry, as, if damp, liable to get hot." Nothing was stated as a warning against liability to outbreak of fire or incandescence, etc. The casks were taken on board and lay there all night. Next morning a "smell of fire" was noticed, showing that something was burning on the ship. When the fire was extinguished, it was proved that it had arisen in the immediate vicinity of each cask of zinc-dust, and had injured or destroyed various goods stowed away upon or near these casks.

Later on it was discovered that most of the casks, before shipment, had lain upon the quay, and one of them was decidedly damaged. A portion of the contents had fallen out, and had got damped by rain. In this case the damaged cask had been filled up, the cask repaired, and then shipped with the rest.

Subsequently, the source of the fire was closely examined, and it was discovered, through the evidence, that the contents of this one cask were red-hot. The Court decided, after full inquiry, to confiscate the cargo and subject the would-be exporters to summary punishment. Ordinary commercial zinc-dust is a grey and very fine powder, consisting of 40 per cent. Zn, 2½ per cent. Pb, 4 per cent. Cd, 50 per cent. ZnO, and 3½ per cent. $ZnCO_3$. Because of its very fine state of subdivision, the metallic portion becomes oxidised very rapidly in presence of moisture, robbing the latter of its oxygen and liberating considerable quantities of hydrogen. Such zinc-dust is in great request in dyestuff works.

Chemicals.

Amongst the acids the most dangerous are sulphuric acid and nitric acid. As ships' freights, the carboys in hampers and straw should be stored with great care, and enclosed either under deck or on deck with sand, so that, anyhow, when the safety of the ship demands it, they can be readily pitched overboard. The schooner *Thetis* of Barth, was laden in Hamburg with sulphuric acid, and, along with various solid goods, also a quantity of nitre! The acid proved to consist of a dangerous mixture of 75 per cent. of sulphuric with 25 per cent. of nitric acid. With this pernicious cargo the captain put to sea on December 1, 1888, at Cuxhaven. When, on December 13, smoke was observed in the ship's hold, the captain pulled up near Plymouth where the fire was got under by steam-jets. Shortly after, the crew abandoned the vessel, and then four or five violent explosions occurred, which reduced the burning schooner to matchwood. Similarly the steamer *Oscar*, bound from Hamburg to Spain, had on board some carboys of vitriol, one of which leaked. A fire arose, and nothing would extinguish it but the wholesale inrush of sea-water, which means the ship had to be sunk!

E. Allairs (*Comptes rend.* 1919, clxviii. 729) has studied the conditions under which the air and ether vapour mixtures may ignite, and he used a special apparatus by which the proportions of the two gases could be varied as desired, and properly measured. The gaseous mixture was led into a U-tube, one limb of which was furnished with points like a Vigreux tube, and having an opening through which a thermometer could be introduced into the bend. The whole tube was then immersed in an oil-bath. Various catalysts, such as oxides of iron, copper, nickel, etc., were tried, but they were apparently ineffective, though the mixture of itself ignited "spontaneously" at about 190° C., when the amount of ether present was about 1 grm. per litre. The flame was pale blue, and visible only in the dark, and the products obtained were ethyl and methyl aldehydes and carbonic and acetic acids. No reaction took place before the ignition. This phenomenon explains the occurrence of accidents in factories and workshops in which ether vapour may diffuse accidentally. The author suggests the possibility, by modifying the conditions of the experiment and the use of tubes of greater diameter, of causing ignition at lower temperatures than the above.

NATIONAL UNION OF SCIENTIFIC WORKERS.

FORMATION OF BIRMINGHAM BRANCH.

ON Monday evening a meeting was held at the Chamber of Commerce, Birmingham, to consider the question of establishing a local branch of the National Union of Scientific Workers. There was a representative attendance of industrial chemists, chemical engineers, and members of laboratory staffs at the University of Birmingham and other educational institutions.

The chair was taken by Sir William Ashlev, vice-principal of the University of Birmingham, and Dean of the Faculty of Commerce. He pointed out that under modern conditions we were continually seeing the emergence of new classes and professions. This phase had been particularly marked in comparatively recent years. When one spoke of scientific workers, one thought, without strictly defining that body, of laboratory workers—people who engaged in scientific work in laboratories. Twenty years ago this was a small class in England even if one included all the staffs of the Universities and other scientific departments. There were then few men employed as industrial chemists in the laboratories established by business firms. But in recent decades the number had largely increased, and it appeared to him quite clear that the number would grow rapidly in the near future. Our Universities were going to have, one hoped, very much larger scientific staffs; and chemical laboratories created in great and small businesses were going rapidly to multiply. But besides those two directions we had seen in recent years the appearance of a new class—laboratories established by public authorities in connection with industrial research, and those created by the Government, such as the National Physical Laboratory, and the Laboratory connected with the work of the National Health Commission. It was apparent that the Government and municipalities would create more of such institutions. Therefore he foresaw a development of this new category of scientific workers; and if one took a broad view one saw a strong tendency towards association and combination. Hitherto we had been accustomed to associate combination chiefly with the manual workers, but of course, some of the oldest professions had long had their organisations which served substantially the same purpose. It seemed most natural that this new body of scientific workers should form its own association. The body of scientific workers could never be a closed body in the sense that some of the industrial unions were because of the varied work that a scientific man or woman might do, but it seemed clear that an increasingly large proportion would continue for the whole of their career in one class of work. In these circumstances it was desirable that there should be an organisation, part of the objects of which should be to safeguard, reasonably, economic interests. They wanted, moreover, to strengthen and maintain professional standards, and to acquire experience and knowledge which should be at the disposal of entrants into the profession.

Mr. O. L. Brady, D.Sc. F.I.C. (President of the National Union of Scientific Workers), said the reason the union was formed was in order that science should occupy its proper place in our national life. The war had brought out the great neglect of science in pre-war days, and many war troubles, brought about by the lack of scientific preparation, might have been avoided. The only hope of maintaining our industrial and trading position among the nations of the world was by the intense application of scientific principles to industry. Those who had any experience of the attitude of the manufacturer to science realised that a great deal had to be done. Hostility was still shown by some manufacturers towards scientific people in general. As a matter of fact the general public did not know what the scientific worker was, and still looked upon him as some extraordinary individual who liked to play with test tubes and bits of wire in the laboratory; they did not realise the part the industrial chemist played in industry. It was therefore felt desirable to educate the public on the aims of the scientific worker and to get for science a position in the country which was comparable with its importance. The supreme aim of the union would be to advance the interests of science, pure and applied, as an essential element in the national life, by the promotion of scientific research, and to secure the public endowment of such. They felt further that scientific and technical departments in the public service and all posts involving scientific knowledge should be under the direct control of persons having adequate scientific attainments.

A resolution was approved on the motion of Mr. Garner deciding to establish a Birmingham branch of the union, and a provisional committee was appointed to organise the branch.

SOUTH AFRICAN SOAP INDUSTRY.

THE development of the South African soap industry is reflected in the returns of the recent industrial census when taken in conjunction with the imports and exports for the last few years. Of a total consumption of approximately 26,000 short tons per annum no less than 24,750 tons were produced in the Union during the year 1916-17, representing a value of about £860,000. Unfortunately the information contained in the census forms with regard to production is not sufficiently detailed to admit of tabulation under the sub-heads laundry and household soaps, soft soap, toilet soap, extracts, and powders; but, judging from the fact that there has been a steady and substantial decrease in the imports of common and household soaps (1,500 tons in 1916, as against 3,300 tons in 1913), there is every prospect of the demand being entirely met by the South African product before long. The imports of both toilet soaps and powders rose steadily until 1916, but the drop in imports in 1917 seems to indicate that the local products are establishing themselves. There are 11 factories in the Union.

Except for salt and whale oil, the South African soap industry is almost entirely dependent on imported raw materials. In consequence of the advance in prices and of transport difficulties due to the war, the industry has been severely handicapped, but these difficulties have focussed attention on the possibility of profitably producing locally at least some of the raw materials. The imports of tallow into the Union for the years 1915 and 1916 amounted to over 4,000 tons; according to reliable estimates, not more than a third of that quantity is produced locally; only a small proportion of this is available for the soap industry.

Salt is very cheap, and the price of coal is such as to make it possible to produce electric power at a comparatively low figure. These are two essential items in the electrolytic manufacture of caustic soda, and, as far as can be judged from available data, the commercial production of caustic soda is possible, particularly if, as is probably in the future, there is a greatly increased demand for conversion into sodium cyanide and sodium arsenite. Carbonate of soda, as soda-ash, is imported to the extent of approximately 2,000 tons a year. The soda pan at Zoutpan, in the Transvaal, produces about 5,000 tons annually, partly as crude carbonate averaging 65 to 75 per cent. and partly as refined crystals. So far as can be ascertained, no appreciable quantities of carbonate have hitherto been drawn from this source for the local manufacture of soap.

The principal by-product of the soap industry is glycerine, of which approximately 850 tons (80 per cent. crude), are annually produced in the Union. The whole production of crude glycerine is, by arrangement with the Union Government, sold to the Cape Explosives Works, Ltd., which have the only refining establishment in the Union. The glycerine is sold at a fixed rate on the basis of 80 per cent. glycerol, with certain stipulations with regard to the percentage of ash.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

(SPECIALLY CONTRIBUTED.)

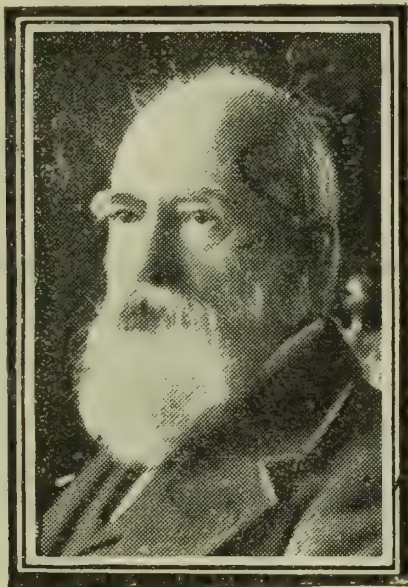
There seemed a reasonable chance a few days ago that it would be found practicable, so to increase hematite pig-iron production on the north-east coast as to compel a bigger output at the west Cumberland by-product coke ovens, but at the last moment the hope has failed to materialise. It is true that two additional blast furnaces have been relighted by the United Steel Company at the Solway Works at Maryport, but one of these is on special iron, of which the harder coke from the east coast is needed, and in any event the same company have damped down a furnace on spiegel and blown out another on ferro-manganese at Oldside, near Workington. Though the hunger for hematite iron is still unappeased, it continues to be impossible, on account of shortage of ore, to put more furnaces into operation, and it looks as if some months may elapse before the 380 by-product coke ovens in the district require to be as busily engaged as they were three months ago. The make of by-products is now of course considerably reduced, and some portion of the plant of the chemical works here is idle. And only benzole, for which there is a steady demand from Ireland; sulphate of ammonia, which is being taken by home users, and pitch, a fair tonnage of which is going to Spain, are readily disposed of.

OBITUARY.

Sir John Brunner.

We deeply regret to record the death of Sir John Tomlinson Brunner, Bart., which took place at his residence at Chertsey, Surrey, on Tuesday morning last, at the age of 77 years. By his death the British heavy chemical industry has lost one of its most successful pioneers, one who, by his indomitable courage and resourcefulness, was largely instrumental in placing the manufacture of heavy chemicals in this country on the solid foundation which during the last few decades has enabled it to be the predominant factor in the markets of the world. The history of the great firm of Brunner, Mond and Co., which Sir John, in partnership with the late Dr. Ludwig Mond, established nearly fifty years ago, is largely the history of the British chemical industry.

Born in Liverpool in 1842, the son of the Rev. John Brunner, who had left Zurich and settled in that city, where he established a private school, Sir John was educated entirely under the supervision of his father. At the age of fifteen he commenced his business career, entering the office of a firm of Liverpool merchants. There he remained for a few years,



Lafayette.

acquiring during that period the rudiments of a commercial training which, combined with the knowledge of chemical manufacture which he afterwards gained, in later years was to stand him in good stead. His next step brought him into close contact with the heavy chemical industry. He entered the service of Messrs. John Hutchinson and Co., alkali manufacturers, Widnes, with whom he stayed for eleven years. Then came the opportunity of his life, and he seized it. Ten years before, shortly after he had gone to Widnes, young Brunner made the acquaintance of the late Dr. Ludwig Mond, an acquaintance which quickly ripened into a close friendship. Dr. Mond had only just come to England to take up a post at the same works, where he worked out the practical application of a process he had devised for the recovery of sulphur from the black ash waste of the Leblanc soda process. The two young men, both in their early twenties, had agreed that if the opportunity arose they would enter into partnership as chemical manufacturers. In 1864 Dr. Mond returned to the Continent and embarked on the manufacture of alkali at Utrecht. Three years later he came back to England. A year or two afterwards considerable interest was aroused in the chemical world by the news that Ernest Solvay had succeeded in inventing a pro-

cess for the manufacture of ammonia-soda, the process being in operation on a commercial scale at Couillet, Belgium. Dr. Mond, in 1872, was enabled to inspect the original Solvay plant, and so impressed was he with the possibilities of the process that he returned to England determined to introduce it here. Very little time elapsed before the partnership which Sir John Brunner and Dr. Mond had so often discussed became an accomplished fact. That the venture turned out to be an eminently successful one is conclusively proved by the present position of the world-famous firm. With so ideal a combination of scientific knowledge and commercial ability, it would perhaps have been more surprising if the enterprise had met with anything but success.

In 1893 the partners were able to raise sufficient capital to purchase the Winnington Hall estate, near Northwich, situated on the Cheshire saltfield. Licences to manufacture by the process were granted by the inventor, and before the end of the year production of ammonia-soda had commenced. By the time the undertaking had been going for not much more than twelve months, the initial difficulties had been overcome, and, dating from the beginning of 1895, development was rapid, and went on unchecked. Improvements in the process were gradually introduced, and in 1896 Dr. Mond was able to claim that he had attained his object of rendering the ammonia-soda process an effective competitor with the Leblanc process in the production of bleaching powder. The steady development of the business of the firm, with a present nominal capital of fifteen millions, and ranking among the largest employers of labour in the country, has been due very largely indeed to the remarkable courage and skill of Sir John Brunner in commercial and financial affairs.

In his treatment of his workmen, Sir John showed a degree of consideration which was commensurate with his ability as an industrialist, and he devoted much attention not only to the improvement of their working conditions, but also to securing a betterment of their social conditions generally. In 1907 he inaugurated a profit-sharing scheme, by which the workmen were paid a bonus on their yearly earnings, varying in amount according to length of service. Sick benefit and other schemes to ameliorate the lot of the employees and their families were also inaugurated. Besides numerous philanthropic gifts to various towns and villages in Cheshire, Sir John endowed a Chair of Political Economy in University College, Liverpool, as a memorial to his father; and when the college became a university he made a contribution to its resources of £10,000.

In the world of politics he was, of course, a very prominent figure. As a Liberal member, he represented Northwich in the House of Commons continuously from 1885, with a break of a year, till January, 1910, when he resigned, being succeeded as Parliamentary representative by his eldest son, Mr. J. F. L. Brunner. He was made a baronet in 1895, and became a Privy Councillor in 1906.

Lord Rayleigh.

We regret to announce the death of Lord Rayleigh, the eminent physicist, in his seventy-seventh year. After receiving a private education, Lord Rayleigh entered Trinity College, Cambridge, taking his degree in the Mathematical Tripos with first place when only twenty years of age. In 1873 he was elected a Fellow of the Royal Society, and from 1879 to 1884 he was professor of experimental physics at Cambridge, in succession to Clerk Maxwell. In 1887 he succeeded Tyndall as professor of natural philosophy at the Royal Institution, resigning in 1905. He was secretary to the Royal Society from 1887 to 1896, and was elected president in 1908. He was awarded the Nobel Prize for Physics in 1904, and in the following year the Albert Medal of the Royal Society of Arts. In 1888, in the course of an investigation into the physical properties of gases, including their specific gravities, he found when dealing with nitrogen different results according to whether he procured it by removing all other known constituents from the air, or by the decomposition of nitrogen compounds, ammonia, for example, in the latter case the nitrogen being lighter. As a result of collaborating with the late Sir William Ramsay the discovery of argon was announced at the meeting in 1894 of the British Association at Oxford, further details being given in a paper read before the Royal Society in 1895. Other work of Lord Rayleigh included research in the fundamental electrical units, Boyle's law of low pressures, and optics and capillarity.

AMERICAN NOTES.

[FROM OUR OWN CORRESPONDENT.]

NEW YORK, June 16, 1919.

Protecting the Dye Industry.—The fight for the enactment by Congress of an import licence law to safeguard the dyestuffs and chemical industries of the United States against possible German invasion began to-day in Washington. The leading men of the industry are to testify before a Committee of the House of Representatives as to the need of putting into effect a law as speedily as possible that will insure the successful development of the American industry. Opinion is virtually unanimous among dye manufacturers that the licence system will solve the problem that now confronts the industry in respect to the possibility of German-made dyes being "dumped" into the American market. It is understood that one of the principal arguments that will be made before the Committee is that Germany has large stocks of dyes and chemicals which she is prepared to send to this country at the most opportune moment. This was pointed out a few days ago by Henry Wigglesworth, trade commissioner for the Department of Commerce, who went abroad to study the chemical and dye situation. At the annual meeting of the Manufacturing Chemists' Association in New York, Mr. Wigglesworth said: "Germany is still the dominating factor in the chemical industry to-day. During the war she had done her best to eliminate France and Belgium permanently from this business, and she has succeeded in setting them back to such an extent that it will take them years to recover, if ever they can. We cannot do better here than to adopt the method already working in England, which has been brought about by the foresight of the British Board of Trade—namely, that of the establishing of a Dyes Committee, which would be composed of representatives of the producer and the consumer, with a Government official at the head. The duties of this Commission would be to licence and admit to the country only such dyes as are not manufactured in this country. If we do not adopt some licensing system the wonderful progress that has been made in America during the war will be destroyed, and the accomplishments which we have achieved will be threatened. We must realise that \$25,000,000. worth of dyes must be used for every two and a half billion dollars worth of textiles, and so important an industry must not be destroyed."

Potash.—The potash interests of the United States are also demanding protection from German aggression. The Ways and Means Committee of the House of Representatives has already begun hearings to determine what should be done to protect the American potash industry. Testimony by representatives of the industry displayed the fact that they are indifferent as to whether this protection be given by an import duty or by some method of licensing imports, but the opinion frequently expressed is that unless some protective steps are taken this industry, fostered by the Government during the war, will be wiped out of existence. It was stated by one witness that \$50,000,000. has been invested in the American potash industry. American plants have assembled about 60,000 tons of potash, and plants here have been forced to shut down in a number of cases. It was declared that there is absolutely no demand in the United States at the present time sufficient to take the domestic output, let alone any imported potash. At one of the hearings American potash producers were accused by Representative Rainey, of Illinois, of unlawful combination in violation of the anti-trust laws. Mr. Rainey stated that the potash producers are practically a unit in asking \$250. a ton for their product. "You do not come here with clean hands," said Representative Rainey to one manufacturer. "You have a combination, and are violating the anti-trust laws." Other members of the committee took exception to that statement, and said there was no basis for it.

SOCIETY OF GLASS TECHNOLOGY.

THE last meeting of the Society of Glass Technology was held at the University, Sheffield, the president, Mr. S. N. Jenkinson, in the chair.

Mr. Jenkinson read a paper on "Impressions of a Recent Tour of the German Glass Factories." During his tour in Germany the author visited Silesia, Saxony, Saxe-Weimar, and other districts, and investigated conditions in several works, particularly glass factories. The size of the glass industry in Germany in pre-war days can be judged from the fact that in 1913 they exported glass to the value of 123,000,000 marks, and pottery to the value of 94,000,000

marks. This amount means that 75 per cent. of their output was exported. It can be realised, therefore, that the outbreak of war caused the shutting down of many German glass factories during 1914-15. The policy during 1915-16 in Germany was to reopen several of the factories, and allow one furnace in each works to be kept going, and a scheme was inaugurated whereby finance in the industry was pooled. At the present time very little production of glassware is taking place, due largely to the lack of coal and the state of transport. Their stocks are very low. Throughout the visit he was very much impressed by the fact that all the plant in the works was kept in the highest pitch of efficiency, so that immediately opportunity came a high rate of production would follow. This fact will have to be taken into account by British manufacturers. Out of some 132 furnaces which he made inquiries about, only eight were working.

Dr. Turner read a paper on "The Properties of British Fireclays Suitable for Glass Works Use. Part I. The Variation of Shrinkage, Density, and Porosity with Temperature," by Edith M. Firth, B.Sc., F. W. Holden, B.Sc., and W. E. S. Turner, D.Sc. This paper was well illustrated by assemblies of fireclay blocks showing the behaviour of various fireclays under the tests outlined by the authors. The paper is the first communication of a research carried out under the auspices of the Refractories Research Committee of the Society.

NEWS FROM THE ANTIPODES.

[FROM OUR OWN CORRESPONDENT.]

SYDNEY, May 15.

Future of Phosphate Island.—According to a passenger on the steamer *Pukaki*, which has arrived in Sydney from Ocean Island and Nauru, the inhabitants of Nauru, the ex-German phosphate island, regard as wild and impossible the recent report that Australia and New Zealand are to be given the joint management of the island. It was pointed out that there are at present three different administrations in the island. Civil control is exercised in Fiji; an Australian military force is acting as garrison, and the Navy Department has control of the wireless station, which has been in daily use during the past three years. Many inquiries are being made regarding land titles, but no definite information is available, as everything depends upon the final decision of the Peace Conference regarding the future of the island and its rich phosphate deposits. A few months ago the natives in Nauru held a meeting, and carried a resolution expressing their desire to remain under British rule. The *Pukaki* brought 1,500 tons of phosphates.

The N.S.W. Tin Industry.—The value of tin ore produced from the tin fields of New South Wales to the end of 1918 is £11,511,880. The value of the output for the year 1918 was £548,876., as compared with £373,696. in the preceding year, thus showing an increase of £175,180. The chief contributing factors to this very satisfactory result was the high price ruling during the year and the output furnished by the dredges.

Increase in Silver-Lead Production.—An increase in quantities and value of the production of silver-lead and zinc was noted in New South Wales during 1918. The output of the silver-lead mines during 1918 was valued at £5,712,138., which was an increase of £602,042. on that for the year 1917.

Chemical Market.—A more optimistic tone is making itself felt in the market for commercial chemicals. Cheaper parcels seem to be disappearing. Many have been worked off the market, while in other instances holders have taken more heart, and are steadily refusing to make sacrifices. Spot prices are once again tending towards overseas equivalents, although many lines yet remain below current c.i.f.e. values. The position for citric acid has been strengthened by the action of some local firms in making re-exports to London. The c.i.f.e. price of citric acid in London has been in the vicinity of 4s. 7d. per lb. for some time. Parcel lots here have been offered at down to 3s., thus giving a very fair margin for shipment back to England. It is said that when merchants came actually to look round for "cheap" citric acid, the quantity available was surprisingly limited. The latest spot quotation was about 3s. 6d. for parcels, with distributing lots at up to 4s. 3d. In cream of tartar there was likewise a better feeling. American and Italian were worth 2s. 3d. net, and French 2s. 6d. net, the distributing rates ranging up to 3s. The last overseas quotation for French cream of tartar was 2s. 8d. c.i.f.e.—equivalent to about 3s. landed. Tartaric acid was worth 3s. 6d. to 4s. on spot, the c.i.f.e. price standing at 3s. 7d.

LEGAL INTELLIGENCE.

Prussiate of Soda Contract: Question of the Prohibition of Export.

A claim for damages for alleged breach of a contract for the sale of yellow prussiate of soda, came before Mr. Justice Bailhache in the Commercial Court of the King's Bench Division on Friday (June 27). The plaintiffs were Messrs. A. Klipstein and Company, of New York, and the action was brought against The Manchester Oxide Company Ltd., of Canal Street, Miles Platting, Manchester.

Plaintiffs' case was that by a contract dated July 10, 1914, the defendants contracted to sell and deliver to them 600 tons of yellow prussiate of soda at 23d. per lb. Delivery was to be in equal monthly quantities over 1915 and in casks free, f.o.b. Liverpool. By Clause 1. of the conditions of sale, it was provided that "deliveries may be suspended pending any contingencies over which the vendor has no control (such as strike, lock-out, fire, accidents, war or the like), causing a short supply of fuel or raw material, or otherwise preventing the manufacture of the article." By Clause 2 it was provided that any deliveries so suspended might be claimed by the buyer at the same rate of delivery, commencing after the period assigned to his contract if such claim were made within a month after such suspension. The plaintiffs, as the defendants well knew, required the goods for the purpose of resale. Defendants it was alleged had not delivered the 600 tons of yellow prussiate of soda, and the plaintiffs claimed damages.

The defence was that an order issued in February, 1915, prohibited the export of yellow prussiate of soda other than to British possessions.

Mr. Compston, K.C., opened the case for the plaintiffs, and said it was admitted that not one ounce of this prussiate of soda was delivered by the defendants.

Evidence was given by Mr. Klipstein, junr., son of the chairman of the plaintiff company, who said they had customers in Canada to whom they could dispose of the goods.

In cross-examination by Mr. Leslie Scott, K.C., witness said he had not got with him the list of their customers in Canada and he could not give the list from memory.

Mr. Leslie Scott said the case for the defendants was that as regards all shipments due under the contract from and including the month of February the defendants were prevented from export by the prohibition.

Mr. Robert Henry Clayton, a director of the defendant company, said there was no consumption of prussiate of soda in Canada.

Asked why the defendants did not perform the contract, witness replied, "Because of the prohibition."

Mr. Compston: There was no prohibition to Canada?

Witness: We did not think Canada came within our contract.

Mr. Percy Ashley, assistant secretary at the Board of Trade, gave evidence that in January, 1915, their attention was called to the manufacture of cyanide and its relation to the gold supply of the British Empire, and after consultation with technical advisers concerned with the chemical industry, they came to the conclusion that there was a *prima facie* case for an order in regard to the restriction of the exportation of prussiate of soda.

Mr. William Neill, of Glasgow, said he was the managing director of the Cassel Cyanide Company, Ltd., of Glasgow, who were the largest manufacturers of cyanide of sodium in the world. The Cassel Company's cyanide was produced by a synthetic process, and not through prussiate of soda. During the early part of the war they were consulted by the Government on various matters connected with cyanide. Cyanide was mainly used for the recovery of gold and silver from ores. Prior to the outbreak of war, the South African firms were drawing about 60 per cent. of their cyanide requirements from Germany. The order prohibiting the export of prussiate of soda other than to British possessions was necessary and could not, in his opinion have been relaxed, right up to the armistice. There was no consumption of prussiate of soda in Canada.

Mr. Kenneth Chance, managing director of the British Cyanides Company, Ltd., also gave evidence on behalf of the defendants.

On Monday, when the hearing of the case was resumed, counsel addressed his Lordship, and Mr. Compston, K.C., for the plaintiffs, said the actual proclamation was issued on March 2, so there was no prohibition until that day.

His Lordship pointed out that in February orders had been given to the Customs in anticipation of the proclamation.

Mr. Compston said there would have been no illegality in shipping the prussiate of soda to Canada. His clients were

entitled to have it shipped to Canada, and they called for it to be shipped there.

His Lordship said he was satisfied there was no substantial consumption of prussiate of soda in Canada.

Mr. Compston admitted the Canadian demand was not the same as the American demand, but said he had evidence of 20 tons being taken to Canada in two months, and that was 120 tons in a year. The plaintiffs had customers in Canada. Defendants must make out that by performing the contract they would be committing an illegality, and he submitted they did not do it.

Mr. Leslie Scott, K.C., on behalf of the defendants, replied to the point in reference to Canada that the plaintiffs did not really want the prussiate of soda in Canada, and never gave the defendants any intimation, pursuant to the terms of the contract, upon which they, as sellers, were called to act.

His Lordship, in giving judgment, went fully into the facts of the case and said it seemed to him he must act upon the proclamation of the Board of Trade, which prevented all exports of prussiate of soda from this country to America after about the middle of February. From February onwards there was a complete defence afforded by the proclamation of the Board of Trade so far as the United States was concerned. He was satisfied from the evidence given to him that there was in fact no consumption in Canada of prussiate of soda,—that was to say, none worth mentioning, and he had come to the conclusion, upon the whole of the correspondence, that the request to ship to Montreal was not a business request which it was intended that the defendants should act upon. Upon the whole of the circumstances, the defence succeeded, except as to failure to ship the January quantity. As to that there must be damages.

Judgment was then given for the plaintiffs for £1,750.

German Patents for Dope and Varnish.

In the Patents Court on Thursday (June 26), Messrs. Nicholson's (Newcastle-on-Tyne), Ltd., of Heaton Junction, Newcastle, applied for licence to manufacture varnish, etc., under half a dozen of the German Baekeland patents.

Mr. Potts, for the patent agents, Messrs. W. P. Thompson, and Co., Liverpool, explained that the applicants had been making the standard dope for aeroplanes during the war, and had installed a big plant which was well adapted for manufacture with underground reservoirs to contain the inflammable liquid, mixing tanks and complete arrangements for delivering the varnish. It was now proposed to develop the varnish industry. The patents, in the main, related to products obtained by mixing phenols and formaldehyde, which could be used for almost any purpose for which varnish or waterproof materials were used.

Sir George Croydon Marks, for the patentees, suggested that there was no evidence that the applicants were familiar with the processes covered by the patent, and recommended that the licences be not granted at the present stage. There was not sufficient evidence that the applicants would carry on a business for which these patents were essential.

Mr. Potts replied that the applicants had a large plant which they must use or else sacrifice the money expended. They had devoted several months to experimenting.

Sir George: British Dyes, Ltd., are concerned with working these patents and they are a very large concern.

Mr. Potts: There is scope for others in this big industry.

Sir Cornelius Dalton, who presided, said he thought more evidence should be produced. It was premature to grant a licence now, and he would grant an adjournment for more detailed particulars to be put in.

Yate Chemical Works, Ltd.

In the Chancery Division on June 27, Mr. Justice Astbury appointed a receiver and manager of the Yate Chemical Works, Ltd., on a motion in the action of Lord Leconfield and the company.

Counsel said that the plaintiff was the sole debenture holder to the extent of £27,000 and had taken action as the company had ceased or threatened to cease to carry on business.

RADIO-ACTIVE SUBSTANCES IN ITALY.—The Italian Minister of Agriculture has just appointed a commission which will conduct an exhaustive investigation with a view to determining whether or not radio-active substances exist in Italy in sufficient quantities to be of practical use. Important studies in this connection have already been made by Professor Millosevich and by Professor Rasini, of the University of Pisa, the results of which have given rise to hopes that success may be attained.

FRENCH CHEMICAL TARIFF.

IN accordance with a French Presidential Decree of June 14, in addition to the import duties leviable under the law of January 11, 1892, and subsequent laws, goods of foreign origin imported into France or Algeria are subject to *ad valorem* surtaxes. Goods which are proved to have been shipped to France prior to the date of publication of the Decree (June 18), will be admitted under the former tariff conditions. The chemical schedule is as follows:

No. in Customs Tariff.	Articles.	Rates of Duty under the Minimum Tariff.		No. in Customs Tariff.	Articles.	Rates of Duty under the Minimum Tariff.	
		Tariff Duty.	Surtax established by the present Decree.			Tariff Duty.	Surtax established by the present Decree.
		Francs. cts.	per cent. ad. val.			Francs. cts.	per cent. ad. val.
CHEMICAL PRODUCTS.							
234 bis ex 234 ter	Bromides 100 kil. net	50 00	5	ex 277	Sulphides:		
ex 235	Fluorides (excepting fluoride of sodium) 100 kil. gross	10 00	5		Of arsenic 100 kil. gross	3 00	
ex 238	Iodine, refined 100 kil. net	400 00	5		Of mercury:		
	Acids:				Artificial:		
	Acetic:				In lumps 100 kil. net	31 00	5
	Containing less than 40 per cent. of crystallizable acid				Pulverized (vermillion) do.	62 00	
	100 kil. gross	5 00		279	Of zinc 100 kil. gross	2 50	
	Containing from 40 to 80 per cent. of crystallizable acid				Prussiate of potash:		
	100 kil. gross	10 00	10		Yellow 100 kil. net	20 00	20
	Containing more than 80 per cent. of crystallizable acid				Red do.	30 00	
	100 kil. net	15 00		281 ter	Celluloid, crude, in lumps, plates or sheets 100 kil. net	75 00	
	Hydrofluoric 100 kil. gross	6 00	5	281 quat.	Celluloid and other similar plastic materials not specifically mentioned, including artificial ivory and tortoise shell:		
	Hydrofluosilicic .. do.	4 00	5		In canes, tubes, batons		
	Lactic (3):				100 kil. net	75 00	15
	Containing in weight 60 per cent. or less of free acid				In sheets, polished, coloured, or worked in any manner		
	100 kil. net	15 00	15		100 kil. net	150 00	
	Containing in weight over 60 per cent. of free acid			295	COLOURS.		
	100 kil. net	18 00			Ultramarine:		
240	Tartaric do.	12 00	5		Natural 100 kil. net	25 00	10
ex 250	Ammonia (volatile alkali) 100 kil. gross	2 00	5		Artificial do.	25 00	
	Salts of soda not mentioned in the Tariff (except phosphate of soda) 100 kil. gross	4 35	20	296	Prussian blue do.	25 00	10
253	Salts of cobalt 100 kil. net	350 00	5	297	Carmines:		
254	Salts of silver 100 kil. net	930 00	15		Common do.	25 00	5
ex 256	Acetate:				Fine do.	200 00	
	Of copper:			298	Varnishes:		
	Crude 100 kil. gross	10 00			Spirit varnish do.	30 00	12
	Refined:				Turpentine varnish do.	30 00	
	In powder 100 kil. net	14 50			Oil varnish, or mixed turpentine and oil varnish 100 kil. net	45 00	
	Crystallised .. do.	21 00		299	Inks, writing, drawing or printing do.	20 00	5
	Of lead 100 kil. gross	7 60		305	Green of Schweinfurth, and Vienna green, blue and green cinders 100 kil. gross	5 00	5
	Of potash 100 kil. net	22 00	5	306	Mountain and Brunswick greens 100 kil. gross	5 00	10
	Of soda:				Greens resulting from a mixture of chromate of lead and Prussian blue 100 kil. gross	7 00	
	Anhydrous 100 kil. gross	5 00		306 bis	Zinc yellow or chromate of zinc 100 kil. net	18 50	10
	Crystallised or hydrated do.	4 75			Colours:		
257	Alcohol amylic .. do.	6 25	5	308	Ground in oil 100 kil. gross	6 00	
257 bis	Methylic alcohol or wood spirit 100 kil. net	11 50	10	308 bis	Carbonate of lead prepared like colours ground in oil		
257 ter	Formic aldehyde:				100 kil. gross	9 00	5
	In solution called formol of not more than 40 degrees of formic aldehyde 100 kil. gross	9 50		319	In paste, prepared with water, for wall paper 100 kil. gross	1 50	
	As trioxymethylene or other polymers more concentrated than formol 100 kil. net	24 00	10	309 bis	Lithopone do.	2 50	
258	Alumina anhydrous do.	20 00	15	311	VARIOUS COMPOUNDS.		
259 ter	Hydrate of alumina do.	10 50	15		Perfumery:		
ex 262	Carbonate:				Soaps other than transparent		
262 bis	Of lead (ceruse) 100 kil. gross	7 00	5		100 kil. gross	8 00	10
264	Chlorate:				Transparent soaps:		
	Of potash 100 kil. net	32 00	20		Manufactured with alcohol or sugar 100 kil. net	40 00	10
	Of soda, of baryta and other				Other 100 kil. gross	8 00	10
	100 kil. net	32 00			Other:		
ex 265	Chloride:				Alcoholic hect. of pure alcohol	80 00	10
	Of aluminium .. do.	20 00	5		Non-alcoholic 100 kil. net	12 00	10
ex 266	Chromate:				Soaps, other than perfumed		
	Of lead do.	18 50	10		100 kil. gross	6 00	5
269	Lactate of iron .. do.	43 00	15	312	Sealing wax 100 kil. net	30 00	5
269 bis	Other lactates do.	15 00		320	Candles:		
269 ter	Formates do.	15 00	5	321	Of paraffine or mixed with paraffin		
270 bis	Nitrates of thorium, cerium, and other rare earth salts				Other 100 kil. net	16 00	5
	100 kil. net	800 00	20	322	Wax and stearic acid, manufactured otherwise than in candles		
ex 271 bis	Pyrolignite:				100 kil. net	16 00	5
	Of lime 100 kil. gross	3 00	10	ex 323	Tallow candles:		
271 ter	Acetone 100 kil. net	15 00	10		With woven, twisted or plaited wicks which have been chemically treated 100 kil. net	12 00	5
ex 273	Sulphate of zinc 100 kil. gross	1 60	10	326 bis	Gelatine:		
					In leaves or in plates:		
					Metallised, irised, watered ("moirée"), glazed or varnished 100 kil. net	30 00	5
					Other 100 kil. gross	10 00	
					Certain articles of gelatine are subject to the same surtaxes as the articles to which they are assimilated for the application of specific duties.		

BRITISH ASSOCIATION OF CHEMISTS.

Hon. Registrar: Dr. FRANCIS W. KAY,
Chemical Department, The University,
Liverpool.

NOTICES.

NOTICES and reports from secretaries of local Sections and articles and correspondence for these pages should be sent to the hon. editor, Dr. E. H. Rodd, 7, Mauldeth Road West, Withington, Manchester, and not to the *Chemical Trade Journal and Chemical Engineer*.

The hon. editor will be glad to receive short articles on the views of members with respect to the B.A.C., its aims and aspirations, for publication in these pages. Such articles should be accompanied by the name and address of the writer, not necessarily for publication.

Reprints of the proceedings of the British Association of Chemists as published in the *Chemical Trade Journal and Chemical Engineer* can be obtained from the hon. editor on payment of an annual subscription of 4s.

THE PROCEEDINGS OF THE ASSOCIATION.

Liverpool Section.

Hon. Local Secretary: Dr. Francis W. Kay, Chemical Department, The University, Liverpool.

The local hon. secretary regrets that, owing to a printer's error, Mr. J. M. Taylor's name was omitted from the list of committee men published in the June 14 issue of the *Journal*.

A fully attended committee meeting was held on Thursday, June 19, when the following resolution was tabled, and it is suggested that it merits more than local consideration on account of its fundamental importance to any prospective members:—

"That there is urgent need for democratic reform in university and technical education; and that in view of the revised regulations of the Institute of Chemistry, by which a degree with first or second-class honours in chemistry will be accepted after training in day or evening classes as a qualification for admission to the associateship without examination, it is desirable that the B.A.C. take steps to ensure (a) that all universities and technical institutions be open in the evenings for the purpose of training students for the full degrees in all the faculties and for post-graduate research; (b) that the N.U.S.W., the N.A.I.C., the Society of Chemical Industry, and other scientific bodies, be asked to co-operate, and thus lend their support to a reform which would do much to relieve the educational loss consequent upon five years of war conditions; and (c) that failing the opening of the universities in the evenings, as many technical institutions as possible should be raised to university rank—on the lines of the Michigan College of Technology,—with power to confer degrees in technology after approved courses of study in day or evening classes."

Council Meeting.

The next meeting of the Council, at Derby, is to be held on Saturday, July 12, instead of June 28, as previously announced.

WHITLEY COUNCILS COMMITTEE.

In pursuance of the arrangement made at the recent conference of scientific and technical organisations, a meeting of the representatives of the chemical organisations present at that conference was held at the Midland Hotel, Manchester, on Saturday, June 21, to discuss practical steps of federation for the purposes of the Whitley scheme. The proceedings were private, but substantial progress was made, and a further meeting will be held on July 19.

INTERVIEW WITH A LABOUR REPRESENTATIVE.

The registrar, Dr. Kay, has had an interview with Mr. Thomas Williamson, who represents on the National Industrial Council for the Chemical Trade, the National Amalgamated Union of Labour, the Federation of Chemical Workers, and the Federation of General Workers. The following account of this interview throws some interesting light on the attitude of the worker towards the technical man, and is of importance in view of the efforts which are now being made by the B.A.C. to secure the representation of the chemist on Whitley Councils:—

(1) Chemists and the National Council.

Mr. Williamson stated in the course of the interview that the question of including chemists' representatives on the Council had been considered during the preliminary meetings which preceded the establishment of the National Council, but not to the advantage of the chemist. The chemist was also at a serious disadvantage in not having the backing of an organised association or an official representative. It was thus an easy matter to dispose of any claim he had to a seat on the Council.

(2) Chemists and Labour Generally.

The attitude of the labourer to the chemist was briefly touched upon, Mr. Williamson stating, in reply, that most of the men about a chemical works seldom came into contact with the chemist, and consequently could not have any but hostile feelings towards him, especially as the latter was inclined to stand aloof. The union official, on the other hand, fully realised the special position filled by the chemist in the works, and would be prepared to support him in any dispute. On the matter of wages, too, the union official appreciated the chemist's claim to something entirely different from the earnings of the ordinary skilled workman.

Commenting on the characteristic individuality of the chemist—the natural result of having to work alone more often than not,—Mr. Williamson explained it was largely on that account that we should find it difficult to make rapid progress. The very fact that most workmen worked together in gangs or squads developed the habit of acting together in their disputes with employers; this habit was really at the root of trade unionism. Environment had therefore an important bearing on the growth of the trade union spirit, and the chemist, having no environment except that of his test-tubes and books, lacked one of the driving powers of concerted action such as that of trade unionism.

(3) Future Possibilities for Chemists.

The allocation of seats on the National Council being entirely on the basis of the numerical strength of the unions engaged—i.e., the number of the various types of trade union workmen employed,—the chemist, owing to his numerical inferiority, stood no chance whatever of getting a seat for himself. The case mentioned by Mr. Todd, where a numerically inferior craft union was given totally disproportionate representation owing to the impossibility of its members gaining a livelihood elsewhere, was cited in favour of giving special consideration to the claims of the chemist, but Mr. Williamson was very emphatic in his reply that the strong unions would strenuously oppose any other kind of representation. To take an obvious case, the cotton operatives in a weaving-shed would object to the stokers carrying the same weight on the Council as themselves. It was brought sharply to notice that the labourers in a chemical works considered themselves just as indispensable as the chemist.

(4) Immediate Steps.

As an absolutely necessary preliminary, Mr. Williamson strongly advised incorporation as a trade union. The employed side of the Council would then be bound to take up the case of the chemist as soon as formal demands had been lodged in the proper quarters. He seemed decidedly confident that the employers would have to agree to whatever recommendation came from the trade unions. In order to find a place for chemists, the Council would have to be augmented equally on both sides. At present the Council was fully occupied with the settlement of economic problems, and would be for some time to come. Mr. Williamson scarcely held out any hope of the early consideration of the scientific and administrative functions being undertaken by the Council, as at present all their time was occupied in adjusting the various differences as between one group and another, and between the various districts. Finally, in reply to a query regarding the necessity or otherwise of affiliating with other trade unions, and introducing strike clauses, and of making provision against victimisation, Mr. Williamson stated that that would have to be considered by the trade unions on the employed panel, and declined to give any indication of what might transpire; he had nothing at all to guide him in this matter. He was strongly opposed to the B.A.C. approaching the Council until we were registered—e.g., it would weaken our case to go to the Council with the statement that incorporation as a trade union was pending, as the unions might possibly smell a rat, and anticipate a change of tactics once we got on the Council; apparently there is still a fair amount of mutual mistrust between the unions and professional men, into which latter category they

apparently place the chemist on account of his schooling and political inclinations.

A SWEATED INDUSTRY.

The following has been received from a correspondent:—

Among the advertisements appearing in a recent number of *Nature*, the two following are well worth comparison. The College of Medicine of the University of Durham wishes to secure the services of a *qualified medical man* (the italics are mine) to act as an assistant in the department of bacteriology; salary, £500. per annum. At the same time the University of Edinburgh advertises for demonstrators in chemistry at an initial salary of £200., rising to £250. per annum. As far as my experience goes, a person is not usually appointed to a university teaching post in chemistry unless he is an honours graduate with at least two years' research experience—that is, six years' study at least; whereas a medical qualification can be obtained in five years. I was also under the impression that a demonstrator is a step above an assistant. Why, then, is the assistant offered £500. and the demonstrator only £200.? Let us refer to the advertisements again, and see if there is not some practical reason for it. Oh, yes! The assistant must be a *qualified medical man*.

No institution dare offer a qualified medical man less than £500. a year, simply because the medical men stand together in a strong body, and would turn down, and rightly so, a smaller offer. It is quite time a stop was put to the common practice of offering these miserable salaries to scientific men—salaries equivalent to about £80. before the war, and scarcely affording the means of subsistence even to a single man of the most simple tastes. The universities are among the worst offenders. They may plead poverty, but they pay adequate salaries to those who can enforce them. Cheap education at the expense of the teachers means bad education. It is urgently necessary that steps be taken to put teaching staffs on a better footing.

The remedy lies in the hands of the chemists themselves. Less than two years ago the B.A.C. was launched with the avowed object of improving the status of the chemist, and, after being battered by tempest and rain, is now entrenched on solid ground behind a rampart of six to ten hundred diards, six hundred of whom are determined to win or die. What are you doing, Mr. Non-member, sitting on the fence? Waiting to see what others are going to do first? We can hold our ground with our present numbers, but we cannot advance without reinforcements. Come inside, and do your bit towards putting your house in order.

CORRESPONDENCE.

The Organisation of Chemists.

Writing from Tudor Lodge, Boughton, Cheshire, Mr. J. Fortesquien, in the course of an interesting letter, urges the necessity of close co-operation between the many societies devoted to chemistry, of which he enumerates nine, with a view to the furtherance of the interests and the raising of the status of the chemist. He deplores the fact that chemists have hitherto displayed nothing like the same energy and organising ability as the manual workers in impressing upon the industry the vital importance of their profession. If they had done so, chemists would now be in receipt of remuneration more in proportion to that received by members of other professions demanding equal training. He questions, indeed, whether the man who is incapable of bettering his own conditions is capable of furthering the interests of his employer! Since so many chemists belong to more than one society, it is obvious that with a scheme of federation, two organisations could well be created, one devoted to the improvement of the material and professional interests of the chemist, the other to purely scientific objects; and this at less cost to a profession at present so poorly paid. Chemists should urge upon the secretaries and councils of the various scientific societies the necessity for a constructive policy of federation. As to the benefits to be derived from an organisation of adequate numbers and revenue devoted to their professional interests, the chemist is recommended to study the daily press.

[Mr. Fortesquien seems to be unaware that such a federation of societies as he suggests is already in being. "The Federal Council for Pure and Applied Chemistry" has for its primary object the promotion of closer co-operation between the societies representing the various branches of chemistry, and consists of representatives appointed by the following eleven societies: The Chemical Society, Society

of Chemical Industry, Association of British Chemical Manufacturers, Institute of Chemistry, Society of Public Analysts, Faraday Society, Biochemical Society, Iron and Steel Institute, Institute of Brewing, Society of Dyers and Colourists, and the Society of Glass Technology. None of these societies, of course, has power to carry out the objects for which the B.A.C. was formed.—Ed.]

PARLIAMENTARY NEWS.

Sulphuric Acid Consumption.

In the House of Commons on Tuesday, Sir R. Cooper asked the President of the Board of Trade the quantity of sulphuric acid that was consumed in the United Kingdom in 1913 and 1918, distinguishing between ordinary commercial acid and fuming acid?

Sir A. Geddes: In 1918 the quantity of sulphuric acid consumed in the United Kingdom was, according to information placed at my disposal by the Ministry of Munitions, about 1,290,000 tons (100 per cent. acid), including about 310,000 tons of fuming acid. The corresponding quantity for 1913, so far as can be estimated, was 1,000,000 tons, the fuming acid included being about 25,000 tons. In both cases the figures refer to acid freshly manufactured in the year.

Committee's Report on British Cellulose Company.

Mr. Raper asked the Prime Minister if he will state when the report of Lord Sumner's Committee regarding the British Cellulose and Chemical Manufacturing Company will be forthcoming?

Mr. Bonar Law: It is hoped that the report will be ready before the end of the month.

Levinstein, Ltd.

Sir Auckland Geddes, on Wednesday, in reply to Mr. Macquisten, said: The Port Eilsworth works of Meister, Lucius and Bruning were sold under the Trading with the Enemy Legislation to Levinstein, Ltd., a British controlled company, of which Lord Armaghdale is chairman and Dr. Herbert Levinstein, a British-born subject, is managing director. The purchase price was approximately £79,000. No secret processes for the manufacture of dyestuffs were discovered there. The details of an agreement made between Levinstein, Ltd., and the Du Pont Company are known to the Board of Trade, but I do not feel able to make them public without the consent of the parties concerned. I will say, however, that they do not warrant the interpretation put upon the agreement by my hon. friend. Dr. Levinstein is only one of the managing directors of British Dyestuffs Corporation, which is acquiring British Dyes, Ltd., and His Majesty's Government are not increasing their investment in that corporation. In view of the suggestions in the question, I should add that Dr. Levinstein and the company with which he has hitherto been specially associated have rendered very great services both to His Majesty's Government and to British dye-users during the war.

OUR BOOK SHELF.

THE CLAIMS OF LABOUR AND OF CAPITAL. By W. R. Cooper. London: Constable and Co.; 2s. 6d.

Contains much in the way of truth and suggestions which should be helpful in enabling a better understanding between Labour and Capital. Although very thorough in its way, it is hardly likely that every reader will accept it *in toto*; nevertheless, taken broadly, ground, which is or ought to be common, is laid bare. Having done this, the author endeavours in a liberal spirit to serve the interests of both parties.

T.N.T.: TRINITROTOLUENES AND MONO- AND DINITROTOLUENES. By G. Carlton Smith, B.S. London: Constable and Co.; 8s. 6d. net.

Although arriving here from U.S.A. rather late in the day as far as T.N.T. is concerned, this work contains much that is useful and interesting. Its leading sections are the Theory of Nitration—Manufacture—Purification—Inspection and Testing and Properties of the Trinitrotoluenes. Subsequent parts are the Properties of Mono- and Dinitrotoluenes—Accidents and Diseases.

ITEMS OF INTEREST.

NOBEL PRIZES HELD OVER.—The Swedish Court has agreed that the distribution of the Nobel prizes for 1919 for physics, chemistry, medicine, and literature, as well as the prizes for some subjects held over from 1918, shall be postponed till June 1, 1920.—*Reuter*.

BRUNNER, MOND AND CO., LTD.—Messrs. Brunner, Mond and Co., Ltd., authorise the contradiction of the rumour referred to in the financial notes of some of Monday's papers that they contemplate the purchase of Messrs. Van den Berghs, Ltd., margarine and soap manufacturers, etc.

ZINC AND ZINC DUST PRICES.—Australian high-grade zinc dust, 88-92 per cent. metallic zinc purity, is unchanged in price at £70. per ton, f.o.r. Australian electrolytic zinc, containing 99.95 per cent. metallic zinc, remains at £40. per ton, f.o.b., Australia, for direct shipment to New Zealand, India, South Africa, and the Far East.

SULPHATE OF AMMONIA.—In our issue of June 21 it was erroneously stated that 40,000 tons of sulphate of ammonia had been put at the disposal of farmers for June-September delivery at £17. per ton. The Sulphate of Ammonia Association informs us that the quantity to be sold at £17. per ton, as agreed with the Board of Agriculture, was 5,000 tons, and this has been disposed of. The price for July-September delivery is now £19. 10s. per ton.

ARTIST COLOUR MANUFACTURERS.—The following gentlemen have been unanimously re-elected in connection with the British Artist Colour Manufacturers' Association: President, Mr. W. E. Killik (Winsor and Newton); hon. treasurer, Mr. W. G. Rowney (Rowney and Co.); committee, Mr. C. J. Wild (Reeves and Sons), Mr. C. P. Park (C. Robertson and Co.), Mr. E. F. Chapman (James Newman), and Mr. Vincent Nello (Madderton and Co.); hon. secretary, Mr. G. R. Cheesman, 6, Holborn Viaduct.

BRITISH SUGAR BEET FACTORY.—With the assistance of M. Rene Bouchon, of the Sugar Makers' Association, France, a site has been chosen for a factory which the British Sugar Beet Growers' Society proposes to build on its estate at Kelham. M. Bouchon was much impressed with the suitability of the Kelham estate in soil, climate, and transport facilities for the inception of this enterprise. It is believed that the Kelham enterprise will form the nucleus of a very large new agricultural industry, finding employment for many thousands of people and helping greatly to restore the prosperity of our country districts.

GERMAN PLATINUM.—*Nieuwe Rotterdamsche Courant* states that shortly before the war it was discovered that there were great quantities of platinum in the districts of Olpe and Siegan, in Westphalia and in the Westerwald. At the outbreak of the war the capital necessary for exploitation had not been raised. Capitalists have now been found, however, who are prepared to finance the exploitation of platinum in the above-mentioned districts. Should the exploitation prove successful a new industry will be established which, it is said, will be a compensation for the loss of the potash mines in Alsace.

MEXICAN DEMAND FOR CHEMICALS AND TINPLATES.—The British Consul-General at Mexico City reports that there should be a very considerable demand for sodium and potassium cyanide in the Zacatecas district as soon as conditions permit the mining companies to restart their reduction plants. At the present time there are two mills in operation. Between them, their cyanide consumption will be, roughly, 18 tons per month. The district consumption might be calculated at 40 tons monthly. In view of the expected enlargement of the oil industry in Mexico, there should be a considerable increase in the demand for tinplates from South Wales, although they will meet with heavy competition from other countries.

GLASGOW FAIR.—With the approach of the date for the next British Industries Fair, to be held at Glasgow, it is interesting to report that the important section for industrial chemicals is now already well filled, and stall space has already been booked by such well-known firms as the Solway Dyes, Ltd., Messrs. Levinstein, Ltd., British Dyes, Ltd., Brotherton and Co., Ltd., and the Explosives Company, Ltd. It has also been decided to send an invitation to the British Chemical Manufacturers' Association requesting that the claims of the Fair should be brought to the notice of the members of that organisation, and it is hoped that as a result the importance of the chemical section will be further augmented.

A COLLOIDAL SILICATE.—In the course of the work of the Department of Scientific and Industrial Research, attention has been called to a certain colloidal silicate, apparently not hitherto in use, which may possibly prove to be of commercial value, especially in the textile industry. A limited number of small samples of this substance may be obtained on application to the Department of Scientific and Industrial Research, 15, Great George Street, Westminster, S.W. 1.

GASSING ACCIDENT AT CHEMICAL WORKS.—James Haynes, aged 44 years, was engaged in cleaning out one of the stills at the chemical works of Messrs. Hardman and Holden, Ltd., Miles Platting, Manchester, on Tuesday, when he was overcome by the fumes. A workman named Thomas Angell went to Haynes' assistance, but he, too, was soon overcome, and had to be removed in the ambulance to Ancoats Hospital. Several other workmen appeared on the scene, and eventually Haynes was got out. A doctor was summoned, but life was extinct.

INCREASE IN URALS PLATINUM OUTPUT.—*Reuter's Agency* learns that, according to a telegram from Omsk from the Minister of Commerce in Admiral Koltchak's Government, the improvement in platinum mining will result in a considerable increase in the output of this metal. It is pointed out that the platinum obtained in the Urals amounts to about 95 per cent. of the quantity obtained in the whole world. The Minister adds that the increase in the output of platinum will undoubtedly considerably raise the rate of exchange of the rouble.

HIGHER EDUCATION OF EX-SERVICE STUDENTS.—A circular has been issued by the Board of Education in regard to the higher education of ex-service students at institutions of lower than university standard. In accordance with the suggestions made, the Birmingham Education Committee are arranging to provide in the main departments of the Municipal Technical School full-time day courses in industrial chemistry for such students. The fee payable has been fixed at £20. per session, and in the case of approved ex-service students this will be payable by the Board of Education.

POPULAR CHEMICAL DICTIONARY.—We understand that Mr. C. T. Kingzett, F.I.C., the chairman of the Sanitas Company, Ltd., and one of the original founders of the Institute of Chemistry, is preparing for early publication by Messrs. Bailliere, Tindall, and Cox, London, an abridged "Popular Chemical Dictionary" in a single volume. Apart from the educative value of such a production, including its use in schools and public libraries, it should be of great service as a work of reference not only to practical chemists but also to brokers, dealers, and business men generally who are naturally interested in the thousand and one articles finding concise description in such a book.

FRENCH MARKET FOR SULPHUR AND SULPHATE OF COPPER.—Investigation into the Bordeaux market disclose that there is at present no market for sulphur products, and, in fact, the same condition appears to hold for all of France in any large commercial way. This is due to the fact that the French Government control the buying and distribution of these products. In regard to copper sulphate, the Government have purchased a large quantity at a high figure, nearly enough for next season's needs for all of France, and, it appears, will not let down the bars for importation until their contracted stock is disposed of. Sulphur is, and will continue to be until July 31, 1919, under Government control. The purchase and distribution is done by L'Office Central des Produits Chimiques Agricoles, 42bis Rue de Bourgogne, Paris (VIIe).—*U.S. Com. Rep.*

SUGAR REFINING IN THE UNITED KINGDOM.—Dealing with the output of sugar in this country, a report of the Select Committee on National Expenditure, just issued, states that the annual capacity of the eleven refineries in the United Kingdom is about 900,000 tons, approximately one-half of the former requirements of refined sugar. They have been under control during the war, and were able at one period to produce nearly the whole of the refined sugar consumed, which was approximately 1,100,000 tons. More recently the larger consumption of sugar has made necessary the purchase of large quantities of Cuban sugar, refined in the United States of America, at a cost of 5s. 4½d. per cwt. in excess of the cost of similar sugar produced from British refineries. On the other hand, when freights are available, the present cost in this country of Java sugar, refined in the East Indies, is somewhat less than the cost of Java sugar refined in the United Kingdom, though the latter is of better quality. No export of beet sugar from Central Europe can be expected for some time.

IMPORTS OF CHEMICALS AND ALLIED PRODUCTS.

(Concluded from page 552, Vol. 'LXIV.)

ARTICLES.	QUANTITIES.		VALUE.		ARTICLES.	QUANTITIES.		VALUE.	
	Month ended		Month ended			Month ended		Month ended	
	May 31st.	May 31st.	May 31st.	May 31st.		May 31st.	May 31st.	May 31st.	May 31st.
	1919.	1918.	1919.	1918.		1919.	1918.	1919.	1918.
OILS :			£	£				£	£
Fish : Train, Blubber, and Sperm tuns	5,032	4,399	326,437	259,822	Soap : Soft Soap cwts.	—	—	—	—
Coco-nut, Unrefined cwts.	47,681	89,934	142,236	320,006	Household & Laundry Soap, in bars or tablets..... cwts.	11,957	—	37,074	—
Olive, Unrefined tuns	5	—	643	—	Polish'g & Scour'g ..	—	—	—	—
Palm (not including Palm Kernel Oil), Unrefined. cwts.	94,205	54,086	247,128	125,126	Powder "	1,222	—	2,035	—
Total "	94,205	54,086	247,128	125,126	Toilet "	288	191	2,452	4,091
Petroleum :					Unenumerated .. "	980	—	1,468	—
Crude gals.	—	—	—	—	STARCH, DEXTRINE, AND FARINA OR POTATO FLOUR :				
Lamp Oils "	15,633,404	13,709,962	626,028	772,000	Rice Starch cwts.	1,600	130	4,800	580
Motor Spirit "	22,007,345	21,564,131	1,741,435	2,290,788	Other kinds Starch ..	165,709	16,254	237,865	36,642
Spirit, other than Motor Spirit .. "	—	—	—	—	Dextrine, and Farina or Potato Flour .. "	39,042	112,194	78,680	393,126
Lubricating Oils .. "	3,174,225	10,310,809	393,249	1,024,289	Total "	206,351	128,578	321,345	430,348
Gas Oil "	—	1,611,629	—	122,868	COPPER :				
Fuel Oil "	33,907,468	59,481,836	875,708	1,272,039	Regulus & Precipitate :				
Other Sorts "	—	—	—	—	From Portugal. tons	297	160	16,900	14,016
Total of Petroleum ..	74,722,442	106,678,367	3,636,420	5,481,984	Spain "	100	503	5,002	27,707
Seed Oil :					U.S.A. "	—	—	—	—
Castor Oil tons	—	368	—	31,185	Peru "	10	—	480	—
Cotton Seed Oil, Unrefined "	168	88	10,115	9,550	Chile "	11	88	600	4,150
Linseed Oil :					Cape of Good Hope "	—	—	—	—
Pure "	—	—	—	—	Oth'r C'tries .. "	166	407	7,813	33,240
Not Pure "	10	—	900	—	Total "	584	1,158	30,795	79,113
Rape Seed Oil .. "	580	—	53,893	—	COPPER ORE :				
Soya Bean Oil .. "	966	25	55,460	1,530	From Spain tons	—	—	—	—
Other Seed Oils .. "	55	35	4,383	2,849	Chile "	—	—	—	—
Turpentine cwts.	69,481	4,848	288,558	26,740	Cape of Good Hope "	—	—	—	—
SOAP STOCK "	58	—	57	—	Australia .. "	—	—	—	—
STEARINE :					Oth'r C'tries .. "	1,293	79	32,334	5,080
From Belgium .. "	—	—	—	—	Total "	1,293	79	32,334	5,080
Oth'r C'tries.. "	4,876	8,007	22,766	48,945	MANGANESE ORE tons	47,467	2,858	319,268	31,026
TALLOW (including Vegetable Tallow), Unrefined :					PYRITES of Iron and Copper	33,626	76,964	97,523	236,193
From China cwts.	16,202	1,018	60,815	3,556	SILVER OREval. £	—	—	74,106	36,856
U.S.A. "	12,515	116	43,574	464	TIN ORE :				
Uruguay .. "	2,054	—	7,171	—	From S. America tons	1,899	1,630	204,121	285,816
Argentina Republic .. "	18,291	—	64,720	—	Brit. S.A. .. "	—	—	—	—
Australia .. "	47,210	1,597	174,123	5,258	Oth'r C'tries .. "	590	960	70,856	194,009
New Zealand .. "	75,643	20	294,223	58	Total "	2,489	2,590	274,977	479,825
Other C'tries .. "	2,405	1,970	6,024	7,960	LEAD, PIG and SHEET :				
Total "	174,320	4,721	650,650	17,296	From Spain tons	—	115,356	—	3,083
GUM :					U.S.A. "	85,568	109,734	3,223	2,787
Arabic cwts.	27,068	37,790	90,643	156,872	Mexico .. "	12,093	—	495	—
Kauri "	6,486	—	23,304	—	Australia .. "	584,492	231,551	19,402	7,590
Lac-dye, Seedlac, Shellac, and Sticklac .. "	7,092	6,059	96,340	78,400	Oth'r C'tries .. "	148,396	6,468	4,720	201
ROSIN "	99,116	64,500	168,340	152,050	Total "	830,549	463,109	27,840	13,661
CEMENT for Building and Engineering purposes	950	—	2,000	—	QUICKSILVER lbs.	3,690	8,500	19,351	31,875
GLUE, SIZE, and GELATINE..... cwts.	3,998	6,723	29,700	49,162	TIN, in Blocks, Ingots, Bars, and Slabs :				
OIL-SEED CAKE, not sweetened :					From Straits Settlements tons	307,904	258,010	1,307	648
Cotton-seed Cake tons	6,209	8	102,459	150	Australia .. "	31,890	—	139	—
Linseed Cake .. "	3,889	—	74,063	—	Oth'r C'tries .. "	163,981	—	705	—
Unenumerated .. "	191	—	3,347	—	Total "	503,775	258,010	2,151	648
Total "	10,289	8	179,869	150	ZINC :				
PARAFFIN WAX . cwts.	58,655	69,016	149,577	176,735	Crude in cakes .. "	10,715	6,631	422,286	300,393

REPORTS OF COMPANIES.

Electro Bleach and By-products, Ltd.

The fifth ordinary annual general meeting was held on June 27 at the Midland Hotel, Manchester. Mr. H. J. Mackinder, M.P., the chairman of the company, presided.

The Chairman, in moving the adoption of the report and the accounts, said they met at a critical time. He thought it was pertinent to remind them that their company was a peace company, and not a war company. It was floated in the spring of 1914, some four months before the war. That fact had told against them until the present time, but he hoped and believed that henceforth it would turn to their advantage. There were many months of hard work and anxiety which followed the outbreak of war, but they went through with it. Then, after a couple of years, came the excess profits duty. He had said they were a peace company, cautiously based on the smallest capital that was practicable. Of course, they had no pre-war year as a standard of profit, and therefore they had to be content with a small percentage on their small capital, and to hand over a large part of their profits to the State. Yet their total profits were at no time during the war in excess of the estimates published in their prospectus, and made, therefore, in times of peace. They made no complaint of the contributions to the State; but he said with some pride that if they had made good to-day, as they had, it was not by any war profits, but in spite of the war. The only advantage they had had in their favour was that their products were of equal importance both in war and peace. Throughout they had tried to treat the Government fairly, and he claimed that they had rendered a real service, in proportion to their size, to the armies in the field. At the same time, they had made it their policy to be considerate to their private customers, and he hoped and believed that they had earned the goodwill of these customers.

In the balance-sheet the two items which would no doubt claim their attention first were the additions to the plant, valued at over £70,000., and the loan from the Ministry of Munitions amounting to over £35,000. Those two items, appearing for the first time, represented the conclusion of the transactions which had, in fact, extended over the last three years. In regard to the additions to the plant, the amount of £70,000 had been arrived at after such writing-down as they believed would cover any likely decline in the value during the coming years. In some cases, in the case of large sums, the writing-down had amounted to 50 per cent. He might usefully remind them in that connection that the amount of £198,000, which stood in their balance-sheet as the value of their plant, was based on somewhat similar facts. It was not based on the first cost, with additions, less depreciation, but it was based on the prices which that company paid for the predecessor's company's plant being taken over, and that represented a considerable writing down on the original cost. As to the item of £12,841. for depreciation during the year, it must be remembered that that was a sum in excess of the cost of repair. On the other side of the balance-sheet they would see that before arriving at the gross profits they had charged the cost of ordinary repairs. Then there was the sum of £10,000. as a special appropriation out of the year's profits for deferred repairs. That large sum had been allowed by the Inland Revenue authorities in order to meet the cost and to make the damage good of certain parts of the plant working under war conditions. They would understand that in certain crises of the war it was essential to press forward without any regard to economic consequences. When they considered all the facts, he thought they would realise that the directors were fully justified. In regard to the Government loan, the Board were considering the best and the wisest course to be taken in the matter of interest and repayment. The Ministry of Munitions had treated them with every consideration. He thought he was justified in saying that, in view of their sound financial condition, that item in their liabilities gave them little concern. In regard to the whole financial position of the company, he felt justified in saying that they started their peace career with no mean achievements behind them. During the critical years of the war, when they had been subjected to excess profits duty taken from the natural growth of the company, which they budgeted for when no war was in sight, they had succeeded in paying off the whole of their preliminary expenses. They had contributed to the sinking fund of their debentures. They had already bought the necessary amount of debentures for the coming year, so that at the present moment they had paid off £10,000. out of their £60,000.

debentures. They had made a beginning in the way of a reserve fund, and were placing a sum to reserve amounting to £10,000. They had preserved—and, indeed, increased—their working capital. Capital was, of course, represented by the two items stock in trade and cash in bank, amounting to over £56,000. The items sundry creditors and sundry debtors practically balanced if they allowed for certain sums. With regard to the plant, it was at the present time in better order than it ever had been, and it was certainly much larger. They would see that the company had constructed fresh water reservoirs, which were of great use during the recent drought. The brine flow was quite satisfactory, and they had sunk a third shaft, which was now in operation. They had not to work all three shafts at once. With regard to present trade, although only half of the current year had passed he felt justified in telling them that on the whole the company had not been unprosperous.

On the motion of Mr. Cubitt, the report was adopted. Mr. H. J. Mackinder was re-elected a director, and Messrs. Fred Scott and Co. were reappointed as auditors.

Lever Brothers, Ltd.

An extraordinary general meeting was held on June 26 at Port Sunlight, the Hon. W. Hulme Lever presiding in the absence of Lord Leverhulme. The business of the meeting was to consider the directors' proposal to increase the capital of the company from £60,000,000. to £100,000,000.

Mr. Lever, in submitting the resolutions embodying this proposal, said some of the shareholders might be inclined to ask why they needed this further increase of capital so soon after the increase made in February last, and if it were needed why it was not proposed then. The directors believed that the capital authorised in February required strengthening by further issues from time to time with capital ranking below already existing capital and below the new capital authorised last February. They were constantly requiring to issue capital for the purpose of purchasing businesses, and it was thought wise to create this new capital for that purpose. The effect would be to strengthen the position of the existing preference shareholders as they purchased new businesses from time to time by the issue of shares ranking below the shares already existing. The directors had always hesitated to issue shares for the purchase of business when such shares ranked *pari passu* with shares quoted on the market, as that disturbed the quotations of such shares, and generally they preferred to avoid doing so. He did not say the issue of new capital would entirely avoid part of the purchase money for businesses being paid in cash, but as much as possible of the purchase price could be paid in shares ranking behind the existing preference and preferred ordinary shares. The scheme was in consonance with the policy of the firm which had enabled them to protect the interests of shareholders. They had the unanimous approval of the ordinary shareholders, which might not be the case at a future date if there were any change in the ownership of the ordinary shares. The result of the scheme would be greater security for the existing preference shareholders, better and more efficient service to the public, ability to sell at the lowest world's price of production, and on those lines to secure a solid and progressive character of business on a sound basis of finance.

Mr. John Gray seconded.

Mr. Arthur W. Colegate, a shareholder, asked if it would not be possible to give a little more light upon why it was necessary to increase the unissued amount of capital. The company had about £60,000,000. of nominal capital, of which only about £18,000,000. had been issued. That left, roughly, £42,000,000. of unissued capital, which, he thought, was ample, and he was not quite clear why a further amount of nominal capital was required.

The Chairman explained that the time was opportune to make the increase, and it might not be opportune later. Although the sum seemed large, the directors felt they were justified in asking the meeting to authorise it, bearing in mind the extensive operations of the company not only in this country, but throughout the world.

The resolutions were carried.

Fortuna Nitrate Co., Ltd.

Directors report for year 1918 that gross profit, inclusive of transfer fees, amounts to £61,534.; deducting London expenses, income tax, and depreciation charges, amounting to £25,128., and adding £3,888. brought in, there is £40,294. Directors recommend dividend of 7½ per cent., less tax; for-



Magnetic Separator Pulley

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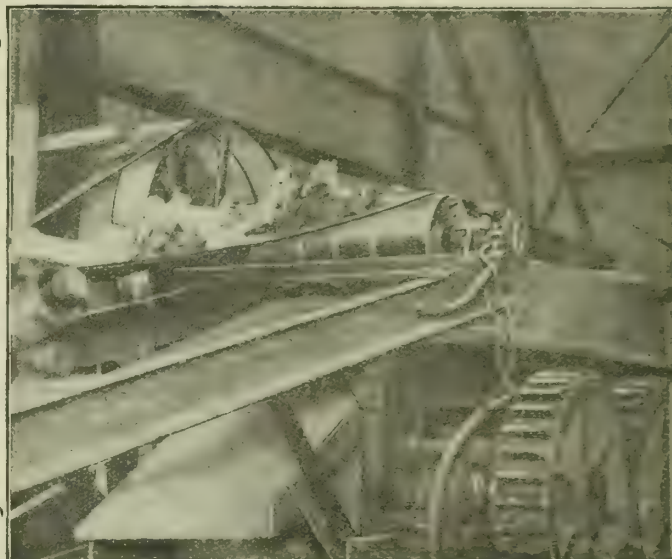
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BROS., 265, Strand, London, W.C. 2.

ward, £32,064. Directors consider it prudent to carry forward this balance in view of abnormal conditions ruling in nitrate industry at present time. Net production of nitrate at the company's oficinas was 1,207,788 quintals. Profit has been taken on 1,165,613 quintals, and unsold stock of 42,175 quintals on hand at December 31 has been valued at approximate cost.

Santa Rita Nitrate Co., Ltd.

For year to December 31 last the gross trading profits, including interest, were £12,881.; less London charges and income tax, £3,911.; net profit, £8,970.; and £1,231, was brought in, making £10,201. Dividend of 5 per cent., less tax; forward, £5,201. The oficina was closed at the end of the year, and manufacturing operations will not be resumed until the large coast stocks have been materially reduced. The extraction of raw material is being continued.

NEW COMPANIES.

Dynevov Tinplate Company, Ltd.—Private company. Capital £50,000., £1. shares. Office: Dynevov Tinplate Works, Pantyffnon.

East Anglian Chemical Company, Ltd.—Private company. Capital £15,000., £1. shares (3,000 7 per cent. preference). Object: To acquire that portion of the business of Mary H. Wilson which concerns the operation of the plant at Sutton Bridge, Lincolnshire, for manufacturing sulphuric acid.

Isthmus Size and Chemical Company, Ltd.—Private company. Capital £15,000., £1. shares. Object: To acquire the business of W. F. Clayton and G. E. Sellers, carried on under similar style at Huddersfield.

J. D. Tipping, Ltd.—Private company. Capital £1,000., £1. shares. Manufacturing chemists, and merchants of boot polishes and furniture cream, etc. Solicitor: E. G. Twemlow, 78, King Street, Manchester.

Narborough Syndicate, Ltd.—Private company. Capital £2,200., in 2,000 preference shares of £1. each and 4,000 ordinary shares of 1s. each. Object: To search for minerals, oils, and natural gas in the U.K. or elsewhere. Solicitor: F. H. Stollard, 56, Gresham Street, E.C.

National Felspar Company, Ltd.—Private company. Capital £12,100., in 12,000 shares of £1. and 2,000 deferred shares of 1s. each. Agreement with L. W. Carder, H. J. Dixon, and the Belleek Felspar Company, Ltd., and to acquire and work felspar mines in Ireland. Solicitors: Foss and Company, 5, Fenchurch Street, E.C.

Everest and Company, Ltd.—Private company. Capital £6,000., £1. shares. Caramel and burnt sugar manufacturers. Office: 21, Northern Road, Plaistow.

Warren Cement Works, Ltd.—Private company. Capital £150,000., £1. shares (50,000 10 per cent. cumulative preference). Object: To take over the business of Portland cement and basic slag manufacturers and merchants carried on by Otto Trechmann. Office: Warren Cement Works, Hart Road, Hartlepool.

Acton Aluminium and Bronze Company, Ltd.—Private company. Capital £10,000., £1. shares. Office: Bank Buildings, 186, High Street, Acton.

Anglo-Norwegian Electro Chemical and Finance Company, Ltd.—Private company. Capital £20,000., £1. shares. Office: 6, Great St. Helens, E.C.

Falcon Chemical and Rubber Company, Ltd.—Private company. Capital £5,000., £1. shares. Office: 230-232, Produce Exchange, Manchester.

Jennison, Ltd.—Private company. Capital £2,000., £1. shares. Oil, water, paint, colour, grease, and varnish merchants, etc. Office: 4, Waltham Street, Hull.

Kerrow and Ennis China Clay Company Ltd.—Private company. Capital £10,000., £1. shares. Office: 85, London Wall, E.C. 2.

John Gonnella and Company, Ltd.—Private company. Capital £10,000., £1. shares. Oil extractors, importers, and refiners, tallow melters, soap and grease manufacturers, etc. Registered office: 150, Baird Street, Glasgow.

Norfolk Oil Share Syndicate, Ltd.—Private company. Capital £6,000., £1. shares. Office: Castle Chambers, Norwich.

Plasmet, Ltd.—Private company. Capital £5,000., in 2,000 preference shares of £1. each and 6,000 ordinary shares of 10s. each. Object: To acquire the formula of and the right to manufacture 'metallic cement' called "Plasmet." Registered office: 45, Brecknock Road, N.W. 7.

Ricarbo, Ltd.—Private company. Capital £10,000., £1. shares. Manufacturers of and dealers in inks, carbon and ink papers, etc. Office: 16, Cobden Street, Leicester.

South Yorkshire Chemical Works, Ltd.—Private company. Capital £350,000., £1. shares (200,000 preference). Object: To acquire the business of an owner of chemical and by-products works carried on by the Right Hon. Earl Fitzwilliam, K.C.V.O., D.S.O., at Parkgate, near Rotherham. Office: 20, Conduit Street, W. 1.

Wells Vegetable Fuel Power Company, Ltd.—Private company. Capital £60,000., £1. shares. Objects: To take over inventions and discoveries in and relating to the carbonisation of wood and the like. Manufacturers of and dealers in charcoal, etc. Solicitors: Rhys Roberts and Co., 63, Queen Victoria Street, E.C.

John and James White, Ltd.—Private company. Capital £600,000., £1. shares. Object: To acquire the business of manufacturers of chemical products and drugs, chemical brokers, drysalts, and merchants carried on at 7, West George Street, Glasgow, and at Shawfield, Rutherglen, and elsewhere, as "John and James White." Registered office: 7, West George Street, Glasgow.

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 73, Basinghall Street, London, E.C. 2, whence further information may be obtained:—

British India.

A firm in Calcutta, claiming to be one of the largest firms of European wholesale and retail chemists in India, are desirous of accepting agencies, on consignment terms, for drugs and chemicals. (Reference No. 1215.)

A firm in Calcutta, claiming to be in close connection with Government departments, railways, shipping companies, etc., and to have special facilities for distribution in all the large centres in India, are desirous of accepting sole agencies to cover Bengal, Bihar, Orissa and Burma, on consignment and on a commission basis, for heavy chemicals. (Reference No. 1218.)

South Africa.

A chemist and manufacturers' agent in Johannesburg desires to get into touch with United Kingdom manufacturers of mining chemicals, rubber goods, dyes, celluloid goods, paints, etc., with a view to obtaining agencies in South Africa. The applicant is at present in the United Kingdom and is open to interviews. (Reference No. 1230.)

Belgium.

An agent at Verviers desires to obtain an agency, with dépôt, for United Kingdom manufacturers of ultramarine blue in bulk and in small packages (500 kilos); extracts for tanners and dyers (1,000 kilos); and pure white lead and linseed oil (5,000 kilos). (Reference No. 1240.)

An agent at Liège desires to obtain agencies for United Kingdom manufacturers of soft pig lead and antimony. (Reference No. 1242.)

Netherlands.

A merchant in Amsterdam wishes to secure the representation in Holland of the following goods of United Kingdom manufacture: Chemicals, drugs, and toilet soap. (Reference No. 1251.)

Chili.

A firm in Santiago desire to get into touch with United Kingdom manufacturers of paints, varnishes and oils, with a view to representing them in Chili. (Reference No. 1203.)

Roumania.

H.M. Vice-Consul at Galatz reports that an agent in that town desires to obtain agencies, on a commission and consignment basis, for United Kingdom manufacturers of tinplates, terneplates, blackplates, lead pipes, sulphate of copper, caustic soda, beef tallow, and general chemicals. (Reference No. 1190.)

FERTILISER NEWS.

(SPECIALLY CONTRIBUTED.)

Nitrate of Soda.—A few steamers seem to have been chartered to load nitrate for Europe in the later summer months, but as only 10,000 tons in all were shipped from Chili in the first half of June, that month's exports will obviously not have materially relieved the top-heavy statistical position; the stocks on the West Coast reaching, as already stated, the unprecedented total of about 1½ million tons, and will continue to increase until tonnage becomes plentiful, and this by common consent is not likely to be the case for many months to come. It is therefore difficult to see how the estimated world's consumption of two million tons in the current twelve months is to be met, even in the highly improbable event of buyers being prepared to pay the prices inseparable from high freights. Unfortunately, the outlook is further obscured by the friction existing between the Chilean Government and the newly formed Producers' Association, comprising, it appears, after all, not 83, but only 73 per cent. of the total output capacity of the industry. The so-called "centralisation of sales" has, as we expected, already resulted in a complete fiasco, the Government having effected large forward sales for account of the native and German companies outside the "ring" at prices considerably below the prices fixed (*sic*) by the latter. The syndicated producers have admittedly not sold a quintal of nitrate since last autumn, many of them have closed their works, and the situation, which will be dealt with in detail in our usual half-yearly review towards the end of the month, may well be described as chaotic. As shown by the official statements at recent company meetings, the producers themselves are, in fact, "crying malodorous fish!"

Spanish and French Fertiliser Companies.—The Spanish Union of Fertiliser Factories, which works practically on French capital, has establishments in Malaga, Alicante, Valencia, and Seville, which, besides the production of sulphuric acid, make or can produce 167,000 tons of superphosphates. The sulphuric acid plants work up pyrites obtained in the company's own mines, and the production exceeds the requirements for fertiliser output. The concern is a subsidiary of the Algerian-Tunisian Omnium, which controls the great phosphate deposits of Constantine, and delivers the raw material to the Spanish Fertiliser Union. The concern worked at a loss in 1914. The year 1915 brought about a great increase in the production, and compensated for the loss in the preceding years, and in 1916 the great rise in the price of superphosphates made the declaration of a 15 per cent. dividend possible. From the report published in October, 1918, of the 1917 business year, it can be seen that in the first-half of the year considerable difficulties were met with in supplying the factories with raw phosphates, so that the regular exploitation during the autumn became an anxious question. The treaty of commerce with France helped the undertaking by the assurance of a good supply of crude phosphates. Work could only be kept going in Seville because they were able to use the Cáceres phosphates there. The production of sulphuric acid, as well as that of superphosphates, was inferior to the usual capacity of the factories, and amounted to 66,000 tons, distributed as follows: Valencia, 25,000 tons; Alicante and Seville, 15,000 tons each; Malaga, 11,000 tons. 84,500 tons of superphosphates were made, and 89,993 tons were sold, as well as a portion of the sulphuric acid. As the rise in the price of superphosphates kept pace with the increase in the cost of raw material, the working year brought a profit of 2,900,000 pesetas, against 3,860,000 pesetas in the preceding year. The dividend was 10 per cent. In the various factories all preparations have been made for working intensively in peace time. In Valencia and Malaga new drying and concentration plants have been installed for the production of a high percentage superphosphate, and in Alicante roasters have been installed for the pyrites found in the district.

The Cia. Navarra de Abonos quimicos propose placing a weir on the Ebro River in the district of Viana. The plant will develop 86,000 H.P., and is to be used for the production of atmospheric nitrogen in order to make fertilisers. The cost of the weir, including hydraulic and electrical plants, is estimated at 5,000,000 pesetas, and that of the fertiliser factory at 3,000,000 pesetas.

The Phosphates du Dan Company shows a profit on its 1918 working year of 128,282 francs, against 8,058 francs only in 1917. The stock of phosphates, valued at 1,047,207 francs, is down by 350,025 francs in value. This reduction is explained

by a reduced output and the improvement in transport facilities which have made it possible to increase the sales during the last quarter of 1918.

Sulphate of Ammonia.—There is not much moving in the sulphate of ammonia market this week, but supplies appear to be obtainable with fair regularity. The statement is made that the quantity of sulphate to be sold at £17. per ton to farmers has been disposed of. The price for July-September delivery is now £19. 10s. per ton. News from the other side of the Atlantic tells that export trading has developed to considerable proportions, with a steady volume of business passing, whilst domestic requirements there are confined to moderate quantities. Prices are firmly maintained, both for double bags and in bulk.

Slag and Superphosphate.—With season prices now fixed for basic slag, country merchants, and many farmers as well, are covering their requirements ahead, and there is not much to be reported in connection with the section beyond that. There is talk of a larger output next season. Superphosphate is quiet, but it is reported that the market will be glad to be reassured over the arrangements for a steady importation of rock phosphates.

Potash.—Manures in this section are unchanged on the week, but the supply is reported to be rather more ample. Stocks of sulphate of potash are improving, as also are stocks of kainit.

Bone Meals.—Indian bone meal is still scarce, and £15. 10s. is the price quoted in some districts. At the same time, Liverpool is offering some quantities of pure dissolved bones, ½-3 per cent. ammonia and 35 per cent. phosphate, in bags, at £12. to £13. 10s. per ton, ex works; with pure steamed meal, 1 per cent. ammonia and 60 per cent. phosphate, in bags, at £11. to £11. 5s. per ton, ex works. There does not seem to be much tendency for bone meal prices to fall at present in default of Indian shipments, and, in fact, in one quarter a further advance is expected.

Blood and Tankage.—There is a good sale for what supplies of dried blood are available, but the import trade is slow. Some sellers are asking 25s. per unit for ammonia. Foreign dry tankages are quoted at 20s. to 22s. 6d. per unit of ammonia, and 2s. to 2s. 3d. per unit of phosphate, the quotations in each case being for bulk lots. Fish meals are in more request at prices reported to be round about 25s. per unit of ammonia and 2s. 3d. for phosphates. Something of the same figures are mentioned for meat meals.

SOUTH WALES NOTES.

(SPECIALLY CONTRIBUTED.)

The South Wales tinplate workers have passed a resolution absolutely repudiating the decisions of the Industrial Council and are calling upon the workmen's representatives to re-open negotiations immediately upon the new claims, threatening that unless this is done and the proposed delegation to America withdrawn they will withdraw their labour. All the manufacturers have been acquainted with the facts and the decision of the men is causing a feeling of much uneasiness and uncertainty in the trade. The works recently acquired by Messrs. Baldwins, Ltd., in Toronto are being converted into an up-to-date tinplate factory. This is an important development and may have considerable effect on the home industry.

The copper industry is very quiet, there being no appreciable quantities of ores arriving, and as far as can be ascertained several weeks will elapse before any improvement can be effected at the local works.

Much activity prevails at all the patent fuel works, the foreign demand being on the increase. Important experiments are being undertaken by experts in connection with pitch wart disease. Several years ago this disease was much more prevalent in South Wales than is the case now, and the experiments are being made with the object of still further decreasing the liability of fuel workers to it.

The business of zinc oxide manufacturers carried on at Landore by Messrs. John R. Down and Co., has been taken over by a new company called the Landore Zinc Works Ltd., with a capital of £100,000. in £1. shares. Messrs. J. R. Down and A. S. Young, of Carshalton, Surrey, are the first directors.

Lead workers are being steadily employed and prices for the metal have an upward tendency. During the week 102 tons of lead ore arrived at Swansea from Laxey for Messrs. Vivian and Sons.

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

The specifications of the following applications are not printed by the Patent Office until the complete specifications have been accepted.

June 23rd to 25th (inclusive).

- Treating Tin Scruff. Clegg, G. H. 15,946.
 Ethyl Alcohol from Acetaldehyde. Compagnie des Produits Chimiques d'Alais et de la Camargue. 15,877.
 Separating Solids from Liquids. Conte, J. Y. 16,015.
 Hydro-extractors. Conte, J. Y. 16,016.
 Treatment of Argentiferous Sulphide Ores. Elmore, F. E. 15,783.
 Electro-deposition of Metals. Jacombs, J. H. B. 15,823.
 Separation in Pure State of Ortho- and Para-isomerides Obtained in Manufacture of Benzenoid Compounds. Jones, W. J.; and Stephen, H. 15,819.
 Manufacture of Resin. Koppers Co. 15,860.
 Roasting, Calcination, or Heat Treatment of Ores, etc., Bearing Sulphur Lines. E. W. L. 16,032.
 Continuous Defecation of Sugar Solutions. Marks, E. C. R. (Industrial Apparatus Corporation). 15,766.
 Fixation of Nitrogen. Marks, E. C. R. (Nitrogen Products Co.). 15,765.
 Methods of Forming Esters. Marks, E. C. R. (U.S. Industrial Alcohol Co.). 15,774.
 Synthesising Ammonia. Nitrogen Corporation. 16,001.
 Ammonia-nitrate Fertilisers. Norsk Hydro-Elektrisk Kvalstoftafabrik. 16,021.
 Mechanical Appliance for Boiling, Heating, or Smelting Liquids or Metal, Producing Steam, or Cooling Liquids. Nutt, B. J. B. 15,890.
 Manufacture of Anthranol. Perkin, A. G. 16,042.
 Distilling Carbonaceous Material. Perry, W. P. 15,985.
 Moulded Articles from Acid-proof Cement. Richards, W. E. Windsor. 15,909.
 Calcining Carbonates of Calcium and Zinc, etc. Southern, F. G. 16,039.
 Continuous Process for Manufacture of Esters. U.S. Industrial Alcohol Co. 15,775.
 Apparatus for Manufacture of Esters. U.S. Industrial Alcohol Co. 15,776, 15,777.
 Electrolysing Liquids. Withers, J. S. (National Electro-Products, Ltd.) 16,154.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 6d. in stamps to the Comptroller, Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane. W.C.

1916.

- Production of Light Mineral Oils from Heavier Oils. Maxim, S., and Crosce, A. W. (legal representatives of the late Sir H. S. Maxim). 8,477. 128,227

1917.

- Treatment of Solid Paraffins. Elborne, W. 8,693. 128,239
 Treatment and Production of Hydrocarbons. Forwood, G. F., and Taplay, J. G. 9,598. 128,255
 Drying Trinitrotoluene. Clayton Aniline Co., and Schedler, A. 9,732. 128,263
 Organic Acid Chlorides. Durrans, T. H., and Boake, Roberts and Co., A. 9,815. 128,270
 Preparing Hydrogen from Carbon or Carbon-containing Substances by the Action of Water or Water Vapour thereon. Prins, H. J. 9,896. 128,273
 Preparation of Acetic Anhydride and Acetyl Chloride. Durrans, T. H., and Boake, Roberts and Co., A. 10,196. 128,282
 Explosives. Marin, A. J. 10,271. 108,853
 Fuel Oil from Crude Oils. Tinken, F. 10,327. 128,288
 Protecting Copper or Its Alloys from Attack by Atmospheres or Liquids. Imperial Trust for the Encouragement of Scientific and Industrial Research, Institute of Metals, Bengough, G. D., and Hudson, O. F. 10,576. 128,297
 Utilisation of Nitre Cake. Morgan, J. S. 10,803. 128,302
 Continuous Process and Plant for the Production of Picric Acid or Other Products of Nitration. Brookes Chemicals, Ltd., and Brooke, N. 10,811. 128,303
 Regenerating Oxide of Nickel Catalysts Employed in the Hydrogenation of Fatty Bodies. Soc. Industrielle de Produits Chimiques. 16,149. 112,768
 Production of Mineral Oils. Carper, J. B. 18,688. 128,326

1918.

- Anhydrous Magnesium Chloride. Hulin, P. L. 467. 128,327
 Zinc Lead Pigments. New Jersey Zinc Co. 6,270. 120,194
 Production of Articles from Viscose. Borzykowski, B. 6,346. 116,268
 Dissolving Chemicals and Elevating the Resulting Solutions. Thorold, F. W., and Sinclair, J. M. 9,209. 128,351
 Separating the Constituents of Mixtures of Volatile Liquids. Green, A. G., and Levinstein, Ltd. 9,689. 128,362
 Measuring and Mixing Liquids. Smith, A. E. 9,876. 128,370
 Preparation of Amines. Rintoul, W., Thomas, J., and Nobel's Explosives Co. 9,895. 128,372
 Concentration of Sulphuric and Other Acids. Davis, G. K. 10,127. 128,396
 Extracting Fat from Bones and Other Material. Powling, W. T., and Powling, B. B. 10,129. 128,397

- Treatment of Liquor from Plants for Purifying Gases from Producers or the Like. Holmes, D. M. 10,208. 128,401
 Manufacture of Acetone and Other Products by Fermentation. Desborough, A. P. H., Reilly, J., Thaysen, A. C., and Henley, F. E. 10,219. 128,403
 Compositions Containing Phenol Formaldehyde Condensation Products. Scott, G. L. 15,449. 128,477
 Antimony Colours. Morris, E. F. 16,334. 128,482
 Fuel Briquettes. Bibb, D. H. 16,809. 128,485

1919.

- Extraction of Cyanides. Jackson, W. J. Mellersh- (Air Reduction Co.) 381. 128,507
 Vulcanising Rubber with Aid of an Accelerator. Hasselt, J. P. B. van 1,008. 126,606

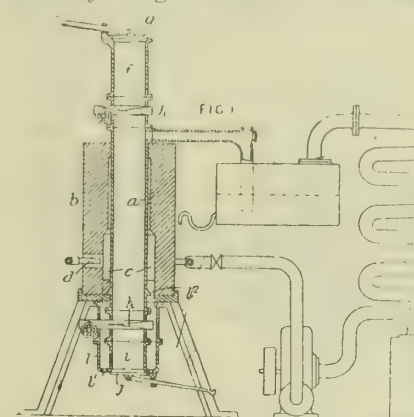
ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Picric Acid Manufacture. P. Ramy, London. British Patent, 125,461, of 1916.

Picric acid is obtained by heating sodium or potassium nitrate with sodium or potassium bisulphate, and passing the resulting mixture of nitrogen oxides and oxygen into heated benzene containing a catalyst consisting of copper, silver, or mercury, or nitrates thereof, or other copper, silver, mercury, or aluminium salt.

Charcoal Retorts. A. B. Roxburgh, Monkseaton; T. Sanderson, Gosforth; and F. H. Sanderson, Eshott, Felton, all in Northumberland. British Patent, 125,439, of 1916.

A charcoal retort *a*, which may be vertical or inclined, is externally heated, so that there is a gradual rise in temperature downwards to a zone of maximum heat, and fed with wood which descends by gravity and substantially fills the cross-section of the retort; the charging and discharging of the retort are effected so that the retort is worked continuously. Fig. 1 shows a vertical cast-iron retort *a* in a



fire-brick setting *b*, and heated by means of gas-burners *d* arranged round a flue *c* about the lower and intermediate parts of the retort; the gas supplied to the burners is the gas given off from the wood after such gas has been treated in condensing apparatus for recovery of tar and wood vinegar. Wood is fed into the retort from a

hopper *f* having a cover *g*, and provided with a valve *h* for controlling the wood supply. At the bottom of the retort is a discharge and cooling chamber *i*, of about half the capacity of the hopper *f*; this chamber is provided with a cover *j* for excluding air from the chamber and a valve *k* for regulating the discharge of charcoal. An air jacket *l*, with apertures *l^1* for admitting air, surrounds the chamber *i*; the hot air from this chamber passes through apertures *l^2* into the chamber *i*. Water or steam may be injected into the chamber *i*.

Nickel Extraction. H. W. C. Annable, Egham, Surrey, and Nickel Concentration, Ltd., London. British Pat. 125,119, of 1916.

Silicate ores of nickel, such as garnierite, are heated in a furnace in the presence of moist sulphuretted hydrogen and preferably a small quantity of a sodium or potassium salt. Suitable salts for this purpose are sodium chloride, which may be used in the form of sea-water, sodium carbonate, sodium sulphate, and the corresponding salts of potassium. The process is preferably carried out by mixing the ore with a sulphur-bearing substance, such as iron pyrites or copper pyrites adding a small quantity of sodium or potassium salt, and heating in a furnace through which a current of steam is passed; when carbonate is employed, sulphur may be used instead of the pyrites. The mass resulting from the operation, containing sulphides of iron and nickel, is roasted to a temperature necessary to convert the sulphides into sulphates

and to decompose the sulphate of iron, but not the sulphate of nickel. The hot mass is discharged into water for dissolving out the sulphate of nickel; in some cases, a basic sulphate of nickel is formed during the roast and, in such cases, the basic sulphate may be dissolved by adding hydrochloric acid to the water; this acid may be obtained from the gases from the furnace in which the ore is heated with iron pyrites and salt in a current of steam. The nickel may be recovered from the solution in several ways. It may be precipitated as carbonate, by adding magnesite, or as sulphide, by adding sodium sulphide; or the furnace gases may be passed into the solution either directly or after removal of hydrochloric acid. If the acid is thus removed, the nickel solution should be neutralised, e.g., by the addition of a little chalk before passing in the furnace gases; and a quantity of chalk more than sufficient to neutralise the acid is added to the solution, when the furnace gases are used directly. The precipitated salt of nickel is dried and heated in the air to obtain nickel oxide, which is found to contain approximately 90 per cent. of nickel oxide, and similarly, when the nickel is precipitated as carbonate, this is separated, dried, and ignited to obtain nickel oxide. Some of the magnesium in the ore is converted, during the process, into magnesium sulphate.

Nitrating and Mixing Machines. Nobel's Explosives Company, Ltd., Glasgow; J. N. Lyall, A. Wilson, J. H. O'Connor, and J. McKillop, Pembrey. British Patent, 125,094, of 1916.

In nitrating, mixing, and similar apparatus, the course of the acid, etc., supplied to the apparatus is controlled by the speed of the stirring mechanism, or by the pressure of the air or the like when the mixing is effected, by compressed air, etc. As shown in Figs. 3 and 4, the sleeve C of a governor B on the stirring-shaft A is connected by a bell-crank lever D and link D' to the outer end of a swivelling bend E, forming part of the acid-supplying pipe F. The pipe E delivers into a feed and overflow-box divided into two compartments H, I by a partition J. A pipe L leads from the compartment

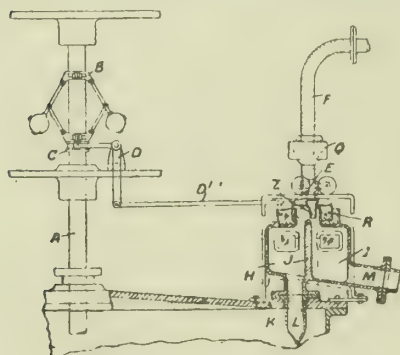


Fig. 3.

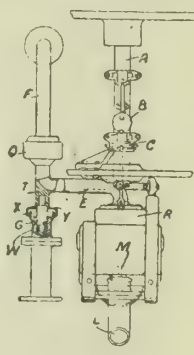


Fig. 4.

H to the nitrator K, and a pipe M from the compartment J to an overflow tank, from which the acid is returned to the supply tank. Should the speed of the stirrer A fall below a certain point, the governor B moves the outlet end of the bend E over the overflow compartment I. Liquid seals Q, R may be provided at the supply and delivery ends of the bend E. A depending lug T on the bend E has a pivot G engaging a piece W on the cover of the nitrator K, and rollers at the outer end of the bend run on a track. An oil bath X is formed in the piece W, and a hood Y is screwed on the pin G. The outlet end Z of the bend E may be flattened to ensure delivery of the acid to one or other side of the partition J.

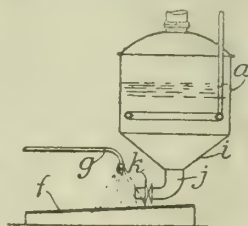
Saponifying Esters. C. F. Cross and C. Dreyfus, London. British Patent, 125,153, of 1916.

Fatty or oily glycerides are saponified by the joint action of methyl or ethyl alcohol, pure or dilute, and an alkali or base in amount less than the equivalent of the fatty acid: glycerine, a salt of the acid, and the methyl or ethyl ester of the acid, are thereby obtained. The glycerides are treated at ordinary temperature, or if solid are treated at a temperature at or above the melting-point; the amount of alcohol employed is also small, the materials are thoroughly mixed and emulsified in a vessel provided with an agitator, and the mixture may then be run into other vessels and allowed to stand until the reaction is complete. The products may be separated by dissolving the soap and glycerine in water, removing the undissolved esters, and then separating the soap or its fatty acid from the glycerine. The process may also be

applied to cellulose acetate; the textile uses and dyeing properties of an acetate silk may thus be varied; the process may be carried out by covering the thread with alcohol, adding the fractional equivalent of caustic soda, and agitating or circulating the liquid until the desired result is attained; the resulting cellulose product contains alkali. Specification 3367/07 is referred to. The Provisional Specification does not confine the invention to the above mentioned types of esters.

Sulphate of Ammonia. J. T. Sheard, Birley Carr, near Sheffield. British Patent, 124,946, of 1918.

To reduce the amount of free acid contained in drained ammonium sulphate crystals, the magma of crystals enveloped in mother-liquor is sprayed with clean water immediately it is ejected from the saturator, and before any draining-away of mother-liquor has taken place. The water is supplied as a shower of intimately divided or atomised jets by a tube g conveying water under pressure, and having a flexible or swivelled end-piece terminating in a rose or other form of jet. The crystals may be removed from the saturator to the draining-table f by a scoop



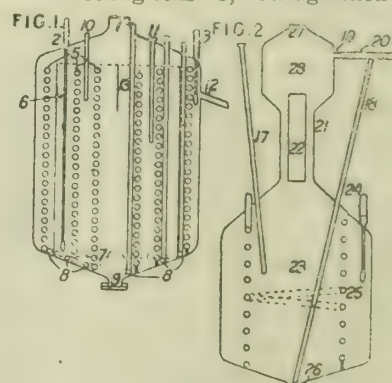
or by a steam ejector, or the saturator a may be provided with a conical bottom i terminating in a discharge-pipe j fitted with a valve k.

Decolorising Carbon. Tai-Koo Sugar Refining Company, 8, Billiter Square, London. (A communication from M. Obrembski and H. C. Resker, Hongkong.) British Patent, 125,230, of 1918.

Decolorising carbon is prepared by impregnating vegetable material—for example, wood chips, sawdust, cocoanut husks, straw, or hay—with an equal weight of calcium chloride applied in aqueous solution and evaporating to dryness under vacuum, carbonising at 600-800° C., washing with acid and water, and finally drying and grinding.

Nitroglycerine Manufacture. J. G. Baxter, Gravesend, Kent. British Patent, 125,091, of 1916.

Apparatus for the continuous manufacture of nitroglycerine comprises the nitration vessel shown in Fig. 1, and the separator shown in Fig. 2. The nitration vessel is divided into two communicating compartments by an annular wall 6 provided with spaces 7 in its lower edge, and is furnished with cooling-coils 5, air-agitation pipes 8, inlet pipes



10, 11 for supply of mixed acid and glycerine, and an outflow pipe 12. A cross-wall 13 for preventing premature mixing of the acid and glycerine, thermometers 2, 3, a fume exit 1, and a discharge outlet 9, are also provided. The separator comprises a lower compartment 23, an upper compartment 28, and a neck 21 provided with an inspection window 22; the mixture of nitroglycerine and waste acid enters by the pipe 17 and separates; the acid flows away by a pipe 18, and the nitroglycerine by a pipe 19, to which is attached a rubber tube 20 which can be raised or lowered to regulate the outflow from the pipes 18, 19; a cooling-coil 25, thermometer 24, fume exit 27, and discharge outlet 26, are also provided.

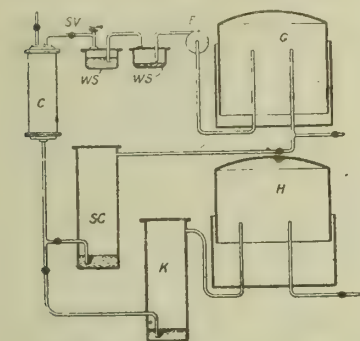
Manufacture of Parchment Paper. Manchester Oxide Co. and R. H. Clayton, Miles Platting, Manchester, J. Huebner, Chaddle Hulme, Cheshire, and H. E. Williams, Withington, Manchester. British Patent, 124,979, of 1918.

In the manufacture of parchment paper, vulcanised fibre, etc., the paper is treated with solutions containing thiocyanates either in water or in a solution of another thiocyanate. The

solution may contain also a salt which does not adversely affect the action of the thiocyanate and may be acidified with acetic acid. Three examples are given. (1) The paper is passed for about 30 seconds through a solution of calcium thiocyanate heated to 130°C ., and of such a strength that it boils at 157°C . (2) The paper is passed for about 15 seconds through a solution containing one part by weight of mercuric thiocyanate and two parts by weight of magnesium thiocyanate heated to 130°C . and of such strength that it boils at 145°C . (3) A solution of equal parts by weight of calcium thiocyanate and calcium chloride heated to 130°C . and of such a strength that it boils at 157°C . is used. When the solution is acidified, four per cent. by volume of glacial acetic acid is added. In each case, the paper is washed and dried in the ordinary manner. Vulcanised fibre is manufactured from the parchment paper in the same manner in which such fibre is manufactured from paper treated with sulphuric acid or zinc chloride.

Hydrogen. C. Dellwik and S. Cutler, London. British Patent, 125,596, of 1916.

In preparing hydrogen from a mixture of hydrogen and air, such as the waste gases from balloons, the mixture is used as the reducing gas in the process of alternate reduction of iron oxide or other suitable material, and reoxidation by



means of steam with liberation of hydrogen. The mixture of hydrogen and air is passed into a gas-holder G, and is circulated by a pump E through a closed circuit comprising the gas-holder G, devices WS, which prevent a local explosion from spreading, a retort C containing iron oxide, and a scrubber SC. The circulation is continued until the gas becomes inactive. A supply of steam generated from the water condensed in the scrubber SC or from another source is then led into the retort C, and the hydrogen obtained is passed through a condenser K to a gas-holder H. If an explosion occurs in the retort C during the reduction, the safety-valve SV lifts, and water is forced from the water-seal vessel WS to form a second water-seal in the vessel ws.

Calcium Nitrate. J. G. Gillbert, Tottenham, London. British Patent, 124,780, of 1916.

Calcium nitrate is obtained by the addition of equivalent quantities of calcium chloride and sodium nitrate to a "nucleus solution" in such quantities as to produce a solution saturated with calcium nitrate at as high a temperature as practicable, say 80°C ., and the precipitated sodium chloride is removed. Water is then added in quantity sufficient to make the proportion of water to sodium chloride equal to that in the nucleus solution, and to provide four molecules of water of crystallisation for the calcium nitrate which is to be separated. The solution is then cooled to a predetermined temperature to separate the calcium nitrate, leaving the nucleus solution, which is used again, and so on indefinitely, the subsequent cycles, however, including a step of evaporating, before the separation of sodium chloride, a quantity of water equal to that which was added in the first cycle. The nucleus solution is a solution saturated with calcium nitrate, sodium nitrate, and sodium chloride if the separation of calcium nitrate is to be effected below 25°C ., or a solution saturated with calcium nitrate and sodium chloride if the separation of calcium nitrate is to be effected above 25°C . The separation cannot be effected above 30°C . in practical quantities.

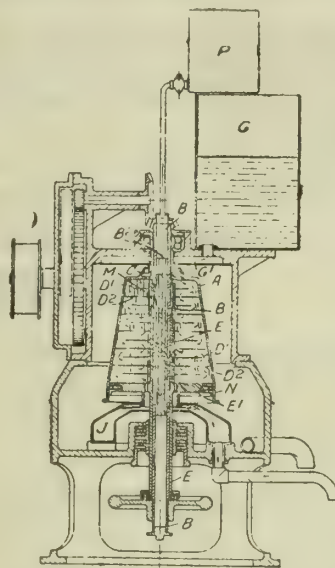
Nitric Acid and Ammonium Sulphate Manufacture. A. T. Cocking and Kynoch, Ltd., Witton, Birmingham. British Patent, 125,444, of 1916.

Nitric acid is obtained from the atmosphere by first obtaining ammonium nitrate by a known process such as those described in Specifications 1820/14 and 14391/15—i.e., by using gas from a producer to drive an engine, to generate electric current which is supplied to an arc furnace for producing nitrogen oxides which are converted into nitric acid and combined with the ammonia obtained from the producer gas;

and then making nitric acid by heating the ammonium nitrate with excess of sulphuric acid under reduced pressure. The residue of acid ammonium sulphate may be neutralised with ammonia or used to obtain a nitrogenous superphosphate from natural phosphates.

Centrifugal Separators. R. A. Sturgeon, Southsea, Hampshire. British Patent, 125,502, of 1918.

Precipitants, coagulants, or the like are added to the material under treatment in a multistage separator before,

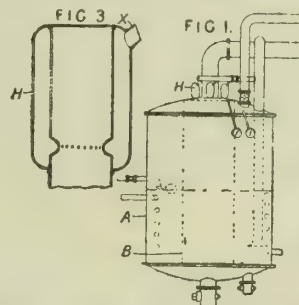


during, and/or after each stage. The hollow spindle B carrying the drum A is driven through gearing, and outside it is arranged the hollow tube E carrying the closing piston E^1 and a series of discs D^1 , D^2 ; the discs D^2 are in contact with the drum and have openings near the axis, and the discs D^1 do not meet the drum. The liquid under treatment enters from the tank G, through the outlet G^1 and the chamber C on the top of the drum, and passes successively outwardly and inwardly through the drum to the receiving channel J. Regagents from the tank P pass down the tubular shaft B by means of channels in the rod B^2 to openings M in the sleeve B at each or any stage. The sleeve E, disc E^1 , D^2 are movable axially from the drum to permit washing the solids from the drum; the washing liquid escapes from the outlets N, which are normally closed by the disc E^1 .

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Distilling Glycerine. Soc Francaise des Glycerines, Paris. British Patent, 125,574. Convention date, April 16, 1918.

The process of distilling glycerine constituting the parent invention is modified by maintaining the vessel A, Fig. 1,



in which water and other impurities are eliminated in the form of vapour, under a vacuum of about 50cm. of mercury, and at a temperature above 180°C ., and afterwards atomising the purified glycerine into the vessel B, in which the glycerine is distilled under a vacuum of 72cm. of mercury, solely by means of the pressure difference existing between the vessels A and B. The atomisation is thus effected without the use of steam or gas. The atomisers H are of the construction shown in Fig 3, the glycerine being admitted to the atomiser by the pipe X. The vessels B, A may be separate and independent instead of being arranged one within the other.

Picric Acid. F. Gros and Bouchardy, Paris. British Patent, 124,751. Convention date, March 23, 1918.

Picric acid is prepared by treating 1 : 2 : 4- or 1 : 2 : 6 dinitrophenol or a mixture with nitric acid saturated with nitrogen pentoxide.

Ozone. F. Gros and Bouchardy, Paris. British Patent, 124,752. Convention date, March 23, 1918.

In the manufacture of ozone from oxygen or air—e.g., by electric treatment—the yield is increased by a reduction of the pressure in the ozoniser to below 550mm. of mercury, preferably accompanied by refrigeration to at least -10°C .

GAZETTE NEWS.

LIMITED COMPANIES. — Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions, Orders, and Official and Other Notices.

Matches, Ltd.—Meeting of creditors, Ridgway Hotel, 40-42, King William Street, E.C., July 4, at 10 p.m.

Messina Copper Extensions, Ltd.—Resolved June 5: That the company be wound up. F. W. E. Morgan, 17, Eldon Street, E.C., liquidator. Meeting of creditors at liquidator's, June 26.

Regulas Metal and Plumbing Co., Ltd.—Resolved May 30, confirmed June 14: That the company be wound up. A. E. Tilley, 8, Staple Inn, Holborn, chartered accountant, liquidator. Meeting of creditors at liquidator's, June 30. Claims to liquidator by August 5.

Wohle Mineral Oil Products (1910), Ltd.—Resolved June 3, confirmed June 21: That the company be wound up. E. Hard, 17, Fenchurch Street, E.C., chartered accountant, liquidator.

DIVIDENDS.

SULPHIDE CORPORATION, LTD.—In view of the uncertainty of the metal position, and of the fact that owing to the maritime strike in Australia work at the Central Mine has been suspended since May 7, and as the time for the resumption of operations is uncertain, the directors have decided to declare only an interim dividend of 5 per cent. on preference in respect of year to June 30.

KYNOCH, LTD.—A dividend at rate of 14 per cent., less tax, on the amount for the time being paid up on ordinary shares for nine months to December 31.

NEW TRANSVAAL CHEMICAL CO., LTD.—Interim dividends for half-year to December 31 last of 3 per cent., less tax, on cumulative first preference, and of 4 per cent., less tax, on cumulative "A" preference.

RECKITT AND SONS, LTD.—Interim dividend of 6d. per share.

MARKET REPORTS.

TAR AND AMMONIA PRODUCTS

WEDNESDAY.

Benzole: London, 90%, 1s. 11d. to 2s.; North, 1s. 9d. to 1s. 10d.; 50%, 1s. 9d. to 1s. 10d.; North, 1s. 9d., naked. Carboic acid, crude, 60%, East and West Coast, nominally 1s.; crystals, 30-40%, 4d. Crude tar, London, 42s. to 43s.; Midlands, 37s. to 38s.; North, 36s. to 37s. per ton, ex works. Pitch, 72s. 6d. to 75s.; East Coast, 62s. 6d. to 63s. 6d., f.o.b.; West Coast, 51s. to 53s., f.a.s. Solvent naphtha, naked, London, 90-100%, 2s. 5d.; North, 2s. 3d. to 2s. 4d.; 90-160%, naked, London, 2s. 1d.; North, 1s. 10d. to 1s. 11d. Crude naphtha, naked, 30%, 8d. to 8½d.; North, 7½d. to 7¾d. Refined naphthaline, £18. to £22.; salts, £6. to £7. Toluol, naked, London, 2s. 1d.; North, 2s. Creosote, naked, London, 5½d. to 5¾d.; North, 5d. to 5½d.; heavy oil, 7½d. to 7¾d. Anthracene, 40-45%, 6d. per unit. Cresylic acid, 95%, 2s. 7d. to 2s. 8d.; 97-99%, 2s. 9d. to 2s. 10d., ex works, London, and f.o.b. other ports. Sulphate of ammonia: Home trade, £19. 10s. per ton; basis 24½%. Nitrate of soda, £21. to £22.

FERTILISER MATERIALS.

LIVERPOOL, THURSDAY.

Nitrate of soda is unchanged in either the tone of the market or in the price of the material, and the quotation on spot for 96% quality is repeated at £20. 2s. 6d. per ton, net cash, f.o.r., prompt delivery. East Indian bone meal for shipment is without alteration, the nearest value of 4½% ammonia and 52% phosphates, July-September shipment, being £12. per ton, net cash, ex ship Liverpool. On spot holders require £14. per ton, net cash, for 4½% and 45% quality. Mineral Phosphates: This material is without alteration, and values are therefore only nominal. Dried blood is quiet, the value being about 25s. per unit of ammonia per ton.

LONDON METAL MARKET.

THURSDAY.

Copper: Standard brands, £89. to £89. 5s., cash; £90. to £90. 5s., three months; electrolytic, £92. to £97. Tin: Standard, £240. to £240. 10s., cash, £238. to £238. 10s. three months; Straits, £240. 10s.; English, £237., f.o.r. Lead: Soft foreign, £22. 15s.; English, £23. 10s. Spelter, £40.; hard, £29. to £30. Antimony, English regulus, 90%, £45. Aluminium, £150. Nickel, £195., delivered, packages extra. Quicksilver, £21. to £21. 10s. Bismuth, 12s. 6d. Platinum, 442s. per oz. Wolfram, 30s. per unit.

MANCHESTER CHEMICAL MARKET.

THURSDAY.

Business generally continues to show steady signs of improvement, and values as a whole are fairly well maintained. Resale parcels of 70% caustic soda are on offer at £18. per ton; 58% alkali at £6. 10s. per ton, and refined bicarbonate of soda, bags, £8. per ton. Bleaching powder steady at £15. on spot for softwood casks, on rails. Chlorates are easy at 1s. 3d. for potash, and 8d. for soda. Bichromates are unchanged at recent rates. Roasted saltcake only in

moderate request at 60s. per ton, carriage paid. Soda crystals, 82s. 6d. per ton, in bags. Recovered rock sulphur easy at £20. per ton, on rails, in bulk. Sulphate of copper remains in the same position as regards export trade, and price nominal at £46. per ton, f.o.b. Liverpool. Phosphate of soda dull at £25. per ton. Commercial hypo. soda, £16. 10s. per ton. Concentrated sodium sulphide, 60-65%, weaker at £22. per ton. White powdered arsenic is rather scarce for spot delivery, and price for best Cornish is firm at £35. per ton. Yellow prussiate of potash is quiet at 1s. 10d. Soda is selling better at 7½d. per lb. Carbonate of potash, 80-82%, £85. per ton. Nitrite of soda again lower at £52. 10s., basis 100%. There is not much demand for lead salts, but quotations are steady. White acetate, £86., and brown £76. per ton, delivered. Nitrate, £58. per ton. Acetic acid and acetate of soda are in better request, and quotations unaltered. Brown acetate of lime in good demand at £10. per ton. Grey, £16. 10s. per ton. Miscible and solvent wood naphtha firm at 10s. 6d. per gallon. Oxalic acid, 1s. 2½d. to 1s. 3d. per lb., delivered.

SWANSEA MARKET REPORT.

THURSDAY.

Tinplate prices are rather unsettled, especially for forward delivery. The quotations for immediate supplies range round 32/6 per box of standard sizes. Tin easier at £238. prompt and £236. three months. Copper a little cheaper and passing more freely at £86. per ton prompt and £88. three months. Lead very firm at £22. 7s. 6d. for foreign. Spelter quiet at £38. 10s. Quicksilver, £18. per bottle. Antimony unchanged; English regulus, 90%, £45. Nichel quiet at £195. per ton, including free delivery London or equal. Aluminium, £150. Linseed oil firm at 122/- per cwt. Turpentine easier at 87/6 per cwt. Pitch dearer and firmly held at 51/-, at ship. Sulphate of copper steady at £45. per ton, for home requirements, and for export £47. 10s. Sulphate of ammonia steady at £19. 10s. for home trade; export prices very irregular. Nitrate of soda quiet and steady at £21. per ton; in smaller lots 22/- per cwt. Palm oil has a better inquiry, and is firmly held at £82. 10/- per ton, for Lagos; softs, £82.; and Benin, £77. 10s. Petroleum very firm at 1/4½ to 1/5½ per gallon, in barrels, for American refined. Oxalic acid, 1/3 per lb. Arsenic in poor request: white powdered, in bags, £35. per ton, f.o.b.

TURPENTINE MARKET REPORT.

Messrs. James Watt and Son, Ltd., of 101, Leadenhall Street, London, E.C. 3, report that the stocks of turpentine on June 28 were: American 22,429 barrels, compared with 9,436 barrels at the corresponding date of 1918; French, 46 barrels (16 barrels); and Spanish, 650 barrels (1,310 barrels). Deliveries during the week ended June 28 were 1,421 barrels, against 696 last year, and since January 1 28,559 barrels, compared with 12,546 barrels in 1918. The price on Saturday last was 90/- per cwt., compared with 116/- at the corresponding date of last year. September-December delivery was quoted at 90/9 per cwt.

LIVERPOOL CHEMICAL MARKET.**THURSDAY.**

Business in the chemical market has been moderately active and shows an improving tendency. More inquiries have been made on export account and the demand from the home trades has been on an increased scale. Bleaching powder has been in moderate request and is £14. 10s. to £15. per ton, free on rail or conveyance, in buyers' packages, and £15. to £17. per ton for export. Chloride of calcium has again been quiet and is £8. to £11. per ton, in casks f.o.r. Caustic soda has been in good request with an improved demand for export and is £24. per ton for 76 per cent.; £22. per ton for 70 to 72 per cent., and £19. per ton for 60 to 62 per cent. Nitrate of soda has been more in request and is £20. 10s. to £21. per ton. Saltcake has been in very fair demand and is £6. 10s. per ton, in casks, f.o.b. Soda crystals have been well inquired for and are £5. per ton in 2cwt. bags, f.o.r. at works. Bicarbonate of soda has again been in fairly active demand. It is £7. 5s. to £10. per ton, according to terms of delivery. Hyposulphite has been quiet and the price has eased. Ordinary is £12. per ton, and crystals are £17. per ton. Ammonia alkali has been in good request and is £6. to £6. 5s. per ton, f.o.r. at works. Borax has been rather freely inquired for. The price has been advanced and is £42. per ton for ordinary and £44. per ton for powdered, in bags. Bichromate of soda has been in fair request and is 8½d. to 9d. per lb., Phosphate of soda has been in somewhat better demand, and is £25. per ton. Sulphide of sodium has been in moderate request and is £20. per ton in casks and £22. per ton, in drums. Chlorate of potash has been in quietly steady demand and is cheaper. It is 1s. per lb. Permanganate of potash has again met with a fair inquiry and is 3s. 6d. per lb.

Sulphate of potash continues very quiet and is £40. per ton. Carbonate of potash has been in fair request and is £85. to £90. per ton for 80 to 85 per cent. Caustic potash has sold rather freely and is £160. per ton for 35° Bé. Nitrate of potash has been more inquired for and is £55. to £58. per ton for refined and £40. per ton for ordinary. Canadian ashes have been very quiet. First quality Montreal are £220. to £225. per ton and second quality, £215. to £220. per ton. Bichromate of potash has been in very fair request and the price has eased. It is 1s. 6d. to 1s. 8d. per lb. Yellow prussiate of potash has sold more readily and is 1s. 10d. to 2s. per lb. Sal ammoniac has been in rather active inquiry and is £80. per ton for lump; £75. per ton, for seconds, and £5. per ton extra for ground. Sulphate of ammonia has been rather more in request. The price to farmers in the United Kingdom is £19. 10s. per ton, delivered free to the nearest wharf or railway station, less 10s. per ton as traders' discount, to September 30. Murate of ammonia has been but little called for, and is £50. to £60. per ton, according to quality. Magnesia has been in moderate demand. Carbonate is £3. 10s. per cwt. and sulphate £10. to £16. per ton, according to grade. Alum has sold rather freely and is £18. per ton for the home trade and £18. 10s. to £19. 10s. per ton for export. Aluminoferric has been neglected and is £8. 10s. to £12. per ton, according to quality. Sulphate of alumina has been but little in request and is £13. to £18. per ton according to grade. Sulphur has been in moderate demand, with English flowers still scarce. They are £32. per ton. Roll is £28. per ton, and rock, £22. per ton, in bags f.o.r. Sicilian kinds are:—Flowers, £28. per ton; roll, £22. 10s. per ton and third quality £17 15s. per ton. Cream of tartar has been quieter and the price has eased. It is £11 5s. per cwt. Tartaric acid has had a moderate sale and the price is slightly lower. It is 3s. 1d. per lb. Boracic acid has again been in fair demand. It is £72. per ton for crystals, and £74. per ton for powdered. Oxalic acid has had a quietly steady sale and is 1s. 3d. per lb. Citric acid has had a fair inquiry and is 4s. 4d. per lb. White acetate of lead has been

in moderate demand and is £85. to £90. per ton. Arsenic has been more in request, and is £35. per ton for white powdered. Sulphate of copper has been quiet and is £44. to £45. per ton for farmers' uses and £47. to £48 per ton, less 5 per cent.; in casks f.o.b. at Liverpool.

TYNE CHEMICAL REPORT.**TUESDAY.**

Market conditions as far as industrial chemicals are concerned for export. Soda crystals locally are in good request at £5. per ton, 2cwt. bags. Sulphur scarce and firm at £22. to £23. per ton.

The following prices are per ton, net: Bleaching powder, softs and hards, £15. per ton; caustic soda, 74-77%, 23. 5s.; do., 70%, £22.; do., 60%, £20.; recovered sulphur, 2cwt. bags, £23.; hyposulphite of soda, 5-7cwt. casks, £19.; do., 1cwt. kegs, £25.; sulphite of soda, 5-7cwt. casks, £12.; do., 1cwt. kegs, £20.; silicate of soda, 75° Tw., £9. 12s. 6d.; do., 100° Tw., £10.; do., 140° Tw., £10. 10s.; soda crystals, 2cwt. bags, £5.; sulphate of soda (saltcake), in bulk, £3. 10s.; pure white sulphate of alumina, 14-15%, £19. 10s.; blanc fixe, £22.; chloride of barium, £27.; sulphate of sodium, crystals, £18.; do., refined concentrated solid, 60-62%, £25.; hydrate of barium, crystals, £56.

COALS.—Market unsettled. Many collieries, owing to local holidays and peace celebrations, have not yet recommenced work, thus increasing the already acute shortage of coal. Forward the demand is heavy for all classes of coal. Allies' quotations: Best Northumbrian steam, 69s. to 70s. per ton; seconds, 60s. to 65s.; Northumbrian small coals, 45s.; seconds, 40s. to 44s.; best Durham gas coals, 55s. to 57s.; seconds, 52s. 6d.; Durham bunkers, 56s. to 55s.; foundry coke, 49s. 6d. to 50s.; gas coke, 37s. 6d.

WEST OF SCOTLAND CHEMICALS.**GLASGOW, Wednesday.**

Market conditions as far as industrial chemicals are concerned are quite unchanged from the last report, and there are no price variations falling to be recorded. Inquiry is fairly steady, but at times rather slow, and matters may therefore be said to be moving along easy-going lines. Prices current are: Arsenic, £40. per ton, net, Glasgow; bicarbonate of soda, £8. 15s. and £10. per ton for 6-8 casks and 1cwt. kegs, Liverpool; boracic acid crystals, English refined, £72. for 2cwt. bags, and borax crystals, £39. for 2cwt. bags, carriage paid; caustic soda, white, 70-72%, £24. per ton, net, Glasgow; chlorate of potash, 1s. 3d. per lb., net, Glasgow; chlorate of soda, 10d. per lb., net, Glasgow; citric acid, 4s. 4d. per lb., 5%, Glasgow; cream of tartar, 88%, £11. 5s. per cwt., net, Glasgow; sal ammoniac, £80. and £75. per ton, net, any port, for first and second lump respectively; sal ammoniac crystals £85. per ton, net, Glasgow; saltpetre, £3. 5s. per cwt., net, Glasgow; tartaric acid, 3s. 1d. per lb., 5%, Glasgow.

Likewise there are no changes among the sea oils. Quantities of all oils are very scarce, and among whale oils only two varieties are still on offer—namely, brown (which is still attracting purchasers at 78/-) and black (which is still getting 76/-). Neither pale nor yellow varieties are on offer, and the same comment applies to both pale seal and Menhaden. Newfoundland cod is a fairly steady market at 74/-, its old price, and everything on offer quickly goes into consumption.

In the coal trade conditions continue a little bit easier, and supplies seem to be sufficiently adequate to meet most purposes, both industrial and domestic. Export business continues quiet, and altogether the tone of the market generally may be said to remain more or less unaltered.

IMPORTS OF CHEMICAL PRODUCTS**AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.****GLASGOW.**

Week ending June 23.

BORAX—
Rosario, 886 bgs.**CARBIDE**—
Montreal, 4,000 drms.**PHOSPHATE**—
Bona, 2,760 t.**SOAP**—
Montreal, 4 cs.**TALLOW**—
Rosario, 860 cks.**GOOLE.**

Week ending June 28.

FORMIC ACID—
Rotterdam, 204 cbs.**GRANGEMOUTH.**

Week ending June 28.

NIL.**HULL.**

Week ending June 28.

BARYTES—
Antwerp, 390 brls.**LITHOPONE**—

New York, 250 brls.

POTASH—

New York, 29 cks.

WAX—

Congo, 153 bgs.

ZINC OXIDE—

Rotterdam, 150 cks.

LEITH.*Week ending June 28.*

NIL.

LIVERPOOL.*Week ending June 28.*

ACETONE—
Baltimore, 178 drms.

BEES WAX—
W. C. Africa, 480 blks.

CARBON—
New York, 132 kgs.

COPPER ORE—
W. C. Africa, 242 bgs.

COPPER PRECIPITATE—
Algiers, 2,800 bgs.

CAPRO—
Kingston, 3 pkgs.; W. C. Africa, 300 bgs.

DYESTUFFS—
Chestnut Extract
Genoa, 800 pkgs.
Logwood Extract
Kingston, 488 pkgs.
Myrobalams
Bombay, 2 cs., 1,230 bgs.
Tanning Extract
Genoa, 300 cks.

GLUCOSE—
New York, 618 brls.

GLUESTOCK—
Genoa, 300 cks.

LITHOPONE—
New York, 100 brls.

MINERAL WHITE—
Genoa, 500 bgs.

NICKEL OXIDE—
Montreal, 3 brls.

OCBRE—
Bombay, 20 cks.

PARAFFIN WAX—
Trinidad, 200 brls.

ROSIN—
Bilbao, 216 brls.

SILVER ORE—
W. C. America, 4 serons.

SOAP—
Montreal, 283 cks., 406 cs.

SOAPSTONE—
Genoa, 100 bgs.

SODA—
New York, 31 brls.

STEARINE—
Montreal, 59 brls.

TARTARIC ACID—
Genoa, 65 brls.

TIN ORE—
W. C. Africa, 10,371 bgs.; W. C. America, 797 bgs.

VEGETABLE WAX—
Bombay, 29 cs.

WAX—
Kingston, 2 pkgs.; Manaos, 230 cs.

ZINC OXIDE—
Rotterdam, 20 cks.

ZINC WHITE—
Rotterdam, 80 brls.

LONDON.*Week ending June 28.*

ANTIMONY OXIDE—
France, 42 cks.

BARYTES—
U.S.A., 60 cks., 143 brls.

BEES WAX—
France, 529 pkgs.

CANDELILLA WAX—
U.S.A., 308 bgs.

CHEMICALS (otherwise undescribed)
Italy, 38 cs.; Switzerland, 2 pkgs.; U.S.A., 50 cs.

CITRATE OF LIME—
B.W.I., 30 cks.; Italy, 90 pkgs.

COAL PRODUCTS—
Benzonaphthol
Switzerland, 1 brl.; U.S.A., 7 brls.

COBALT OXIDE—
U.S.A., 35 cks.

COBALT SULPHATE—
U.S.A., 4 cks.

DYESTUFFS—
Argols
Cape, 36 pkgs.
Myrobalams
Brit. India, 2,000 pkgs.

DYESTUFFS—
Shumac
Italy, 200 pkgs.

TURNERIC—
Brit. India, 78 pkgs.

GELATINE—
France, £200.; Spain, £1,980.

GLUE—
Italy, £1,057.

LEAD ACETATE—
U.S.A., 35 brls.

LITHOPONE—
U.S.A., 800 cks.

MAGNESITE (CALCINED)—
Brit. India, £4,800.

OCBRE—
France, 97 cks.

PITCH—
U.S.A., 25 brls.

PLUMBAGO—
France, 165 brls.

POTASH—
Brit. India, 7 bgs.

POTASSIUM CHLORATE—
Switzerland, 40 pkgs.

POTASSIUM CHLORIDE—
Brit. India, 200 pkgs.

POTASSIUM IODIDE—
Japan, 10 cs.

POTASSIUM MURIATE—
Brit. India, 250 bgs.

POTASSIUM PRUSSATE—
Holland, 6 pkgs.

ROSIN—
Sweden, 28 pkgs.; U.S.A., 50 pkgs.

SALTPETRE—
Brit. India, 30 t.

SOAP—
Canada, £10.; France, £164.; U.S.A., £695.

SODA—
France, 1 t.

SODIUM HYPO—
Switzerland, 1 t.

SULPHUR—
Italy, 100 bgs.

TALLOW—
N.Z., 896 t. 17 c.; U.S.A., 192 t. 7 c.

TANNIC ACID—
U.S.A., 14 brls.

TAR—
Sweden, 600 brls.; U.S.A., 100 brls.

WAX—
Japan, 80 cs.; U.S.A., 975 bxs., 150 t., 10 c.

ZINC DUST—
Victoria, 2,000 bxs.

ZINC OXIDE—
Spain, 73 cks.; U.S.A., 950 brls.

ZINC WHITE—
N.S.W., 2,000 bgs.

MANCHESTER.*Week ending June 28.*

FORMIC ACID—
Rouen, 18 cks.

MINERAL WHITE—
Bergen, 2,187 bgs.

SODIUM PHOSPHATE—
Antwerp, 52 cks.

MIDDLESBROUGH.*Week ending June 28.*

NIL.

NEWCASTLE-ON-TYNE.*Week ending June 28.*

BAUXITE—
Pt. Du Bauc, 3,070 t.

N. & S. SHIELDS.*Week ending June 28.*

NIL.

STOCKTON-ON-TEES.*Week ending June 28.*

NIL.

SWANSEA.*Week ending June 28.*

NIL.

EXPORTS OF CHEMICAL PRODUCTS**AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.****GLASGOW.***Week ending June 28.*

AMMONIUM SULPHATE—
Jamaica, 2 t.

CHEMICALS (otherwise undescribed)
Bordeaux, 4 t. 18 c.; Boston, 8 t. 16 c.; Delagoa Bay, 102 t. 8 c.; Gothenburg, 44 t. 4 c.; Vera Cruz, £145.

COAL PRODUCTS (otherwise undes.)
Antwerp, £3,220.; Calcutta, £85.

COAL PRODUCTS—
Creosote Oil
Beira, 4 t. 17 c.
Cresylic Acid
Colombo, 400 gals.

LEAD NITRATE—
Rouen, 5 t.

MAGNESIA (CALCINED)—
Havre, 11 c.

MAGNESIUM CARBONATE—
Havre, 10 t. 8 c.

PARAFFIN WAX—
Bordeaux, 20 t. 1 c.

POTASSIUM BICHRIMATE—
Rouen, 2 t. 7 c.

RED LEAD—
Durban, 17 c.; Mauritius, 2 t.; Madras, 18 c.

SHEEP DIP—
Beira, 42 t. 3 c.; Delagoa Bay, 14 t. 1 c.; Durban, 23 t. 14 c.

SOAP—
Antwerp, 655 bxs.; Madras, 4 t. 9 c.

SODIUM BICARBONATE—
Bordeaux, 4 t. 2 c.; Rouen, 40 t. 9 c.

SODIUM CARBONATE—
Durban, 1 t.

SULPHURIC ACID—
Madras, 3 t. 18 c.

TALLOW—
Madras, 15 c.

WHITE LEAD—
Antwerp, 6 t. 1 c.; Durban, 2 t. 16 c.; Rouen, 21 t. 8 c.

GOOLE.*Week ending June 28.*

NIL.

GRANGEMOUTH.*Week ending June 28.*

SODIUM BICHRIMATE—
Nantes, 23 t. 17 c.

GRIMSBY.*Week ending June 28.*

DYESTUFFS (otherwise undescribed)
Dieppe, 628 cks.

HULL.*Week ending June 28.*

ACID—
Amsterdam, 11 cks.

CHEMICALS (otherwise undescribed)
Amsterdam, 4 drms.; Calais, 10 bgs., 2 cks.; Gothenburg, 75 drms.; Rotterdam, 29 drms.

COAL PRODUCTS (otherwise undes.)
Amsterdam, 30 brls.

DISINFECTANTS (otherwise undes.)
Copenhagen, 1 cs.; Melbourne, 240 drms., 233 cs.; Napier (N.Z.) 24 drms., 28 cs.

FATTY ACIDS—
Antwerp, 59 brls.

GLUE—
Antwerp, 16 bgs.; Copenhagen, 1 cs.; Gothenburg, 21 bgs.

SOAP—
Antwerp, 50 kgs., 147 cs.; Melbourne, 20 drms.

TAR SALTS—
Sydney, 30 brls.

WOOD PRESERVATIVE—
Auckland, 100 drms.; Christiania, 31 bxs.; Melbourne, 6 brls.

AMMONIUM BICHRIMATE—
Rouen, 5 t. 1 c., £29.

AMMONIUM CARBONATE—
Gothenburg, 1 t., £62.

BORAX—
Amsterdam, 2 t., £80.; Faroe Islands, £1.; Rotterdam, 2 t., £80.

BORIC ACID—
Gothenburg, 2 t. 10 c., £183.

CALCIUM CHLORIDE—
Iceland, 1 t. 12 c., £16.

CAUSTIC SODA—
Amsterdam, 980 t., £1,005.

COAL PRODUCTS (otherwise undes.)
Gothenburg, £398.

CREAM OF TARTAR—
Faroe Islands, 5 t. 4 c., £37.

MAGNESIUM CARBONATE—
Rouen, 10 t., £390.

POTASSIUM BICHRIMATE—
Amsterdam, 10 t. 1 c., £91.

SODA—
Faroe Islands, 20 t. 11 c., £11.

SODA CRYSTALS—
Faroe Islands, 2 t.

SODIUM BICHRIMATE—
Rouen, 1,024 t. 8 c., £2,362.

SODIUM CARBONATE—
Faroe Islands, 10 t. 7 c., £13.

SODIUM NITRATE—
Odense, 16 t. 5 c., £7,872.

LEITH.*Week ending June 28.*

ALUMINA SULPHATE—
Trondhjem, 10 t., £75.

LIVERPOOL.

Week ending June 26.

ACETIC ACID—

Punta Arenas (Chile), 1 c., \$6.

ALUM—

Bombay, 9 t. 19 c., \$200.; Calcutta, 14 t. 11 c., \$207.; Guayaquil, 2 t. 9 c., \$16.; New York, 10 t., \$240.; Rangoon, 10 c., \$11.; Samarang, 17 t. 13 c., \$396.

ALUM (CHROME)—

Havre, 4 t. 9 c., \$550.

ALUMINA SULPHATE—

Barcelona, 20 t., \$300.; Bilbao, 22 t. 15 c., \$433.; Soerabaya, 5 t. 6 c., \$115.

ALUMINOFERRIC—

Calcutta, 74 t. 16 c., \$599.

AMMONIA—

La Libertad, 1 c., \$5.; Rouen, 10 t. 10 c., \$370.

AMMONIA (ANHYDROUS)—

Opobo, 3 c., \$55.; Pt. Harcourt, 5 c., \$109.

AMMONIUM CARBONATE—

Bombay, 1 t., \$84.; Barcelona, 1 t. 12 c., \$92.; Christiania, 1 t., \$65.; Callao, 2 c., \$13.; Eten, 1 c., \$10.; Fremantle, 6 c., \$19.; La Libertad, 1 c., \$8.; Mollendo, 1 c., \$6.; Marseilles, 1 t. 10 c., \$99.; Madras, 2 t. 6 c., \$184.; New York, 4 t., \$225.; Porto Alegre, 19 c., \$63.; Panama, 1 c., \$8.; Perth, 10 c., \$32.; Punta Arenas (Costa Rica), 10 c., \$25.; Rangoon, 5 c., \$17.; Santos, 19 c., \$63.; Zaragoza, 2 c., \$9.

AMMONIUM MURIATE—

Antwerp, 5 t. 11 c., \$283.; Alexandria, 6 t., \$380.; Algoa Bay, 4 c., \$12.; Adelaide, 18 c., \$57.; Bombay, 63 t. 15 c., \$2,179.; Calcutta, 30 t., \$1,725.; Montreal, 2 t. 11 c., \$154.; Rangoon, 5 t., \$291.

ANILINE PRODUCTS—

Alexandria, 2 t. 13 c., \$345.; Bombay, 5 t. 7 c., \$843.

ANTIMONY OXIDE—

Bilbao, 5 t., \$220.

ARSENIC ACID—

Tammerfors, 2 c., \$35.

BARIUM CHLORIDE—

East London, 2 t. 5 c., \$70.

BLEACHING POWDER—

Antwerp, 1 t. 3 c., \$21.; Bombay, 11 t. 19 c., \$225.; Calcutta, 115 t. 10 c., \$1,594.; Colombo, 2 c., \$4.; Ghent, 9 t. 12 c., \$187.; Perth, 2 t. 1 c., \$26.; Rouen, 51 t. 8 c., \$605.

BORAX—

Antwerp, 25 t., \$998.; Barcelona, 4 t. 9 c., \$174.; Callao, 1 c., \$2.; Gothenburg, 1 t., \$16.; Rotterdam, 19 t. 16 c., \$392.; Saltpond, 3 c., \$7.

BORIC ACID—

Eten, 1 c., \$11.; Pt. Stanley, 1 c., \$3.; Rotterdam, 1 t. 9 c., \$107.

CALCIUM CARBIDE—

Seccondee, 10 c., \$16.

CALCIUM CHLORIDE—

Auckland, 1 t. 1 c., \$8.; Bombay, 11 t. 7 c., \$81.; Hong Kong, 10 t. 2 c., \$77.; Lytleton, 11 c., \$58.; Melbourne, 10 t. 2 c., \$77.; Newcastle, 10 t. 2 c., \$77.; Rangoon, 4 t. 19 c., \$38.; Singapore, 10 t. 2 c., \$77.; Wellington, 9 t. 19 c., \$79.

CARNAUBA WAX—

Madeira, 2 bgs.

CAUSTIC SODA—

Algoa Bay, 200 drms.; Athens, 2 drms.

CHEMICALS (otherwise undescribed)

Kilindini, 2 c., \$34.

COAL PRODUCTS (otherwise undes.)

Balik Papan, 54 t. 14 c., \$398.; Christiania, 15 t. 12 c., \$1,785.; Lome, 11 c., \$11.; Malacca, 10 t. 7 c., \$45.

COAL PRODUCTS (otherwise undes.)

Punta Arenas (Chile), 1 t. 13 c., \$18.; Samarang, 14 t. 10 c., \$145.; Teneriffe, 8 c., \$16.

COAL PRODUCTS—**Aniline Dyes**

Bordeaux, 35 t. 3 c., \$2,625.; Havre, 4 c., \$73.; Pinaus, 13 c., \$803.; Shanghai, 1 t., \$182.; Yokohama, 2 c., \$83.

Carbolacene

Bathurst, 2 c., \$3.; New York, 18 t., \$600.

Carbolic Acid

Calcutta, 1 t., \$10.; La Libertad, 1 c., \$6.

Dyes

Barcelona, 2 t. 18 c., \$772.; Boston, 1 t. 5 c., \$690.; Batavia, 5 t., \$33.; Halifax, 5 t. 11 c., \$716.; Montreal, 6 c., \$55.; New York, 2 t. 8 c., \$971.

COPPER SULPHATE—

Galatz, 179 pkgs.; Rangoon, 60 pkgs.

DISINFECTANTS (otherwise undes.)

Algoa Bay, 1 t. 16 c., \$91.; Abonema, 5 c., \$3.; Bombay, 4 t., \$70.; Barcelona, 15 c., \$57.; Calcutta, 5 t. 12 c., \$210.; Cape Town, 1 t. 16 c., \$91.; Callao, 1 c., \$3.; Degama, 2 c., \$5.; East London, 4 t. 18 c., \$263.; Helsingfors, 1 t., \$75.; Koko, 1 c., \$1.; La Libertad, 12 c., \$48.; Marseilles, 1 t. 1 c., \$29.; Macassar, 9 c., \$11.; Opobo, 14 c., \$42.; Pacasmayo, 4 c., \$15.; Pt. Harcourt, 5 c., \$8.; Puerto Barrios, 14 c., \$35.; Pt. Stanley, 4 c., \$5.; Rangoon, 1 t. 14 c., \$67.; Sarawak, 9 c., \$16.; Soerabaya, 14 t. 4 c., \$171.; Singapore, 4 t. 11 c., \$225.; Valencia, 1 c., \$10.; Vera Cruz, 3 c., \$24.

GLUE—

Mauritius, 1 pkg.; Norrkoping, 20 pkgs.; Yokohama, 100 pkgs.

GLUE, SIZE, AND GELATINE—

Accra, 1 pkg.; Alexandria, 89 pkgs.; Bombay, 10 pkgs.; Colombo, 3 pkgs.; Kingston, 1 pkg.; Kobe, 299 pkgs.; La Paz, 2 pkgs.; Lagos, 2 pkgs.; Lisbon, 2 pkgs.; New York, 422 pkgs.; Rangoon, 200 pkgs.; Shanghai, 51 pkgs.; Valparaiso, 5 pkgs.; Valencia, 25 pkgs.

GLYCERINE—

Cape Coast, 2 c., \$1.

HYDROCHLORIC ACID—

Singapore, 6 c., \$26.

LEAD CARBONATE—

Mollendo, 3 c., \$13.

MAGNESIA—

New York, 20 pkgs.; Valparaiso, 2 pkgs.

MAGNESIUM CARBONATE—

Mollendo, 4 c., \$20.

MAGNESIUM CHLORIDE—

Bombay, 29 t. 9 c., \$452.; Bangkok, 6 t. 10 c., \$121.; Cape Town, 4 t. 18 c., \$77.

MAGNESIUM CITRATE—

Mollendo, 2 c., \$25.; Panama, 1 c., \$15.; Punta Arenas (Costa Rica), 4 c., \$10.

MAGNESIUM NITRATE—

La Libertad, 2 c., \$20.

MANGANESE SULPHATE—

New York, 5 t. 3 c., \$257.

PARAFIN WAX—

Alexandria, 34 bgs.; Christiania, 55 bgs.; Perim, 40 pkgs.

PHOSPHORUS—

Kobe, 20 t. 7 c., \$2,876.

PITCH—

Antwerp, 120 t. 10 c., \$510.; Granville, 200 t., \$550.

POTASSIUM BICHRONATE—

Marseilles, 7 c., \$85.

POTASSIUM CHLORATE—

Opoto, 2 t. 5 c., \$314.

POTASSIUM NITRATE—

Barranquilla, 15 c., \$50.

POTASSIUM SULPHATE—

Teneriffe, 20 t., \$720.

SALAMMONIAC—

Alexandria, 10 cks.; Antwerp, 1 t., \$72.; Barcelona, 10 c., \$34.; Bombay, 6 t. 1 c., \$429.; Bilbao, 10 c., \$36.; Christiania, 50 cks.; Karachi, 3 t. 18 c., \$280.; Rouen, 17 cks.; Rotterdam, 5 c., \$20.; Salonika, 10 cks.; Santander, 10 cks.; Sekondi, 3 cks.

SALT—

Burutu, 349 t.; Barbados, 45 t.; Belize, 4 t.; Calcutta, 4,254 t.; Calabar, 78 t.; Cotonou, 48 t.; Delagoa Bay, 1 t.; Durban, 1 t.; Grand Bassam, 24 t.; Halifax, N.S., 359 t.; Isafjord, 330 t.; Killindini, 10 t.; Koko, 36 t.; Lagos, 1,168 t.; Manaos, 37 t.; Monte Video, 36 t.; Montreal, 200 t.; Natal, 2 t.; Para, 177 t.; Pt. Gentil, 20 t.; Pt. Harcourt, 92 t.; Quebec, 450 t.; Rio del Rey, 10 t.; Sapele, 36 t.; Sekondi, 6 t.; Sierra Leone, 94 t.; Stockholm, 207 t.; Warri, 18 t.

SALTPETRE—

Saltpond, 3 c., \$10.

SHEEP DIP—

Barranquilla, 4 c., \$11.; Buenaventura, 2 c., \$9.; Cape Town, 3 t., \$169.; Curacao, 17 c., \$74.; Corral, 2 t. 1 c., \$111.; East London, 17 t. 8 c., \$869.; Pt. Stanley, 11 t. 8 c., \$108.; Puerto Cabello, 1 t., \$95.; Punta Arenas (Chile), 52 t. 10 c., \$2,013.

SOAP—

Alexandria, 762 bxs.; Autofagasta, 18 cs.; Antwerp, 1 cs.; Arica, 100 cs.; Ashanti, 7 cs.; Athens, 300 cs.; 300 bxs.; Azua, 224 bxs.; Bangkok, 1 cs., 1 pkg.; Belawan, 3 pkgs.; Bermuda, 50 pkgs.; Bombay, 2,242 bxs.; Bucharest, 49 pkgs.; Calcutta, 2,871 bxs.; Christiania, 350 cs., 40 bxs.; Copenhagen, 50 bxs., 6,133 cs.; Demerara, 4 cs.; Duala, 1 cs.; Fernando Po., 170 bxs.; Gothenburg, 40 cs.; Galatz, 465 cs.; Gibraltar, 50 cs.; Havre, 655 cs.; Hong Kong, 500 cs.; Iquique, 45 cs.; Karachi, 500 bxs., 1,236 cs.; Kingston, Jam., 10 bxs., 6,991 cs.; Kuala Lumpur, 16 cs.; Lagos, 3 cs.; Las Palmas, 258 bxs.; Madeira, 20 cs.; Macassar, 300 bxs.; Madras, 52 cs.; Menado, 100 cs.; Mogador, 17 bxs.; Panorocon, 50 pkgs.; Padang, 48 pkgs.; Penang, 528 bxs.; Paris, 8 pkgs.; Pt. Said, 2,106 bxs.; Pt. Louis, 12 pkgs.; Pt. Sudan, 161 bxs.; Quittah, 150 pkgs.; Rangoon, 9,964 bxs.; Rouen, 100 bxs.; San Carlos, 20 bxs.; Samarinda, 350 pkgs.; Sabang, 62 cs.; Saltpond, 350 bxs.; Singapore, 1,970 pkgs., 23 cs.; Sierra Leone, 50 bxs.; Smyra, 20 cs.; Suelaba, 50 bxs.; Teneriffe, 224 cs.; Upsala, 100 cs.; Valparaiso, 92 bxs.

SODA ASH—

Calcutta, 4,771 pkgs.; Copenhagen, 2,914 pkgs.; Gothenburg, 1,437 pkgs.; Karachi, 1,750 pkgs.; Kobe, 1,812 pkgs.; Piraeus, 370 pkgs.; Tampico, 1,200 bgs.; Valparaiso, 369 pkgs.; Wellington, 19 pkgs.; Yokohama, 2,200 pkgs.

SODIUM BICARBONATE—

Alexandria, 150 pkgs.; Amsterdam, 675 pkgs.; Cape Town, 70 pkgs.; Christiania, 54 pkgs.; Kobe, 2,000 pkgs.; Malta, 10 pkgs.; Montreal, 250 pkgs.; Piraeus, 100 pkgs.; Salonika, 150 pkgs.; Valparaiso, 840 pkgs.

SODIUM SILICATE—

Adelaide, 286 cs.; Boston, 94 pkgs.; Delagoa Bay, 10 pkgs.; Gothenburg, 36 pkgs.; Kobe, 32 pkgs.; Lisbon, 16 pkgs.; Montreal, 32 pkgs.; Natal, 20 pkgs.; Piraeus, 472 pkgs.; Vera Cruz, 25 pkgs.

SULPHUR—

Christiania, 8 c., \$12.; Helsingfors, 4 c., \$16.; Punta Arenas (Chile), 1 c., \$2.

SULPHUR—

San Jose, 6 c., \$39.

SULPHURIC ACID—

Valparaiso, 2 t., \$80.

SUPERPHOSPHATE OF LIME—

Orotava, —

TALLOW—

Opoto, 15 brls.

TARTARIC ACID—

Kingston, 1 c., \$26.; New York, 4 t. 16 c., \$1,476.; Rangoon, 6 c., \$83.

WAX—

Bilbao, 11 bgs.; Cartagena, 2 cs., 9 c.

WOOD PRESERVATIVE—

Calcutta, 2 t. 13 c., \$68.; Dundedin, 2 t. 7 c., \$52.; East London, 9 c., \$11.; Singapore, 2 t. 14 c., \$61.

ZINC CHLORIDE—

Bombay, 8 t. 13 c., \$369.; Samarang, 1 t. 2 c., \$84.; Singapore, 2 t. 16 c., \$252.

LONDON.

Week ending June 25.

ACETANILID—

New York (F.), 25 drms., \$340.

ACETIC ACID—

Canton, 2 cs., \$24.; Durban, 5 cs., \$15.; Mauritius, 1 cs., \$16.; Rotterdam (F.), 12 brls., \$170.; Tamatave, 2 c., \$5.

ACETO SALICYLIC ACID—

Cape Town, 1 cs. (pt.), \$17.; Mauritius (F.), 1 cs. (pt.), \$8.; Mauritius, 1 cs. (pt.), \$5.; Perth, 1 cs., \$14.; Pt. Elizabeth, 1 cs., \$23.; Singapore, 1 cs. (pt.), \$26.

ALUM—

Abo, 1 t., \$23.; Colombo, 10 c., \$14.; Cartagena (Col.), 13 c., \$20.

AMMONIA—

Athens, 4 drms., \$11.; Durban, 12 cs., \$24.; Kilindini, 4 cs., \$8.; Lisbon, 18 drms., \$178.; Paris, 26 drms., \$249.; Rangoon, 12 cs., \$37.; Rio de Janeiro, 5 cs., \$17.; Tientsin, 5 cs., \$7.

AMMONIA (ANHYDROUS)—

Channel Islands, 1 cyl., \$10.; Rangoon, 19 cs., \$262.

AMMONIUM ACETATE—

East London, 1 cs. (pt.), \$9.

AMMONIUM CARBONATE—

Buenos Ayres, 2 c., \$7.; Calcutta, 1 c., \$7.; Cape Town, 4 c., \$15.; Colabo, 1 c., \$7.; Karachi, 1 c., \$5.; Mauritius, 2 c., \$11.; Monte Video, 1 t. 19 c., \$184.; Paris, 1 t. 19 c., \$128.; Pt. Elizabeth, 7 c., \$28.; Rio de Janeiro, 18 c., \$103.; Tamatave, 1 c., \$6.

AMMONIUM CHLORIDE—

Amsterdam, 2 cks., \$30.; Brussels, 1 ck., \$6.; Buenos Ayres, 2 cks., \$16.; Melbourne, 1 cs. (pt.), \$5.

AMMONIUM FLUORIDE—

Gothenburg, 4 cks., \$114.

AMMONIUM HYDRATE—

East London, 1 cs. (pt.), \$9.

AMMONIUM IODIDE—

Batoum, 1 cs. (pt.), \$5.

AMMONIUM PHOSPHATE—

Hong Kong, 1 cs., \$6.

AMMONIUM SULPHATE—

Mauritius, 700 t., \$18,901.

AMYL ACETATE—

Antwerp, 3 drms., \$35.

AMYL ALCOHOL—

Buenos Ayres, 1 cs., \$9.

ANTIMONY CHLORIDE—

Buenos Ayres, 8 cks., \$141.

ANTIMONY SULPHIDE—

Antwerp, 1 ck., \$39.; Abo 4 cks., \$52.; Brussels, 11 cks., \$139.; Boulogne, 2 cks., \$115.; Calais, 28 cks., \$504.

ANTIMONY TRISULPHIDE—

Copenhagen, 1 kg., \$8.

- ARSENIC**
Bahia, 1 t., £42.; Calcutta, 4 t., £232.
- BARIUM CHLORIDE**
Bilbao, 3 cks., £18.; Havre, 5 cks., £30.
- BARIUM SULPHIDE**
Alexandria, 1 cs., £15.
- BENZOIC ACID**
Abo, 3 cs. (pt.), £149.; Athens, (F.), 1 cs. (pt.), £6.; Brussels, 2 brls., £63.
- BEEF WAX**
Buenos Ayres, 2 c.
- BISMUTH AND AMMONIUM CITRATE**
Buenos Ayres, 1 cs. (pt.), £17.
- BISMUTH CARBONATE**
Batoum, 1 cs., £40.; Buenos Ayres, 1 cs. (pt.), £25.; Cape Town, 1 cs., £8.; Singapore, 1 cs. (pt.), £14.
- BISMUTH SALICYLATE**
Mauritius, 1 cs. (pt.), £7.
- BISMUTH SALTS**
Perth, 2 cs. (pt.), £18.
- BISMUTH SUBGALLATE**
Batoum, 1 cs. (pt.), £18.
- BISMUTH SUBNITRATE**
Amsterdam, 1 cs. (pt.), £63.; Antwerp, 1 cs. (pt.), £155.; Mauritius, 1 cs. (pt.), £10.
- BORAX**
Abo, 8 c., £17.; Amsterdam, 2 t., £160.; Athens, 2 c., £13.; Athens (F.), 6 c., £12.; Batoum, 10 c., £20.; Beira, 6 c., £12.; Pt. Elizabeth, 2 c., £6.; Rotterdam, 5 t., £210.; Wasa, 10 c., £24.
- BORIC ACID**
Athens, 3 c., £17.; Batoum, 2 c., £7.; Bermuda, 1 c., £5.; Calcutta, 6 c., £25.; Canton, 3 c., £16.; Cape Town, 10 c. (F.), £37.; Delagoa Bay, 2 c. (F.), £37.; Durban, 1 c., £5.; Durban, 2 c. (F.), £8.; East London, 2 c., £9.; Hong Kong, 2 c., £9.; Kilindini, 2 c., £8.; Madras, 1 c., £5.; Montreal, 12 c., £46.; Samarai, 1 c., £6.; Tamatave, 1 c., £7.
- CALCIUM CARBIDE**
Bombay, 1 cs., £6.; Durban, (F.), 5 t., £124.
- CALCIUM GLYCEROPHOSPHATE**
Brussels, 1 cs. (pt.), £22.; Mauritius, 1 cs. (pt.), £10.; Pt. Elizabeth, 1 cs. (pt.), £6.
- CALCIUM HYPO**
Buenos Ayres, 1 cs. (pt.), £5.
- CALCIUM HYPOPHOSPHITE**
Buenos Ayres, 1 cs. (pt.), £5.
- CALCIUM LACTATE**
Adelaide, 1 cs., £14.; Melbourne, 2 cs. (pt.), £17.
- CALCIUM PHOSPHATE**
Abo, 1 ck., £13.
- CARBIDE**
Malta, 1 t. 2 c., £28.
- CARBON BISULPHATE**
Gothenburg, 100 cs., £378.
- CARNAUBA WAX**
Antwerp, 16 c.; Amsterdam, 2 c.; Fremantle, 10 c.
- CAUSTIC POTASH**
Cape Town, 1 cs., £17.
- CAUSTIC SODA**
Kilindini, 3 c., £7.; Samarai, 3 c., £6.; Shanghai, 8 c., £32.
- CERESINE WAX**
Abo, 1 t. 10 c.; Amsterdam, 2 t. 11 c.; Paris, 1 t.
- CHEMICALS (otherwise undescribed)**
Alexandria, 35 pkgs., £208.; Amsterdam, 2 cs., £55.; Antwerp, 8 cs., £50.; Brussels, 2 pkgs., £28.; Buenos Ayres, 1 cs. (pt.), £39.; Calcutta, 4 cs. (pt.), £32.; Canton, 3 pkgs., £17.; Cape Town, 5 cs. (pt.), £115.; Colombo, 3 cs., £28.; Durban, 6 cs. (pt.), £100.; East London, 2 cs. (pt.), £21.; Lisbon, 1 cs. (pt.), £21.; Madras, 1 kg., £6.;
- CHEMICALS (otherwise undescribed)**
Pt. Elizabeth, 2 cs., £12.; Shanghai, 22 pkgs., £244.; Stockholm, 4 cs., £35.
- CHLORAL HYDRATE**
Batoum, 2 cs. (pt.), £20.; Mauritius, 1 cs. (pt.), £10.
- CHLOROSULPHONIC ACID**
Switzerland, 24 drms., £430.
- CHROMIC ACID**
Batoum, 1 cs. (pt.), £6.
- CITRIC ACID**
Aden, 1 c., £26.; Amsterdam, 2 t. 5 c., £1136.; Colombo, 1 c., £13.; Durban, 2 c., £45.; East London, 1 c. (F.), £31.; Grenada, 1 cs., £7.; Leeuwarden, 2 c. (F.), £56.; Mauritius, 1 c., £18.; Melbourne, 2 c., £45.; Paris, 1 t., £443.; Shanghai, 1 cs. (F.), £9.; Swatow, 1 c., £13.; Sydney, 1 t. 13 c., £756.; Tientsin, 2 c., £56.
- COAL PRODUCTS**
Allzarine
Baltimore, 6 cks., £225.; Bombay, 200 cks., £5,804.
- Aniline Dye**
Barcelona, 4 kgs., £103.; Brisbane, 12 cs., £65.; Brussels, 2 kgs., £34.; Cape Town, 3 pkgs., £97.; Mauritius, 1 cs., £18.; Pt. Elizabeth, 4 pkgs., £127.; Rauma, 4 cks., £338.; Sydney, 2 cs., £17.; Sydney (F.), 2 pkgs. (pt.), £24.
- Aniline Salt**
Piraeus, 8 kgs., £140.
- Benzonaphthol**
Buenos Ayres, 2 cs., £150.
- Carbolic Acid**
Brussels, 12 drms., £33.; Constantinople, 1 cs., £15.; East London, 1 cs., £5.; Helsingfors, 52 cks., £542.; Hong Kong, 5 drms., £6.; Osaka, 40 cks., £211.; Rotterdam, 7 drms., £50.; Tokio, 158 drms., £40.
- Cresote**
Abo, 8 cks., £140.; Canton, 19 cks., £79.; Helsingfors, 1 dm., £7.; Montreal, 1 cs., £143.; Paris, 80 cks., £310.; Selzaete, 18,557 gals., £464.
- Cresote Oil**
Shanghai, 20 dm., £18.
- Cresylic Acid**
Genoa, 12 drms., £168.; Toronto, 10 cks., £90.
- Myrbane Oil**
Constantinople, 2 drms., £33.; Sydney, 1 dm., £54.
- Naphthalene**
Abo, 3 cks., £30.; Antwerp, 10 cks., £30.; Athens, 3 pkgs., £27.; Buenos Ayres, 2 cks., £20.; Calcutta, 46 tcs., £172.; Cape Town, 4 cks., £34.; Copenhagen, 15 cks., £47.; Piraeus, 50 bgs., £100.; Pt. Elizabeth, 5 cs., £13.; Treport, 4 drms., 8 cks., £101.
- Pitch**
Antwerp, 1,626 t., £5,769.; Brussels, 318 t., £1,147.; Paramaribo, 6 cks., £82.
- Pyridine**
Alexandria, 1 cs., £6.; Paris, 1 dm., £20.
- Tar**
Durban, 200 cks., £308.; Malacca, 6 kls., £12.
- Terebine**
Antwerp, 2 brls., £37.; Cape Town, 2 cs., £10.
- COBALT LINOLEATE**
Antwerp, 2 cks., £60.; New York, 6 brls., £144.
- COPPER ACETATE**
Mauritius, 1 pkgs. (pt.), £6.
- COPPER OXIDE**
Paris, 1 ck., £20.; Paris (F.), 1 ck., £126.
- COPPER SULPHATE**
Antwerp, 2 t., £90.; Copenhagen, 2 c., £8.; Scheidam, 1 t., £15.
- CREAM OF TARTAR**
Bombay, 3 c., £39.; Calcutta, 1 c. (F.), £15.; Calcutta, 1 c., £16.; Cape Town, 2 c. (F.), £33.; Copenhagen, 11 t. 1 c., £2,666.; Delagoa Bay, 1 c. (F.), £2,666.; Durban, 3 c., £45.; East London, 1 c., £6.; Jamaica, 1 c. (F.), £14.; Malmö, 10 c., £180.; Norrköping, 15 t. (F.), £3,630.; Pt. Darwin, 10 c. (F.), £113.; Pt. Elizabeth, 5 c. (F.), £70.; Samarai, 2 c. (F.), £34.; Tientsin, 1 c., £18.
- DISINFECTANTS (otherwise undes.)**
Alexandria, 9 c., £33.; Amsterdam, 3 t. 8 c., £195.; Antwerp, 2 c., £9.; Bangkok, 1 t. 5 c., £49.; Brussels, 8 c., £50.; Copenhagen, 4 t. 15 c., £113.; Durban, 11 c., £44.; East London, 1 c., £7.; Gothenburg, 1 t., £55.; Kilindini, 1 c., £7.; Mauritius, 4 c., £29.; Montreal, 4 c., £14.; Moresby, 4 c., £11.; £125.; Pt. Elizabeth, 2 t. 15 c., £130.; Pt. Elizabeth, 4 c., £10.; Saigon, Rockhampton, 10 c. (F.), £15 c., £33.; Scheidam, 10 c. (F.), £69.; Selzaete, 3 t. 12 c., £90.; Singapore, 2 t. 10 c., £185.; Toronto, 5 c., £21.
- ETHER**
Dar-es-Salaam, 8 drms., £36.
- ETHYL CHLORIDE**
Cape Town, 2 cs. (pt.), £24.; Pt. Elizabeth, 1 cs., £11.
- FATTY ACIDS**
Dunkirk, 45 t., £380.; Nantes, £3,100.; Paris, 5 t. 14 c.
- FULLERS EARTH**
Baltimore, £521.; Monte Video, 50 t.; New York, 394 t.
- GALLIC ACID**
Abo, 1 cs., £4.
- GLYCERINE**
Abo, 1 t., £150.; Alexandria, 5 c., £27.; Athens, 2 c., £18.; Bombay, 2 c., £14.; Brussels, 1 t., £115.; Buenos Ayres, 10 c., £75.; Calcutta, 4 c., £31.; Durban (crude), 21 t., £2,025.; Karachi, 1 c., £12.; Lisbon, 6 c., £47.; Paris, 8 c., £149.; Rangoon, 1 c., £11.; Tientsin, 2 c., £18.
- GLUE**
Aarhus, 2 t.; Madeira, 1 t.; Montreal, 5 t.; New York, 3 t.; Pt. Sudan, 12 c.; Tientsin, 11 t.
- GLUE, SIZE, AND GELATINE**
Antwerp, 11 c.; Bombay, 17 c.; Cape Town, 2 c.; Copenhagen, 4 t. 19 c.; Durban, 1 c.; Ghent, 2 t. 10 c.; Hong Kong, 2 c.; Kobe, 25 t.; Pt. Elizabeth, 5 c.; Rangoon, 12 c.; Sydney, 1 t. 9 c.; Yokohama, 53 t. 10 c.
- GOLD CHLORIDE**
Mauritius, 4 cs. (pt.), £8.
- HYDROBROMIC ACID**
Calcutta, 1 cs., £11.
- HYDROCYANIC ACID**
Durban, 4 cs. (pt.), £5.
- HYDROGEN PEROXIDE**
Alexandria, 2 cs., £11.; Brussels, 5 cks., £58.; Colombo, 4 cs., £14.; Ghent, 5 crbys., £21.; Helsingfors, 1 crby., £6.; Pt. Elizabeth, 1 cs., £10.
- HYPOPHOSPHITE (otherwise undes.)**
Paris, 5 c., £93.
- IODINE**
Buenos Ayres, 1 cs., £82.; Rio de Janeiro, 1 cs. (pt.), £51.
- IODINE (BISUBLIMED)**
Batoum, 1 cs. (pt.), £12.; Piraeus, 1 cs. (pt.), £23.; Rosario, 1 cs. (pt.), £39.
- IODINE (RESUBLIMED)**
Rotterdam, 4 cs. (pt.), £135.
- IODIFORM**
Rio de Janeiro, 1 cs. (pt.), £35.
- IRON AND AMMONIUM CITRATE**
Alexandria, 4 cs. (pt.), £38.; Bahia Blanca, 3 cs. (pt.), £3.; Buenos Ayres, 3 cs. (pt.), £63.; Brussels, 1 cs., £3.; Rosario, 3 cs. (pt.), £49.
- IRON & POTASSIUM TARTRATE**
Buenos Ayres, 1 cs. (pt.), £14.
- IRON IODIDE**
Canton, 1 cs. (pt.), £13.
- IRON SULPHIDE**
Singapore, 1 cs., £7.
- IRON TARTRATE**
Rosario, 2 cs. (pt.), £11.
- KAINIT**
Channel Islands, 2 t., £15.
- LACTIC ACID**
Boulogne, 1 brl., £10.; Stamboul, 1 cs. (pt.), £22.
- LEAD ACETATE**
Alexandria, 1 ck., £26.; Brussels, 1 ck., £10.; Copenhagen, 1 ck., £21.; Constantinople, 4 kgs., £66.; Mauritius, 1 kg., £14.
- LEAD ARSENATE**
Pt. Elizabeth, 8 pkgs., £15.
- LITHIUM CITRATE**
Melbourne, 4 cs. (pt.), £7.
- LITHIUM IODIDE**
Batoum, 1 cs. (pt.), £5.
- MAGNESIA (CALCINED)**
Buenos Ayres, 8 cs., £44.; Bombay, 3 cs., £25.; Paris, 10 cs., £80.; Rouen, 40 cs., £176.
- MAGNESIUM CARBONATE**
Abo, 6 bgs., £45.; Colombo, 1 kg., £17.; Demerara, 1 cs., £6.; New York, 1 cs., £20.; Paris, 10 cs., £38.; Perth, 3 cks., £11.; Sydney, 3 cks., £18.
- MAGNESIUM SULPHATE**
Bombay, 3 c., £11.; Buenos Ayres, 6 c., £33.; Bunder Abbas, 2 c., £6.; Calcutta, 2 c., £6.; Cartagena (Col.), 6 c., £17.; Colon, 3 c., £7.; Durban, 10 c., £23.; East London, 6 c., £7.; Karachi, 14 c., £15.; Malta, 10 c., £10.; Montreal, 12 c., £12.; Newcastle, 1 t. 4 c., £49.; Pt. Elizabeth, 18 c., £51.; Pt. Moresey, 3 c., £6.; Samarai, 5 c., £11.; Toronto, 4 c., £5.
- MANGANESE PEROXIDE**
Antwerp, 3 cks., £40.
- MERCURY BICHLORIDE**
Buenos Ayres, 1 cs. (pt.), £36.
- MERCURY CHLORIDE**
New York, 5 cs., £34.
- MERCURY CYANIDE**
Rosario, 3 cs. (pt.), £12.; Rio de Janeiro, 1 cs. (pt.), £6.
- MERCURY OXIDE**
Malmö, 1 cs., £80.
- MERCURY PRECIPITATE**
Amsterdam, 1 cs. (pt.), 1 cs., £33.
- METHYL SALICYLATE**
Antwerp, 1 dm., £18.
- MINERAL PITCH**
Dieppe, 1 t.
- OXALIC ACID**
Sydney (F.), 2 c., £24.
- PARAFFIN WAX**
Paris, 3 t.
- PEARL ASH**
Tananarive, 1 cs., £14.
- PHENIC ACID**
Piraeus, 1 cs. (pt.), £5.
- PHOSPHORIC ACID**
Bombay, 1 cs., £12.; Melbourne, 1 cs., £22.; Perth, 1 ck., £6.
- PHOSPHORUS (AMORPHOUS)**
Bombay, 2 c., £30.
- PHOSPHORUS SESQUISULPHIDE**
Arica, 9 cs., £99.
- PLUMBAGO**
Bombay, 10 c.
- POTASSIUM BICARBONATE**
Adelaide, 3 c., £17.; Madeira, 2 c., £20.
- POTASSIUM BICHROMATE**
Brussels, 1 ck., £10.; Mauritius, 1 cs. (pt.), £5.
- POTASSIUM BINOXALATE**
Sydney (F.), 2 c., £29.

POTASSIUM CARBONATE—

Cape Town, 1 cs., £9.; Lourenco Marques, 4 c., £24.; Mauritius, 2 c. £9.; Osaka, 11 c., £20.

POTASSIUM CHLORATE—

Bushire, 1 cs., £7.

POTASSIUM CITRATE—

Melbourne, 1 cs., £8.; Perth, 1 cs., £34.; Pt. Elizabeth, 2 cs. (pt.), £8.

POTASSIUM HYDRATE—

Cape Town, 1 cs. (pt.), £18.

POTASSIUM IODIDE—

Bombay, 1 cs. (pt.), £20.; Batoum, 1 cs. (pt.), £35.; Alexandria, 3 cs., £35.; Buenos Ayres, 1 cs., £76.; Cape Town, 1 cs. (pt.), £5.; Durban, 1 cs. (pt.), £35.; Piraeus, 1 cs. (pt.), £16.; Rio de Janeiro, 1 cs. (pt.), £8.; Rotterdam, 4 cs. (pt.), £225.; Singapore, 2 cs., £156.

POTASSIUM METABISULPHITE

Boulogne, 7 pkgs., £45.

POTASSIUM OXALATE—

Perth (F.), 2 kgs., £23.

POTASSIUM PERMANGANATE—

Batoum (F.), 2 cs. (pt.), £20.; Bombay, 9 cs. (pt.), £5.

POTASSIUM PRUSSATE—

Bahia Blanca, 3 cs. (pt.), £13.

POTASSIUM SULPHATE—

Cape Town, 2 pkgs., £25.

POTASSIUM SULPHITE—

Adelaide, 1 c., £7.; Brussels, 2 c., £43.

PRUSSIAN BLUE—

New York, 1 ck., £10.; Paris, 8 cks., £220.

PYROGALLIC ACID—

Brussels, 1 ck. (pt.), £23.

RETORT CARBON—

Calais, 115 t., £650.

SALAMMONIAC—

Athens, 2 c., £12.; Buenos Ayres, 1 t., £77.; Calcutta, 1 c., £7.; Cape Town, 1 ck., £5.; Perth, 5 c., £19.; Singapore, 4 c., £18.

SALICYLIC ACID—

Athens, 1 cs. (pt.), £7.; Bombay, 1 cs., £13.; Brussels, 2 c., £16.; Dieppe (F.), 3 pkgs., £40.; Paris, 10 pkgs., £162.; Singapore, 1 cs. (pt.), £14.

SALICYNE—

Cape Town, 1 cs. (pt.), £6.; Launceston, 1 cs., £10.

SALT—

Antwerp, 12 t.; Aden, 2 t.; Delagoa Bay, 2 t.; East London, 1 t.; Havana, 3 t.

SALTPETRE—

Buenos Ayres, 4 c., £14.; Calcutta, 1 c., £5.; Durban, 1 t. 10 c., £88.; Kilindini, 2 c., £7.; Lisbon, 10 t., £500.; Madras, 4 c., £12.; Rosario, 10 t., £800.; Santander, 20 t., £1,025.; Sydney, 1 t. 10 c., £89.

SHEEP DIP—

Buenos Ayres, 4 t. 9 c., £325.; Philadelphia, 11 t. 1 c., £230.

SILVER NITRATE—

Antwerp, 2 cs., £531.; Mauritius, 4 cs. (pt.), £6.

SILVER PROTEINATE—

Melbourne (F.), 1 cs. (pt.), £11.

SOAP—

Alexandria, 11 c.; Adelaide, 2 c.; Amoy, 1 c.; Amsterdam, 3 t. 13 c.; Antwerp, 303 t. 12 c.; Auckland, 1 t. 17 c.; Barbados, 2 c.; Bangkok, 10 c.; Beira, 4 c.; Bombay, 4 t. 15 c.; Buenos Ayres, 1 c.; Boulogne, 7 c.; Brisbane, 2 c.; Calcutta, 16 c.; Cape Town, 11 c.; Colombo, 6 c.; Copenhagen, 16 c.; Constantinople, 1 t.; Darwin, 1 c.; Dunkirk, 2 t. 10 c.; Durban, 10 c.; Ghent, 16 c.; Hankow, 3 c.; Hobart, 2 c.; Hong Kong, 4 c.; Italy, 5 c.; Karachi, 1 c.; Kilindini, 3 c.; Kobe, 4 c.; Lima, 1 c.; Lisbon, 1 t. 2 c.; Lourenco Marques, 5 c.; Malacca, 1 c.; Madras, 8 c.; Malmo, 4 c.;

SOAP—

Malta, 3 c.; Melbourne, 1 c.; Neves, 1 c.; Madagascar, 1 c.; Melbourne, 15 c.; Monte Video, 6 c.; Penang, 5 c.; Piraeus, 5 t. 2 c.; Pt. Elizabeth, 6 c.; Pt. Moresby, 2 c.; Rangoon, 14 t. 3 c.; Rotterdam, 1 c.; Salonika, 8 c.; Sandakan, 1 c.; Santiago, 2 c.; Santos, 2 c.; Shanghai, 1 t. 16 c.; Suez, 2 c.; Singapore, 5 c.; Stockholm, 5 t. 9 c.; Tientsin, 2 c.; Toronto, 4 c.

SODA CRYSTALS—

Rotterdam, 20 t., £123.

SODIUM BENZOATE—

Athens (F.), 1 cs. (pt.), £7.; Calcutta, 1 cs., £24.; Mauritius, (F.), 1 cs. (pt.), £5.

SODIUM BICARBONATE—

Abo, 1 t., £16.; Antwerp, 1 t., £37.; Cartagena (Col.), 12 c., £14.; Calcutta, 2 t., £85.; Copenhagen, 2 t., £40.; East London, 10 c., £19.; Hango, 1 t., £15.; Rotterdam, 13 t., £130.; Singapore, 4 c., £5.; Stockholm, 1 t., £15.

SODIUM BICHRONATE—

Beyrout, 1 kg., £5.

SODIUM BISULPHITE—

Antwerp, 3 t. 10 c., £102.; Brussels, 4 t. 7 c., £95.; Paris, 3 t. 7 c., £100.

SODIUM BROMIDE—

Batoum (F.), 3 cs. (pt.), £26.

SODIUM CACODYLATE—

Batoum, 1 cs. (pt.), £20.

SODIUM CARBONATE—

Brussels, 3 c., £9.

SODIUM CHLORIDE—

Cape Town, 1 cs. (pt.), £6.

SODIUM CITRATE—

Calcutta, 1 cs., £11.

SODIUM CYANIDE—

Channel Islands, 1 c., £11.

SODIUM DIETHYLBARBITURATE

Batoum, 1 cs. (pt.), £11.

SODIUM GLYCEROPHOSPHATE—

Buenos Ayres, 1 cs. (pt.), £17.; Copenhagen, 1 cs., £63.; Mauritius, 1 cs. (pt.), £7.

SODIUM HYDROSULPHITE—

Antwerp, 4 c., £6.; Raumo, 10 c., £280.

SODIUM HYPO—

Bombay, 1 t. 10 c., £42.; Buenos Ayres, 1 cs. (pt.), £5.; Canton, 1 kg., £10.; Kilindini, 5 c., £8.; Melbourne, 3 t., £134.; Singapore, 1 t., £30.

SODIUM IODIDE—

Buenos Ayres, 1 cs. (pt.), £17.

SODIUM NITRATE—

Copenhagen, 2 cs., £11.; Naples, 2 cks., £52.

SODIUM PHOSPHATE—

Pt. Louis, 10 t., £399.

SODIUM PYROPHOSPHATE—

Auckland, 10 c., £40.; Paris, 11 c., £48.

SODIUM SALICYLATE—

Antwerp, 8 c., £28.; Buenos Ayres, 1 cs. (pt.), £12.; Cape Town, 2 cs. (pt.), £11.; Bombay, 1 cs., £10.; Copenhagen, 2 cs., £88.; Helsingfors, 1 cs. (pt.), £5.; Marseilles, 1 t., £400.; Pt. Elizabeth, 1 c., £15.; Singapore, 1 cs. (pt.), £8.

SODIUM SILICATE—

East London, 10 c., £15.

SODIUM SULPHATE—

Antwerp, 9 t. 15 c., £137.

SODIUM SULPHITE—

Cape Town, 2 c., £8.; Durban, 12 c., £9.; Osaka, 11 c., £34.

SODIUM TARTRATE—

Montreal, 1 c., £8.; Toronto, 15 c., £135.

SULPHUR—

Antwerp, 2 t. 13 c., £105.; Antwerp (F.), 10 c., £30.; Bombay, 1 t. 1 c., £33.; Copenhagen, 2 c., £8.; Paris, 4 c., £5.

SULPHUR (FLOWERS)—

Cape Town, 6 t. 14 c., £188.; Durban (F.), 1 t., £29.; Nantes, 5 t., £178.; Pt. Elizabeth, 2 t. 5 c., £59.; Tamatave, 2 c., £5.

SULPHURIC ACID—

Alexandria, 2 t., £47.; Channel Islands, 18 c., £18.; Shanghai, 3 c., £24.

SUPERPHOSPHATES—

Mauritius, 40 t., £610.

TALLOW—

Boulogne, 10 t. 2 c.; Dunkirk, 9 t.; Genoa, 50 t. 4 c.; Rotterdam, 20 t.

TANNIC ACID—

Rotterdam, 2 cs., £35.; Rosario, 1 cs. (pt.), £20.

TARTARIC ACID—

Calcutta, 1 c. (F.), £16.; Delagoa Bay, 3 c., £68.; East London, 1 c., £23.; Karachi, 15 c., £236.; Mauritius, 4 pkgs. (pt.), £11.; Pt. Elizabeth, 3 c., £60.; Rio de Janeiro, 2 c., £48.; Shanghai, 1 c. (F.), £12.; Singapore, 1 cs. (pt.), £5.; Sydney, 4 c., £75.; Tientsin, 2 cs. (pt.), £6.

THEOBROMINE—

Rosario, 1 cs. (pt.), £74.

TURPENTINE—

Cochin, £16.

URANUM OXIDE—

Gothenburg, 1 kg., £40.

WAX—

Amsterdam, 1 t. 7 c.; Calais, 7 c.

WHITE LEAD—

Antwerp, £460.; Calais, £1,355.; Ostend, £91.; Paris, £2,086.; Pt. Said, £27.; Shanghai, £100.

WOOD TAR—

Lisbon, £400.

XYLOL—

Cape Town, 2 cs., £8.; Paris, 10 drms., £137.

ZINC LEAD—

Antwerp, 10 t.

MANCHESTER.

Week ending June 28.

ACETIC ACID—

Genoa, 1 pkg.

ALUM—

Alexandria, 1 brl.

ALUM (CHROME)—

Antwerp, 5 cks.

AMMONIUM CARBONATE—

Alexandria, 14 brls.; Bordeaux, 10 pkgs.; Rouen, 25 cks.

BARIUM CHLORIDE—

Rouen, 34 cks.

BORAX CRYSTALS—

Alexandria, 6 bgs.

BORIC ACID—

Alexandria, 12 cks.

CAUSTIC SODA—

Alexandria, 39 drms.; Gothenburg, 13 drms.

CHLORIDE OF LIME—

Rotterdam, 16 cks.

COAL PRODUCTS (otherwise undes.)

Genoa, £105.

CRESYLIC ACID—

Philadelphia, 36 pkgs.

DYESTUFFS—

Logwood Extract
Bordeaux, 40 cs.; Genoa, 22 cs.

FERRO-MANGANESE—

Philadelphia, 500 t.

GLUE—

Montreal, 268 bgs.

GLYCERINE—

Alexandria, 22 drms.

MAGNESITE—

Rouen, 100 bgs.

PHOSPHORUS SESQUISULPHIDE

Gothenburg, 60 pkgs.

POTASSIUM BICHRONATE—

Alexandria, 6 cks.

POTASSIUM METASULPHITE

Montreal, 5 cks. **CRYSTALS—**

SALAMMONIAC—

Alexandria, 2 pkgs.

SALT—

Montreal, 12,800 sks.; St. John, N.B., 50 t.

SALTCAKE—

Gothenburg, 150 t.

SIZE—

Rouen, 1 ck.

SOAP—

Alexandria, 22 pkgs., 180 cs.; Leghorn, 10 cs.; Rotterdam, 4,000 bxs.

SODA CRYSTALS—

Alexandria, 34 brls.; Genoa, 2,022 pkgs.

SODIUM BICARBONATE—

Alexandria, 60 bgs.; St. John, N.B., 268 pkgs.

SODIUM SULPHIDE—

Montreal, 146 drms.

SULPHUR—

Dunkirk, 18 pkgs.; Rouen, 5 bgs.

SULPHUR (FLOWERS) -

Rouen, 300 bgs.

TALLOW—

Alexandria, 8 brls.

MIDDLESBROUGH.

Week ending June 28.

AMMONIUM SULPHATE—

Granville, 240 t. 9 c., £8,120.
Kobe, 280 t., £5,328.

BARIUM NITRATE—

Antwerp, 1 t., £50.

BENZOLE—

Dieppe, 216 t. 6 c., £1,127.

CHEMICALS (otherwise undescribed)

Calcutta, 52 t. 6 c., £758.

COAL PRODUCTS—

Disinfectant
Calcutta, 16 t. 2 c., £352.; Cape Porto, 63 t. 9 c., £1,483.

Naphtha

Dieppe, 22 t. 4 c., £349.

Cresote Oil

Dieppe, 9 t. 2 c., £74.

MAGNESIUM CARBONATE—

Dieppe, 14 t. 18 c., £640.

NAPHTHALENE—

Algoa Bay, 1 t., £20.; Shanghai, 15 t., £270.

SODIUM SULPHITE—

Genoa, 8 t., £138.

TOLUOL—

Dieppe, 47 t. 7 c., £1,156.

XYLOL—

Dieppe, 4 t. 15 c., £170.

NEWCASTLE-ON-TYNE

Week ending June 28.

MAGNESITE—

Trondhjem, 3 c.

RED LEAD—

Archangel, 49 t. 16 c.

SOAP—

Archangel, 2 t. 10 c.

N. & S. SHIELDS.

Week ending June 28.

NIL.

STOCKTON-ON-TEES.

Week ending June 28.

ALUMINA SULPHATE—

Rotterdam, 4 t. 18 c., £117.

ZINC SULPHIDE—

Havre, 2 cks., £239.

SWANSEA.

Week ending June 28.

PRICES CURRENT.

THURSDAY, July 8, 1919.

PREPARED BY MESSRS. HIGGINBOTTOM AND CO., 21, SPRING GARDENS, MANCHESTER.

The values stated are F.O.R. at makers' works, or at usual ports of shipment in U.K., unless otherwise specified
The prices in different localities may vary

Acids:—			£	s.	d.
*Acetic 40% and 60% ...	per cwt.	32/- & 48/-			
* " Glacial ...	per ton	85 0 0			
Arsenic, S.G. 2,000° ...	per ton	50 0 0			
Boric, Crystals ...	"	72 0 0			
*Fluoric ...	per lb.	0 0 7			
*Muriatic (Tower Salts), 28° Tw. ...	per carboy	0 6 6			
*Nitric, 80° Tw. ...	per ton	31 10 0			
*Nitrous ...	per ton	29 0 0			
Oxalic ...	per lb.	0 1 3			
Phosphoric, 1,750° ...	"	0 1 9			
*Sulphuric (fuming, 70%) ...	per ton	—			
* " (Pyrites, 168°) ...	"	7 18 9			
* " (" 140°) ...	"	4 10 0			
* " (free from arsenic, 144°) ...	"	5 7 4			
*Sulphurous (Solution), S.G. 1,025° ...	"	6 0 0			
Tannic (commercial) ...	per lb.	0 2 6			
Tartaric (crystals) ...	"	0 3 2			
*Acetone ...	per ton	80 0 0			
*Alum, loose lump (delivered) ...	"	17 0 0			
Alumina Sulphate (pure) ...	"	19 0 0			
Aluminoferic (in slabs) ...	"	8 10 0			
Aluminium (Ingot Metal, 98/99%) ...	per ton	150 0 0			
*Ammonia, Anhydrous ...	per lb.	0 1 10			
* " 880 ...	per ton	33 0 0			
* " 920 ...	"	20 0 0			
" Carbonate ...	per lb.	0 0 6½			
" Muriate (grey) ...	per ton	50 0 0			
" (salammoniac) 1st & 2nd, per cwt. ...	"	80/- & 75/-			
" Nitrate ...	per ton	58 0 0			
" Phosphate ...	"	114 0 0			
" Sulphate (grey), London, net ...	"	—			
" " Hull ...	"	—			
" " Manchester ...	"	—			
*Aniline Oil (pure) ...	per lb.	0 1 2			
Aniline Salt ...	"	0 1 2			
Antimony ...	per ton	45 0 0			
" (tartar emetic, 43/44%) ...	per lb.	0 3 4			
" (golden sulphide) ...	"	0 1 3			
Arsenic, white powdered ...	per ton	35 0 0			
Barium Chloride (in bags) ...	"	28 0 0			
" Carbonate (native), 92/94% ...	"	11 10 0			
" Sulphate (native levigated) ...	"	47 to 414			
*Bisulphide of Carbon ...	"	54 0 0			
Bleaching Powder, 35% ...	"	15 0 0			
* " Liquor, 7% ...	"	6 0 0			
Casein (commercial) ...	"	82 0 0			
Chromium Acetate (crystals) ...	per lb.	0 1 6			
Calcium Chloride ...	per ton	8 0 0			
China Clay (at Runcorn), in bulk ...	"	40/- to 70/-			
Coal-tar Products and Dyes:—					
Alizarine (artificial), 20% ...	per lb.	0 2 0			
Magenta ...	"	18/- to 35/-			
Anthracene, 40/50% A, f.o.b., L'don, per unit, ...	"	6 to 7			
Benzol, 90's (naked) ...	per gal.	0 1 11½			
" 50/90's ...	"	0 1 9½			
Carbolic Acid (crude, 60°) ...	"	—			
" (crystallised, 40°) ...	per lb.	0 0 4			
" Acid (pale liquid, 97/98%) ...	per gal.	0 2 9			
*Croosote (ordinary), naked ...	"	0 0 5½			
*Crude Naphtha, 30% at 120°C. ...	"	0 0 8½			
*Grease Oils, 18° Tw. (naked) ...	per ton	6 10 0			
Pitch, f.o.b., Liverpool or Garston ...	"	2 11 0			
*Solvent Naphtha, 90% at 160° ...	per gal.	0 2 1			
Copper ...	per ton	89 5 0			
" Sulphate ...	"	45 0 0			
" Oxide (copper scales) ...	"	70 0 0			
Dross Salts ...	"	39 0 0			
*Glycerine (crude), 80% ...	"	72 0 0			
* " (industrial, S.G. 1,260) ...	"	110 0 0			
*Iodine ...	per oz.	0 0 10½			
*Iron Nitrate, 80° Tw. ...	per ton	12 10 0			
" Sulphate (copperas), delivered ...	"	4 15 0			
" Sulphide ...	"	7 15 0			
Lead (Foreign Pig) ...	"	22 15 0			
" Litharge Flake ...	"	45 0 0			
" Acetate (white), (ex ship) ...	"	85 0 0			
" " (brown) ...	"	75 0 0			
Lead, Carbonate (White lead), pure ...	per ton	51 0 0			
" Nitrate ...	"	58 0 0			
Lime, Acetate (brown) ...	"	10 0 0			
" (grey), 80% (ex ship) ...	"	16 10 0			
Magnesium Chloride ...	"	15 10 0			
" Carbonate (light) ...	per cwt.	3 7 5			
" Calcined Magnesite ...	per ton	25 0 0			
" Sulphate (Epsom Salts) (coml.) ...	"	10 10 0			
" (druggists) ...	"	16 0 0			
Manganese, Sulphate ...	"	80 0 0			
" Borate ...	"	109 0 0			
*Methylated Spirit, 64° (industrial) ...	per gal.	0 5 7			
*Naphtha (Wood), Solvent ...	"	0 10 6			
" " Miscible, 60° p. ...	"	0 10 6			
Oils:—					
*Cottonseed ...	per ton	135 0 0			
*Linseed ...	"	122 0 0			
Stearine, 115-120° M.P. ...	"	95 0 0			
Potassium, Bichromate ...	per lb.	0 1 6			
" Carbonate, 80/82% ...	per to	85 0 0			
" Chlorate ...	per lb.	0 1 3			
" Cyanide, 98% ...	"	—			
" Hydrate (Caustic Potash) 90° ...	per ton	150 0 0			
" " 75/80° ...	"	135 0 0			
" Potash Hydrate Liquid, 38° B. ...	"	70 0 0			
" Nitrate (refined) ...	"	60 0 0			
" Permanganate (B.P. crystals) ...	per lb.	0 3 6			
" Prussiate (yellow) ...	"	0 1 9			
" (red) ...	"	0 5 6			
" Sulphate, 90% (ex ship) ...	per ton	40 0 0			
" Muriate, 80% ...	"	30 0 0			
Silver (metal) ...	per oz.	0 4 5			
Sodium (metal) ...	per lb.	0 1 3			
" Acetate ...	per ton	53 0 0			
" Arseniate, 45% ...	"	48 0 0			
" Borate (Berax), Crystals ...	"	39 0 0			
" Bicarbonate (1 cwt. kegs) ...	"	10 0 0			
" Bichromate ...	per lb.	0 0 11			
" Carb. (Caustic Soda-ash), 48% ...	per ton	10 0 0			
" (Alkali), 58% (bags) ...	"	6 0 0			
" (Soda Crystals), (bags) ...	"	4 2 6			
" Chlorate ...	per lb.	0 0 8			
" Cyanide (100% basis) ...	"	0 0 10			
" Hydrate (76% C. Soda) (f.o.r.) ...	per ton	23 10 0			
" " (74% C. Soda) ...	"	23 0 0			
" " (70% C. Soda) ...	"	22 0 0			
" " (60% C. Soda) ...	"	21 0 0			
" (pure liquid, 90° Tw.) ...	"	9 0 0			
" 77/78° Powdered (99%) Hydrate ...	"	25 10 0			
" Hyposulphite (commercial) ...	"	16 10 0			
" Manganate, 25% ...	"	65 0 0			
" Nitrate, 96%, reid., f.o.r., L'pool ...	"	21 0 0			
" Nitrite, 100% ...	"	52 10 0			
" Phosphate ...	"	25 0 0			
" Prussiate ...	per lb.	0 0 7½			
" Silicate (glass) Alkaline ...	per ton	12 5 0			
" (liquid, 100° Tw.) ...	"	10 0 0			
" Sulphate (Saltcake), delivered ...	"	3 0 0			
" (Glauber's Salt) ...	"	3 0 0			
" Sulphide (conc.), 60/65% casks ...	"	22 0 0			
" Sulphite ...	"	10 0 0			
Sulphocyanide, Ammonium, 95% ...	per lb.	0 2 1			
" Barium, 95% ...	"	0 1 6			
" Potassium ...	"	0 2 4			
Sulphur, (Flowers) ...	per ton	21 0 0			
" (Roll Brimstone) ...	"	20 0 0			
" Brimstone (best thirds) ...	"	—			
" (ex ship) ...	"	13 0 0			
Tallow ...	"	100 0 0			
Tin Crystals ...	per lb.	0 1 8			
" English Ingots ...	per ton	237 0 0			
Titanium, Potass. Oxalate ...	per lb.	0 1 6			
Titanous Chloride ...	per cwt.	4 10 0			
Zinc (Spelter) ...	per ton	39 10 0			
" Powder, 88/92% ...	"	70 0 0			
" Chloride (solution, 102° Tw.) ...	"	25 0 0			
" Sulphate, Crystal ...	"	22 0 0			

* Packages extra or returnable; otherwise prices specially include packages.

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NOTICES.

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NEW ARRANGEMENTS.

The "Chemical Trade Journal" will be published in future a day earlier.

SUBSCRIBERS to whom the Journal is posted direct will therefore receive it each week on Friday.

THE TRADE will in future be able to secure their supplies from our London office, 265, Strand, at 10 a.m. on Fridays.

EDITORIAL NOTICES.

Readers are invited to forward items of intelligence, company reports and balance-sheets, or cuttings from local newspapers of interest to the trades concerned.

Articles, reports, and correspondence on all matters of interest to the chemical and allied industries, home and foreign, are solicited. Correspondents should condense their matter as much as possible, write on one side only of the paper, and in all cases give their names and addresses, not necessarily for publication. Sketches should be sent on separate sheets.

Communications for the Editor, if intended for insertion in the current week's issue, should reach the office not later than Wednesday morning.

CURRENT TOPICS.

NATIONALISATION.

THE fact that we are gradually drifting towards what promises to be probably the greatest political fight in history is one which cannot be regarded calmly by industry, if for the moment we exclude labour. Events have come to a head quickly during the past few weeks, and we now see ranged on one side labour, the strong advocates of nationalisation, and on the other, capital as represented by manufacturers and business men, the strong opponents. Apart from any subtle possibilities in the Ways and Communications Bill, the immediate object of the protagonists of nationalisation is the coal mines and the railways, and as the successful conduct of all our industries is intimately bound up with them, it is clear that the position needs to be carefully thought out by the industrialists and not left for the politicians alone to gain their own desired ends on either side. Broadly speaking, industry, especially in the period of severe competition which is ahead, wants cheap coal, power, and cheap transit, and granted these, it matters not in whose hands these two commodities are. Industry, however, must take steps to see that it is not forced into an unfavourable position merely because certain people in the position to wield power with the Government seek to take the opportunity of doing so in order to give expression to theories as regards State control which have no experience to back them up. The unanimous opposition of all classes of traders and manufacturers against nationalisation of the coal mines is not a thing to be set aside lightly, and it is not putting it too highly to say that the more or less enforced experiments in State socialism during the war have enormously strengthened the opposition to interference in any form by the Government in trade. Looked at quite impartially, it cannot be said that industry and the effect upon it played a very important part in the coal inquiry. It is

true that evidence from many industries was heard, and the invariable case put forward was that nationalisation would lead to dearer fuel. The contrary case, on the other hand, is largely the theoretical one that State ownership would do away with profits to shareholders, and consequently the result to the consumer would be cheaper. Would that past experience led us to accept that point of view, as, for the reason already stated that industry desires cheap coal and transit, we should be rabid supporters of State ownership. The same spirit of doubt exists in regard to electricity supply, and one of the leading electric-power engineers of the country has averred that the consumer will have to pay more for electricity under the proposed scheme of super-stations than is the case now. One striking point in regard to the reconstructed electric-power industry is that plant will cost ever so much more than was the case in the existing power-stations, and, in consequence, the standing charges will be correspondingly higher. With these doubts so strongly present in the minds of the business community, which realises better than perhaps is the case in the environment of Westminster how vital cheap raw materials of the kind referred to are, it is urgently to be hoped that this epoch-marking experiment will not be embarked upon merely to give an outlet for testing a political fetish or as a means of avoiding an out-and-out conflict with the political aims of labour. The official habit is a more or less indefinable quantity, but that it exists we have everyday experience, and none of us likes it. We have heard a little of the loose methods adopted in handling the coal situation during the war, and it is the feeling that there is no guarantee that other methods will be adopted in a general change over to nationalisation which has instilled into the one side of industry—what may be called the commercial side—a wholesome dread of any such happening. It is impossible to evade the fact that industrialists and private trading built up the British Empire, and the experience of the past few years does not suggest that a change in the direction indicated would be for the better. However, our one and only concern is that industry shall not be deprived of what is essential to it merely for the sake of political intrigues and party jealousies. There is no place for these in industrial considerations, and the chemical industry no less than others comes within this category.

TRADE RETURNS.

THE exports of British produce and manufactures last month, as regards total value, were closely akin to those in May, the value being £64,562,000., an increase of £19,536,000. compared with the shipments in the corresponding month of last year. The total imports were valued at £122,945,000., or £21,400,000. more than in June, 1918. Exports of chemicals, drugs, dyes, and colours during the month under review show rather an unexpected drop from the encouraging figures of the past few months. Since November last, the value of the exports of chemicals and allied products had gradually recovered from the low war level, until in March they reached £2,200,000., in April £2,731,000., and in May £2,568,000. Last month's shipments, however, have declined to £1,946,698., or actually £41,000. less than in June, 1918. The exports of bleaching powder, sulphate of ammonia, chemical manures (unenumerated), muriate of ammonia, barytes, white lead, zinc oxide, painters' colours and materials (unenumerated), saltpetre, chromate and bichromate of potash, soda ash,

caustic soda, and soda crystals were all greater than a twelvemonth ago, but compared with the month of May most of the items showed declines. The export movement in sulphate of copper, crude and distilled glycerine, sodium bicarbonate, sodium chromate and bichromate, sodium sulphate, soda compounds (other sorts), and chemicals (other sorts) was less brisk than in June of last year. Imports of chemicals, drugs, dyes, and colours have recovered some of the ground lost during recent months. During the period under review these were valued at £1,776,000., against £2,582,000. in the corresponding month of 1918, a decrease of £805,787. April imports of chemicals were valued at £1,365,000., and May £1,550,000. During the first six months of this year the exports of chemical products were valued at £14,328,000., against £11,049,000. in the first half of 1918; and the imports £10,671,000., compared with £18,362,000.

THE POTASH SITUATION.

A NEW Bill to give effect to the provisions of the law passed by the German National Assembly on April 24 last for the regulation of the potash industry has been prepared, and is now under the consideration of the Board for Economy and the Expert Council. Pending the publication of the details, a Berlin correspondent of a German newspaper draws attention to the change in the potash industry.

The correspondent states that the transfer to foreign hands of thirteen completed Alsatian potash shafts and four in course of construction may have serious consequences for the remaining potash mining undertakings on the right bank of the Rhine and the manufacturing industries which are based upon them. In Alsace 20 per cent. salts are produced direct from the mine at approximately the same working expenses as are required in Central Germany for the winning of 8 to 9 per cent. salts. In the meantime, the mere prospect of French offers of potash—so slowly as the Alsatian production can develop to its full extent—is making itself perceptible in neutral and other countries. How is it possible otherwise, it is asked, to explain why foreign countries or their Governments—England, for instance,—which are in need of potash, have not yet definitely accepted the German offers, which are by no means unfavourable? It has further to be taken into consideration in connection with the development of German sales that the Spanish deposits near Barcelona are being worked with American participation, and that the production of potash in the United States has made some progress during the war, so that America is said to possess moderate stocks. Of course, all these substitutes only have their life prolonged under the operation of the absolute world-potash famine, and can only satisfy the enormous American requirements to an unimportant extent.

Two or three days after the publication of the above communication—on June 26, in fact—Emil Sauer, chairman of the Rothenberg Potash Corporation, informed the shareholders that England had now concluded contracts for the supply of German potash at a total cost of nominally £1,500,000., and that telegrams had been received from the United States, according to which American merchants wished to enter into negotiations for deliveries of potash, the first instalment being for a value of nominally £500,000. The chairman also depicted the situation of the industry as being very serious, and said that a complete revolution in prices must take place if the industry is to continue working. As a consequence of the increase in wages and the rise in the cost of materials, coal, etc., the potash industry would have to incur additional expenses of from £4,500,000. to £5,000,000. this year on a total income of about £12,500,000.

A further statement on the potash situation emanates from Paris, and deals with French and German competition. It is reported, for instance, that the Potash Sales Bureau at Mulhouse has offered to supply 20,000 tons of kainite to Rotterdam merchants this year. The latter stipulate that the Sales Bureau must guarantee the delivery of a similar quantity in 1920 and 1921 at fixed prices. If this condition is not accepted, it is said that the Dutch merchants intend to apply to the German Potash Syndicate instead of importing from the French Sales Bureau.

"WORK-BLINDNESS" IN CHEMICAL INDUSTRY.

ITS PREVENTION AND CURE.

(FROM A CORRESPONDENT.)

A FEW weeks ago, at the close of a series of lectures delivered at Newcastle, Dr. J. W. Mellor made what at the time seemed a most remarkable statement. He said that, taken on the whole, a large number of cases of difficulty to which he had been called in as consultant had been solved in the simplest possible manner by methods which were not only known to the persons in difficulty, but had actually been used by them at some time for another purpose. So frequently, in fact, was this the case that Dr. Mellor had classified such instances as examples of what he called "Work-Blindness." Now this state of the senses, although little attention has been drawn to it, is one of the most important factors to be reckoned with in the great age of reconstruction in which we are going to live.

Before proceeding further, let us firmly grasp the meaning of this phrase. "Blindness," to put the cart before the horse, may be defined as want of sight, ignorance, the human eye being deprived of its normal function. "Work" is the daily round, the common task, the every-day carrying out of operations which each one of us, from the highest to the lowest, must perform. Work-blindness is inability to see defects in the course of our daily work; it is inability to see mistakes and methods of improvement.

It is a phenomenon not peculiar to one trade or profession but to all trades and professions. It affects the highest and the lowest, male and female, adult and child. It is not an infectious complaint in the generally accepted sense, but it is remarkable that groups of people in the same sphere of work may, at one and the same time, be as blind as bats while staring at the same obvious defect. I will give two examples that will appeal to chemical manufacturers.

Quite a few years ago a firm of chemical producers decided to manufacture acetanilide. They had a large aluminium still, with a bottom run-off cock, in only intermittent use. They decided that the temperature from their high-pressure steam supply would carry out the reaction, so they charged up the still in accordance with their research process quantities, and proceeded to carry out the manufacture. At the close of the operation, having placed a large pan underneath the bottom cock, they essayed to run off the product. Unfortunately, the acetanilide had solidified in the cockway, and in about four inches of piping between the cock and the still bottom. Oh, yes! It was quite solid, so they commissioned a man to chip out carefully the block with a thin nickel chisel. They warned him to keep his arms from directly beneath the cock, and provided him with rubber gauntlet gloves for safety. At the end of about an hour the blockage was pierced, and the yield poured out. And because the man was very careful and did not get splashed with the molten product everybody apparently was satisfied. Six or seven charges were run through in this way under the supervision of a practical pharmaceutical chemist, who, however, afterwards tried to keep the cockway hot during the operation. But he did not succeed in preventing the blockage, which had to be chipped out before running off the charge.

About this time there were departmental changes, which caused this job to be given to a young and comparatively inexperienced academic chemist, who, after being shown the method of running off the yield, almost collapsed. The whole of the first charge that young man made on his own was run through the cock in one-fifth of the time previously taken to clear the cock that was always blocked.

How did he do it? Well, in the first place he had the cock well lubricated with graphite at the start, so that it would easily turn, and, in the second place, he pushed one limb of a U-shaped piece of $\frac{1}{4}$ in. iron rod, strongly heated, up the open cockway; the other limb of the U-wire, bent at right angles and wrapped with asbestos string, was used with safety as a handle. The solid acetanilide (M.P. 112° C.) by this means had a narrow passage melted through it, and the 3 cwt. charge of molten product up above did the rest.

The trick was obvious to an outsider, but the routine worker had not thought of it. True, he endeavoured to prevent solidification, but failed, and was settling down to the regular operation of chipping out the solid blockage after each batch.

An even better example of chemical work-blindness was instanced by a friend of mine the other day. He had been shown round an old-style English chemical works by the manager. In one shed, used chiefly for filtering and centri-

fuging operations, the floor, a flagged one, was an area of pools and puddles, and in some cases pits of resting water and weak chemical liquor. The process workers, by a species of mental geography, picked out a fairly dry path to their machines, although when running a trolley into the shed this was a work of art. My friend commented on the condition of the floor, and was told that "they could not always be brushing water away."

At the far end of the shed they were just beginning to remake the floor with a concrete surface. They were making a beautifully level floor, just like the bed of a billiard table. But when my friend suggested that it would be much better to have a gentle slope on the floor towards the single-side drain, the manager thought it was a brilliant idea. And yet on visiting the acid plant, quite close by, my friend noticed that the identical principle had been applied to the lead trays on which stood the Glover and Gay-Lussac towers, which all drained down to one side, with an outlet to a common channel. On the other hand, even my friend admitted that he had never thought of applying the same principle to the drip-catching tray of a filter press.

Work-blindness is often the result of too great familiarity with one's job, whereby one is apt to pass over the little details which one day count against us. It is produced by the feeling of satisfaction that everything is going all right, and by our complacent idea that we know all about our job. As Kipling has said in one of his poems:—

"And whatever we do, we shall fold our hands and suck our gums and think well of it.
Yes, we shall be perfectly pleased with our work, and that is the perfectest Hell of it!"

The engine-driver who runs past his signals, the doctor or pharmacist who uses the wrong drug through taking the bottle next to the one he wants, and the foreman who spoils a yield, perhaps through working without a thermometer or relying solely on judgment, are all momentary victims of this dangerous affliction.

I am afraid that work-blindness is of such an insidious nature that even now some of my readers may not realise its existence. However, I will leave them to ponder and reflect. The main purpose of my article is to stimulate and suggest means by which this failing may be counteracted. Not only in the chemical industry, but in every other, methods are, and ought to be, more available for the prevention of the effects of industrial blindness.

Broadly speaking, the line of procedure is to substitute systematic or scientific methods for the old rule-of-thumb arrangements which have been so much the fashion in the past. Useful remedies may be classified under two heads: (1) Human methods; and (2) mechanical methods. Unfortunately, both are liable to defects of themselves. The first because they are human, and the second because most mechanical apparatus may fail at some moment through a simple external cause. Still, we must do what we can. But there is an impression abroad amongst manufacturers that scientific methods are hard to carry out. The reverse is usually the case. In fact, unless a method simplifies a procedure, it should not be regarded as either scientific or useful.

Now the human method must be as easy and simple as possible, or it will not be used. A good deal will depend on the class of worker under consideration. In the case of a brain worker, which I will not define, the matter may be attacked on psychological lines. I would suggest that the first thing a manager must do when in difficulty with a plant or a process or a product is to convince himself that he does not know everything about the job in hand. Then he must approach the difficulty in a fresh and unbiased manner.

First, let him consider and put down on paper, if necessary, all the items that he knows are essential in the operation. After seeing that the essential details are correct and have been observed, let him consider possible defects which may have occurred through physical changes in the product or failure in the work's supply services. Thirdly, let him run over all parts of the work usually left to workmen and subordinates, always mindful of the possibility of tradesmen, who have been doing repairs, etc., on the plant, leaving behind harmful rubbish, or making alterations to cocks, valves, or other parts of the apparatus.

Along the above lines many potential causes of a difficulty may be found, and if, after such an examination, the problem

is unsolved, let him call in the most practical assistant that he employs and listen with an open mind to all the criticism he may hear. Then, if outside help has to be called in, he at any rate will know that he has done his best.

In the case of workmen or juniors such methods of examination and deduction are not usually successful, although on every possible occasion they should be suggested and demonstrated even to the unskilled worker. The two most successful ways of preventing work-blindness in these cases are: (1) To train them to check one another in important operations, and record the check, where possible, in writing; and (2) to insist that they immediately report to a competent person anything abnormal or unusual which may come to their notice. For instance, (a) sudden rise or fall of temperature; (b) cessation of steam, vacuum, gas, or other service supply; (c) unusual physical appearance of materials; (d) analytical results differing in a marked degree from the routine figures found on the tests.

By a strict insistence on the above points many difficulties may be traced to their source, and extension of supervision on these lines will yield fruitful results.

Mechanical methods for the prevention of work-blindness lie chiefly in the use, wherever possible, of self-recording instruments and automatic-warning devices and the systematic tabulation of figures or charts obtained from them. This is a most important point in regard to recording-instruments. Such instruments are often fitted up, used for a short time, and then fall into disuse, perhaps through lack of charts or defects in the instruments themselves. It is therefore desirable to make one person on the works responsible for the fitting and adjustment of all the recording instruments used, and to have all charts, etc., collected and examined by the manager at a fixed hour every day.

Depth-registering instruments on tanks and boilers and vacuum or pressure gauges on mains along which fluids are travelling are examples of useful control devices. Warning bells are of great value, especially if they are loud and distinctive enough, and by means of innumerable electrical arrangements may be made to serve all sorts of purposes, from exposing extremes of temperature and pressure to indicating the correct load weighed into trucks, bins, etc., which are of uniform tare.

It is not, however, my wish to catalogue the numerous devices possible for the elimination of work-blindness: it is rather to suggest that their use should be extended on every occasion, and that a more sympathetic realisation of their value may prevail. By such methods of progress the human factor will be more generally allowed for and checked and counter-checked almost to elimination.

After all, the fact remains that if we can only persuade ourselves that there is still something more to be learned about our own job, and from that basis proceed to search for further and further improvements, we shall certainly discover better and better methods, and in such measure as we progress, without doubt we shall receive our reward.

NEW TYPE OF VESSEL FOR POTASH AND OTHER DETERMINATIONS.

MR. L. J. RILEY, F.I.C., writes:—Ap[ro]pos the more recent methods for potash determination mentioned in a recent issue, mention may be made of the use of porcelain basins with dark-coloured lining in lieu of the less stable and more fragile and costly glass basins hitherto generally employed. Additional advantages possessed by the new type of basin are that the colourless crystals of potassium perchlorate are better seen, thus facilitating washing out, and an experienced operator can gauge approximately the potash content before the determination is completed. Deep green-lined basins of about 3 in. diameter have been found very convenient. The basins should be particularly useful for students.

PERSONAL.—Mr. John Watson, F.I.C., formerly of the Allhusen Works, Gateshead-on-Tyne, and more recently chief assayer of the City and Suburban Mine, Johannesburg, has been appointed chief chemist and works manager of the Indian works of the Magadi Soda Company, Ltd.—Mr. J. A. Johnson has retired from the general managership of the Lostock Gralam works of Messrs. Brunner, Mond and Co., Ltd. Mr. Johnson has held the position for nearly twenty years, and altogether has been forty years with the firm.

SOCIETY OF CHEMICAL INDUSTRY.

ANNUAL MEETING.

THE annual general meeting of the Society of Chemical Industry will be held in London on Tuesday, Wednesday, Thursday, and Friday next, July 15 to 18, under the presidency of Professor Henry Louis, D.Sc. The headquarters during the meeting will be at the Salters' Company Hall, St. Swithin's Lane, E.C. 4. The Chemical Industry Club, 2, Whitehall Court, S.W., has kindly offered temporary membership to members of the society during the meeting. The programme of arrangements, which has already appeared in these columns, is as follows:—

Tuesday, July 15.—10 a.m., Council Meeting; 11 a.m., Annual General Meeting, at the Mansion House. Welcome by the Right Hon. the Lord Mayor of London. Address by the President, Professor Henry Louis, D.Sc. 1 p.m., Luncheon at the Connaught Rooms, Great Queen Street, Kingsway, by invitation of the London Section. 3.30 p.m., Conference at the Mansion House. "Inter-Allied Chemical Federation." Addresses by representatives of the Inter-allied Conference, to be opened by Sir William J. Pope, F.R.S., chairman of the Federal Council for Pure and Applied Chemistry. 8.30—11 p.m., Soirée and Reception at the Imperial College of Science and Technology, South Kensington.

Wednesday, July 16.—10.30 a.m.—1 p.m., and 3 p.m.—5 p.m., Conference at Salters' Hall, St. Swithin's Lane, E.C., "Power Plant in Chemical Works." 10.30 a.m.—1 p.m., and 3 p.m.—5 p.m., Conference at Clothworkers' Hall, Mincing Lane, E.C., "Empire Sugar Production." 7.15 for 7.30 p.m., Annual Dinner at the Savoy Hotel, Strand, W.C.

Thursday, July 17.—10.30 a.m.—1 p.m., and 3 p.m.—5 p.m., Conference at Salters' Hall, St. Swithin's Lane, E.C., "Dyestuffs, Synthetic Drugs, and Associated Products." 10.30 a.m.—1 p.m., Conference at Goldsmiths' Hall, Foster Lane, E.C., "The Chrome Tanning Industry." 3 p.m.—5 p.m., Conference at Goldsmiths' Hall, Foster Lane, E.C., "Recent Developments in the Fermentation Industries." 8.30 p.m.—11 p.m., Reception at British Scientific Products Exhibition, Central Hall, Westminster.

Friday, July 18.—Excursion to Windsor and Taplow. Leave Paddington Station (Great Western Railway) for Windsor. Lunch Windsor. By steam launch to Cookham Lock and Taplow. Tea Cookham. Return Taplow to Paddington.

Among those who have signified their intention of being present are: The Right Hon. Lord Moulton; Colonel Sir Frederick L. Nathan, K.B.E.; Dr. J. C. Cain; Dr. C. C. Carpenter; Mr. A. Chaston Chapman; Dr. E. F. Armstrong; Dr. M. O. Forster, F.R.S.; Professor J. C. Philip; Professor J. W. Hinchley; Professor W. P. Wynne (Professor of Chemistry, Sheffield); Dr. R. S. Morrell; Sir William A. Tilden, F.R.S.; Professor H. Louis; Professor T. Turner (Professor of Metallurgy, Birmingham); Dr. Bernard Dyer; Dr. A. Réé; Sir Richard Gregory; Dr. E. J. Russell, O.B.E., F.R.S. (Director of Rothamsted Experimental Station, Harpenden); Sir William Pope, K.B.E., F.R.S. (Professor of Chemistry, Cambridge); Sir Robert Robertson, K.B.E., F.R.S. (Superintendent of Chemistry, Royal Arsenal, Woolwich); Sir J. J. Dobbie, F.R.S. (Chief Government Chemist); Dr. Herbert Leviinstein; and Professor W. A. Bone.

RAMSAY MEMORIAL FUND.

THE following have consented to act as trustees of the Ramsay Memorial Fellowship Fund: Sir George Beilby, Sir Hugh Bell, Bt., the Right Hon. Lord Glenconner, the Marquis of Crewe, the Right Hon. H. A. L. Fisher, Sir Donald MacAlister, and the Right Hon. Lord Moulton. The trustees will consider in the course of July applications for Fellowships not exceeding three in number. Each Fellowship will be of the value of £250. a year with an expenses grant not exceeding £50., and will be tenable normally for two years, with a possible extension to a third year. The Fellowships are intended for those who have already graduated with honours in chemistry, or taken some equivalent qualification. Candidates who desire their claims to be considered should communicate with the Organising Secretary, Dr. Walter W. Seton, University College, London, W.C. 1. Applications should be received not later than July 14, 1919.

SCIENTIFIC PRODUCTS EXHIBITION.

THE second annual Scientific Products Exhibition promoted by the British Science Guild was opened at the Central Hall, Westminster, London, on Thursday (July 3), and will remain open until August 5.

The origin of the exhibition is now familiar. The war revealed our weakness in many industrial directions, not the least in the chemical industries, and the exhibition has been designed primarily to demonstrate to the general public the manner in which new industries were developed under the compulsion of war conditions, and incidentally to enlist public support in maintaining these new industries, and, secondly, to drive home to the public the manner in which science plays a predominant part in all industrial operations. The exhibitions in London and Manchester last year showed the directions in which we had made ourselves independent of products previously obtained largely from enemy countries, and, carrying this one step further, the second exhibition aims at promoting the development of the industries thus established, and to encourage the foundation of new British manufacturing enterprises depending upon progressive science and invention.

The revolution which many departments of industry have undergone during the war has depended largely for its success upon processes derived from scientific research, and in no branch of national activity has our potential power and productive capacity been more strikingly shown than in the chemical industries. We have recovered lost ground, and need never lose it again if the development of industry through science is made a national aim. There is danger that with the close of the war this will be forgotten, and industry will drift back again into the old grooves, not so much because of the indifference of manufacturers as because of neglect of their interests by the State, or lack of encouragement of home products by the public.

The bearing of politics upon industry, unfortunately, cannot be overlooked. Certain industries which languished in this country before 1914 did not do so through lack of inventive capacity or scientific ability on our part, but for quite other reasons which no amount of science was apparently able to get over. All that the best of our newly applied science has achieved could very well be undone by what happens in the political world as regards the policy adopted after September 1, and it can only be hoped that a happy medium will be struck by which the British manufacturer will not suffer from foreign competition in the manner he formerly did, and, on the other hand, the consumer will not be exploited.

OPENING CEREMONY.

Lord Crewe officially declared the exhibition open in the afternoon of July 3. As the first head of the Department of Scientific and Industrial Research—indeed he was instrumental in bringing it into existence—he naturally devoted his speech to the value and importance of research and the necessity for largely increasing the supply of research workers. The question was, he said, that when a student had finished his scientific training, how was he to be fitted for taking an early part in the various processes of industry. There were different methods of doing this. One, which always appealed to him, was for the student to take definite industrial courses during the vacation. That was commonly adopted in the United States. Another method was for the student to go direct from college to a position as chemist or physicist in a works, and, lastly, there was the system of Industrial Fellowships, which had also been perfected in the States. He hoped now that Peace had come, we were not going to sacrifice the fruits of the skill employed in the recovery of the industries which had been re-established.

Lord Moulton said there were three ways in which Germany had attained the commercial position she had before the war. One was her skill in cornering raw materials. That must be stopped. It would be done partly by our Legislature, but it would be still more the acuteness and resolution of business men that would prevent Germany getting the monopoly of any natural product, and therefore making us dependent upon her. The second cause was that Germany had developed salesmanship to a far greater extent than we had, and in that he thought we might well adopt the sound policy of the Germans, and, finally, there was the specialised attention which the Germans gave to specific objects, in which they were guided by all the scientific knowledge that was at the command of the world. The question which faced us now was how to produce articles of higher quality at reasonable prices which the German had been able to make by means

of the patience and industrial research carried out for so many years. His experience as Director of Explosives Supply had convinced him that we had nothing to fear from any nation. All that we had to fear was from ourselves. The British nation had got the power of research and of invention; it had got the power of patient devotion to a particular end that it had chosen, and it had got the power of acting together on the largest possible scale. All that was necessary was that the nation should be roused to the necessity of doing it, and then, as it had done during the war, it would prove that it could do in all the production demanded by peace what it had done in regard to war production. After a special reference to the rapid strides made in the glass industry, which, he said, was now equal to any in the world, Lord Moulton ended by saying that British manufacturers in the future ought to be ashamed of themselves if they did not continue to make progress in peace at the same relative rate that they had during the war.

"CHEMISTRY IN RECONSTRUCTION."

Lecture by Sir William Tilden.

On Monday Sir William Tilden, F.R.S., delivered the first of the series of lectures which have been arranged during the run of the exhibition, and dealt with chemistry in reconstruction. After mentioning that he had returned to practical laboratory work after a period of ten years' retirement, Sir William said that he interpreted the title of his lecture to mean that he should give not only some words of encouragement but also of warning in respect of the future. He was sure that everyone after visiting the exhibition would go away with a feeling of satisfaction that the British chemist, if he was only given a chance, was able to hold his own not only against the German but against the chemist of any other nationality. The exhibition was strong testimony to the activity, knowledge, skill, and scientific ability of the British chemist. Whilst, however, he felt a considerable amount of gratification and pride in the achievements of his fellow-countrymen, there were one or two facts which must be borne in mind. It might be said that the British chemical manufacturers were now able to meet the situation, to supply the needs of the country with a little over, but it was not much, and that position might be subject to very considerable modification as time went on. Germany had not suffered the violation that she had inflicted upon Belgium and part of France; her factories remained practically as they were before the war. Moreover, the chemists of Germany were very able people who had shown great capacity for organisation and extraordinary skill in applying scientific knowledge to practical purposes. Consequently, with her chemical factories little disturbed by the war, if at all, Germany would prove a serious competitor who would have to be reckoned with when it came to questions of foreign trade.

Then there was Switzerland with a well-established chemical industry and chemical schools, and we had been indebted to Switzerland in recent times for some help on the matter of dyes and other things. The United States, too, during the past few years had been making huge efforts to cultivate the science of chemistry by the provision of bigger and bigger laboratories in connection with universities and technical schools on a very large scale. At one university there was a chemical laboratory with places for 1,500 students. That beat anything in any other part of the world. He did not know how that was going to work because it was difficult to realise that the teaching could be satisfactory under such conditions. However, they liked to do things on the grand scale in America, and there was no doubt that the American chemical industry would prove a formidable competitor. Another country which must not be overlooked was Japan. The Japanese have shown extraordinary activity in the chemical industries, and had established a very respectable chemical school. Moreover, they had some natural products which were available; for instance, camphor, which, while it could be produced synthetically, could not be made in that way at a price which would keep the natural product off the market. Therefore in congratulating ourselves upon our position, we must not overlook the competition we were faced with, at any rate in foreign markets.

A question mentioned by Lord Crewe in opening the exhibition was the best means of training necessary for producing not only chemical teachers but chemists for practical work. He himself contended that a chemist should first of all have a good general education, then he should spend five years in learning the various branches of chemistry before he went into the works. He had put that forward 25 years ago when he was chairman of one of the sections of the British Association,

and had been ridiculed for suggesting such a long period, but he did not recede from that position to-day. The rudiments of chemistry might be learned in two or three years, but it must be remembered that chemistry involved the study of an art as well as the study of the application of the principles of science. They had got to learn to do things as well as talk about them, and that meant long practice in the laboratory. It was quite possible that the period of five years might be shortened appreciably in the near future on account of what was learned at school, because the great public schools now had magnificent chemical laboratories, but he believed that the best course was to send the student straight from college to the shop rather than to put him through a so-called course of chemical engineering which could not give that training in the handling of thousands of gallons of liquids or tons of solids which had to be handled in the works.

After mentioning how chemists in the past had suffered from the ignorance of the public, and complaining of the application of the word "chemist" to a pharmacist, Sir William Tilden dealt with dyes. The mind of the public, he said, had been a little too much occupied with dyes during recent years, owing to the shortage of dyes which existed in the early days of the war. It was now possible to produce synthetically all the vegetable dyes, and although disparaging remarks were made with regard to aniline dyes, it was not the fact that vegetable dyes were superior to aniline dyes. But there were things that were even more important than drugs and dyes. The fundamental materials were acids and alkalis. The amount of sulphuric acid consumed by a country was a measure of its industrial conditions, and sulphuric acid was the key to everything else. Of late years larger and larger amounts of sulphuric acid had been made by the contact process, and, although the old chamber process was not extinguished, it no longer took the premier position; in course of time it might possibly disappear altogether.

The most important recent discovery was the production of ammonia by the combination of hydrogen gas with atmospheric nitrogen. This process was one of extraordinary scientific interest, and practically had become of great commercial importance. It was introduced in Germany by Professor Haber, and a plant was to be erected very shortly in this country for the purpose of carrying it into effect. There were a number of other substances which could be mentioned as likely to play an important part in the future of the chemical industries. Many chemical compounds now of the highest practical importance were, at the beginning of the war, mere chemical curiosities, and in this connection Sir William exhibited a specimen of synthetic rubber, the basis of which was acetone. It was pure rubber, and had been made during the war in considerable quantities by the German firm of Bayers under conditions which did not consider price. He was told that it cost, roughly, 20s. per lb. to make, whereas the selling price of rubber was one-tenth of that; but he was quite certain that within two or three years synthetic rubber would be on the market as a serious rival to natural rubber. It was over 30 years ago that he himself found that by keeping ether in a bottle for a few months at a temperature between 30° and 40° C. it was sufficient to convert it by spontaneous change into rubber. That was the method which had been adopted by the Germans.

His word of warning in regard to chemistry in reconstruction was that we must work hard and see that we raised a new and highly qualified race of young men who would take the leading places in the industry.

Sir Richard Gregory, chairman of the Exhibition Organising Committee, in proposing a vote of thanks to Sir William Tilden for his lecture, said that the United States had now invested something like £50,000,000 in the dye industry, an amount equal to that invested in the seven or eight German dye companies before the war. America before the war only had four or five firms making dyes, but by the beginning of 1917 she was producing all the intermediates she required, and 150 firms were producing anilines. We in this country had to get into a position to compete with that. The United States, one time an importing country, completely dependent on Germany and Switzerland, was now an exporting country, for she had invaded Canada, South America, and even Japan and India, with her dyes.

THE EXHIBITS.

As was the case in 1918, the chemical section of the exhibition is by far the largest, the number of exhibits exceeding 60. In addition, the interest of the chemist is attracted to the metallurgical section in particular, and to some of the

other sections in general. We will, however, deal with the exhibits in the chemical section first. Many exhibits consist of show cases, which it is difficult adequately to describe, as any description must necessarily consist merely of a list of the examples of chemical shown.

The Accrington Brick and Tile Company, of Accrington, Lancashire, are now making the Guttman patent cellular-filling material for absorption towers, which were formerly made in Germany. They are made of Accrington acid-proof brick. Two sizes are exhibited: type B, measuring 6in. by 3in., and type C, measuring 4in. by 2in., in section. The latter is chiefly used for small towers. The point made in cell filling compared with other types of filling material is that in their passage through a cell tower the gases are continuously changing their velocity, thus giving a mixing action which brings fresh particles of gas into contact with the wetted surface. The velocity of the gases in a tower is usually very low, about 30ft. to 50ft. per minute, and if nearly the same cross-section obtains throughout the tower, this is insufficient to cause strong eddies by impact against the surfaces or by mere deflection from them. In cells, the cross-section, when the gases pass through the slots, is reduced to about 15 per cent. of the area of the tower, thus giving the gases a velocity five or six times that obtaining at the widest part of the cell, and producing a good mixing action.

The British Alizarine Company, Limited, Silvertown, London, claim that they are the only makers of dyestuffs of the alizarine series in the United Kingdom. Originally alizarine was derived from the madder-root, but it is now prepared synthetically from anthracene, a coal-tar hydrocarbon. The exhibit includes specimens of crude anthracene, as well as of the purified material, the production of which constitutes the first stage of the alizarine process. The second stage consists of the oxidation of anthracene, producing sublimed anthraquinone, which in turn is treated with fuming sulphuric acid to obtain sulphonie acids, which are exhibited in the form of various sulphonie salts. On fusion with caustic soda, the monosulphonate yields alizarine, the α -disulphonate yields flavopurpurine, and the β -disulphonate yields anthrapurpurine. Specimens of each of these fundamental dyestuffs are exhibited.

Bow Bridge Dyes and Chemical Works, Stratford, London, E. 15, the proprietors of which are British Pharmacy Oils, Limited, have designed their exhibit to give an idea of the progress made more especially since the works were released from war work by the signing of the armistice. Special attention is directed to eosin, made entirely from intermediates produced in the firm's works, and is regarded as an important step in reducing the list of dyestuffs hitherto imported. Another direction in which special attention is being given is the paint, varnish, printing ink, and pigment trades, which have been neglected somewhat in comparison with the attention paid to other branches. The firm intend specially to cater for these trades, and are introducing a large number of suitable pigments. An interesting feature is the practical demonstration with a hank-dyeing machine, of the dyeing of hank with dyes obtainable hitherto only from German sources, but now made at Stratford.

Guthrie and Co., of Accrington, manufacturers of "Ceratherm" acid and flame-proof earthenware, show some specimens of heavy chemical plant made of this material. No metal of any kind is used in the essential portions of the armoured centrifugal pumps, so that the liquids which are dealt with are in no way contaminated. They are in satisfactory use on boiling hydrochloric acid, nitric acid, sodium peroxide solutions, etc., where other forms of pumps would at any rate give trouble. Exhausters for condensing hot acid gases are also exhibited made of this material.

"Ironac" has already made a name for itself in the chemical industries as an effective acid-resisting iron for sulphuric and nitric acids, and specimens of vessels, pipes, pumps, valves, and other castings demonstrate its wide application on the stand of Haughton's Patent Metallic Packing Company, Limited, 30, St. Mary-at-Hill, London, E.C. 3. Parts of plant and equipment are also shown. Acid-resisting iron is peculiarly a British industry, and great progress has been made with Ironac metal during the period of the war.

As would be expected, British Dyestuffs Corporation, Limited, which incorporates Levinstein, Limited, of Manchester, and British Dyes, Limited, of Huddersfield, have an imposing exhibit, aimed at demonstrating primarily the manifold applications of coal-tar dyes. These are shown in their relation to the dyeing and colouring of leather, paper, paints,

distempers, soaps, fats, wax, oils and varnishes, boot polishes, writing, copying and printing inks, etc. The various stages necessary for the production of the finished coal-tar colour from the crude distillate obtained from the coal-tar resulting from the destructive distillation of coal are set out in an informative manner, and the whole exhibit bears testimony to the progress which has been made in the coal-tar colour industry in this country since the stoppage of the Continental supplies. Special sections are devoted to synthetic indigo (Indigo LL) and its derivatives and to other colours of exceptional fastness. A particular feature is a collection of samples of all the colours requisite for the production of a single direct cotton colour. The large number required serves a useful purpose in instructing the uninitiated in the many processes involved in the production of what the trade terms a "common black."

Close by and of allied interest is the stand of the South Metropolitan Gas Company, a striking reminder of the relationship between the gas and chemical industries. The products shown are in two groups—viz., (1) those manufactured before the war and still made, (2) those manufactured since the declaration of war. Among the latter may be specified desulphurised motor spirit, benzene, toluene, synthetic phenol, purified naphthalene, pure anthracene, anthracene (95-97 per cent.), carbazol, acridine, phenanthrene, and fluorene, to mention the coal-tar products. Among the other products is metro-sulphate, a dry neutral sulphate of ammonia guaranteed to contain 25½ per cent. ammonia. A typical analysis given us is: Ammonia, 25.65 per cent; moisture, 0.03 per cent; free acid, nil. The special characteristics of this material are demonstrated by the operation of the metro-sulphate fountain, which shows the ease with which this material may be distributed on the ground owing to its dry, finely divided nature. Contact sulphuric acid, hydrochloric acid, nitric acid, and oxide of iron, sodium sulphide, and copperas are among the other war products of the gas industry to be seen.

In the same breath may be mentioned a similar exhibit by the Gas, Light, and Coke Company, and there is no need to particularise again, beyond mentioning the special attention given to British-made blues, examples of which are shown in the form of stained papers, artists' colours, printing inks, enamelled leather and paint.

The Thermal Syndicate, Limited, Neptune Bank, Wallsend-on-Tyne, again show their Vitreosil products, which were described on the occasion of the last exhibition. This material is produced by the fusion of pure silica in the electric furnace, resulting in a uniform product absolutely resistant to acids of any strength or temperature. It has now been applied to all forms of chemical plant and apparatus where its special qualities are called for, and is claimed to have entirely replaced Continental porcelain and pottery ware in chemical works and laboratories.

T. and C. Clark and Co., Shakespeare Road, Wolverhampton, show their porcelain enamelled cast-iron vessels, a development in which they were the original patentees and manufacturers. From the largest chemical works apparatus to the smaller details of the laboratory, the material is applicable, as the exhibit well shows.

Catalpo, Limited, of 19-20, Holborn Viaduct, London, E.C. 1, show in a neutral-end product bearing the same name the result of progress in colloidal chemistry in the treatment of a British mineral earth by a "physico-chemical lixiviation and sedimentation process." For dyes and colours, and in paints, printing inks, enamels, etc., it is offered as the only base, absorbing the smallest quantity of dye on the largest quantity of pigment to produce a given shade of colour.

On a stand erected by the Sir John Cass Technical Institute, Jewry Street, Aldgate, E.C. 3, we saw the clip for securing rubber connections with glass and metal tubing designed by Dr. Charles A. Keane and Mr. G. Patchin, and already noticed by us on the occasion of the June meeting of the London Section of the Society of Chemical Industry. On the same stand Dr. H. J. S. Sand exhibits the cadmium vapour arc lamp, which was also described at a meeting last session of the London Section of the Society of Chemical Industry. In principle, it is similar to the well-known mercury lamp, and once started, gives a powerful light, and will burn indefinitely. It is hoped that, in addition to its uses for the purposes of optical measurement, in which lines of definite wave length and great intensity are required, the lamps will find application as a powerful source of red and of ultra-violet light.

An interesting exhibit by Messrs. Thomas Kerfoot and Co., Limited, Bardsley Vale Mills, Bardsley, Lancashire, is the

actual bottle of kerocein shown at the 1918 exhibition. This has been kept sealed since, but fully exposed to light, and it shows no change in appearance. Kerocein is said to be chemically, physiologically and therapeutically identical with the German pre-war product novocain, a most desirable local anæsthetic. Kerocein is manufactured under licence from the Board of Trade, and is tested under arrangements approved by the Board. It is demonstrably purer than the German article, its melting point, for example, averaging nearly a degree higher than the German standard. This firm, in addition to a series of organic compounds, the manufacture of which has been undertaken since 1914, has taken on the manufacture of a considerable variety of the rarer sugars and related compounds which are required in a specially pure condition for bacteriological purposes.

"Vitreon" chemical ware is, as in 1918, shown by Shanks and Co., Limited, Tubal Works, and Victorian Pottery, Barrhead. The claims for it, which have been demonstrated by its extensive use, are that it is a porcelain body with great crushing and tensile strength, good heat-resisting properties, and high dielectric strength. It is extensively used in the Hart condensing plant for nitric acid.

Quite a considerable number of exhibits consists of show cases containing samples of various organic chemical products, pharmaceutical and fine chemicals and intermediates, about which it is difficult to say much unless a list of the samples shown by each firm were given, which is impossible for reasons of space. A brief reference must therefore suffice for these. Allbright and Wilson, Limited, Oldbury, who show phosphorus products, were the first firm in England after the outbreak of war to produce tungsten powder (April, 1915); British Drug Houses, Limited, 22-30, Graham Street, City Road, London, have an exhibit comprising about 100 specimens of fine chemicals of the high degree of purity called for by analytical and research work; W. J. Bush and Co., whose exhibit consists of fine organic chemicals prepared synthetically, were manufacturing them before the war, but immediately increased their facilities, and the firm are satisfied that they are now well equipped to meet any German competition in the future; Clorethers, Limited, 26-28, Mark Lane, London, E.C. 3, have recently started operations on a large scale at Blackburn for the preparation of intermediates for dye manufacture; Hedley and Co., 120, Harrow Road, Leytonstone, state they were the first firm in this country to undertake the preparation on any scale of ethylchloride, many hundreds of tons of which were manufactured yearly in Germany before the war, and were largely used in the manufacture of pharmaceutical products and intermediates for dyes. Special pamphlets have been prepared dealing with the technical application of ethylchloride to the chemical industry and to refrigeration.

Other firms exhibiting who come within the above category are: The Weston Chemical Company, Limited, Liverpool; Spencer, Chapman and Messel, Silvertown, London, E.; Stafford Allen and Sons, Limited, London; Stockton-on-Tees Chemical Works, Limited, Stockton; Pierson, Morrell and Co., Limited, Barnet; London Chemical Works, Limited, Southall; J. W. Leitch and Co., Milsbridge, near Huddersfield; Holt, Thompson and Co., Limited, Liverpool; R. Graesser, Limited, Ruabon; Brunner, Mond and Co., Limited, Northwich, who exhibit synthetic phenol and ammonium nitrate produced from nitric acid made by the catalytic oxidation of ammonia; and A. Boake Roberts and Co., Limited, Stratford.

It is difficult to particularise with regard to the exhibits of laboratory glassware and porcelain goods, so numerous are the articles now made. The story of the development of the British chemical glassware industry has been told more than once during recent years, and need not be recapitulated here. Suffice it to say that no one need now go out of the country for any such apparatus. A notable exhibit is that of the British Chemical Ware Manufacturers' Association, a combination of some eighteen firms, who, in pointing to the sustained effort and heavy expenditure which has been entailed to produce the results shown, call attention to the fact that if the prices of the goods are considerably in excess of the prices which prevailed before the war, examination will show that the increase is less in proportion than the increase in the cost of labour, materials, and fuel. Also exhibiting laboratory glassware are: H. I. Elliot, 20, Cross Street, Hatton Garden, London; the Scientific Supplies Company, Limited, Hatton Garden, London; Hyposol, Limited, High Road, Wealdstone, Harrow; and the British Laboratory Ware Association, 24, Martin's Lane, Cannon Street, London.

BRITISH CHEMICAL TRADE ASSOCIATION.**ANNUAL MEETING.**

THE statutory and first annual general meeting of the British Chemical Trade Association was held recently at the Great Eastern Hotel, London. Mr. William Mann, president, who occupied the chair, said:—

On March 10 the Association was registered with limited liability, and under licence of the Board of Trade permission was obtained to register without the addition of the word "limited." The Association can therefore be said to have commenced its corporate existence on a permanent basis on that date. The conditions of sale and rules of arbitration have been completed and issued in booklet form. These conditions have been widely adopted. Many firms have made it their invariable practice to state on their contracts that they are subject to the conditions of sale and rules of arbitration of the British Chemical Trade Association. Some hundreds of such contracts to my knowledge have been accepted by members as well as by non-members without question, and it is pleasing to record that, notwithstanding the large number of trade disputes which have unfortunately occurred since the armistice, so far as I know not a single arbitration has had to be held under the Association's conditions. There is not the slightest doubt that these conditions have done much to crystallise the position, to furnish acceptable definitions, and to abolish incipient causes of dispute. An Appeal Committee has been formed, and is now ready to deal with any disputes which may be referred to it, but, obviously, since there have been no disputes under our conditions of sale, no occasion has so far arisen for the rules governing appeals to be put into operation.

At the last general meeting I referred to the necessity of the formation of sub-committees, and I made special reference to Manchester. Since then a local sub-committee has been formed in Manchester for dealing with affairs there, and, in view of the great importance of Manchester in the chemical trade, this was, I think, highly desirable.

An Alkali and Allied Products Sub-Committee has also been formed in accordance with the promise made at the last general meeting. In connection with this I would like to refer to the caustic soda question, with which I dealt at some length at the last meeting, when I made special reference to the apparently preferential treatment which seemed then to be in force in regard to licences for these products. As arranged at that meeting, your committee took the matter up with the War Trade Department, and I am glad to record that a considerable measure of success was attained in so far as we succeeded in obtaining an undertaking from the Department concerned to give special consideration to applications for licences from firms who held stocks purchased on the strength or expectation of licences, and which stocks were thrown on their hands by a refusal to renew or sudden suspension of the issue of such licences.

The committee have had under consideration the possibility of effecting arrangements in various places abroad, somewhat on the lines of Lloyd's Agencies, whereby any member, desiring reliable and independent services in any place where he may have no branch office or agency of his own, either for the purpose of inspecting goods before shipment, surveying disputed parcels, or in other ways, may readily obtain such facilities at a reasonable fee through his membership in the Association. This may seem a somewhat ambitious scheme, but it has been evolved in accordance with the wishes of various members who have expressed a desire for such facilities. The matter is now in hand, and we hope to have a more definite announcement to make shortly.

The Association has, I believe, been able to render some considerable service to its members and also to the national interest by the steps taken in connection with the disposal of surplus stocks of chemicals and allied products held by the Ministry of Munitions. The Ministry recognised that the Association, on account of the large number of leading chemical exporters which it represents, was in a special position for finding outlets abroad for materials on hand in excess of what could be conveniently taken up by our home manufacturers, who are, of course, entitled to first consideration. We met them on more than one occasion, and I am pleased to say that our co-operation was welcomed.

Recently we have been called upon to deal with a question of serious concern to importers and consumers. You are aware that the importation of dyes is prohibited except under licence. The attention of the committee was drawn to the

method of licensing which had been adopted, and which necessitated importers and consumers disclosing information as to their business not only to a Government Department but to a trading firm which had been appointed by the Board of Trade to act as their agents in the distribution of imported dyes. Had it been left there, it would have been a sufficiently serious matter for importers that, after receiving their licence from the Licensing Committee, the whole of their business connections should be disclosed to a firm who might at some time become their competitors. But it went beyond that, and, according to information received by the committee, the firm in question had approached manufacturers in the United States, informing them of the position to which they had been appointed, and asking for offers and samples. We took this matter up most energetically with the Dye Commission, and I interviewed Mr. Graham on the matter. A certain measure of satisfaction was obtained, as Mr. Graham gave me an assurance that the firm in question would not be permitted to trade on its own account. We are, however, not content to leave the matter where it is.

I might now conveniently refer to a question upon which there was considerable discussion at the last meeting. I refer to the question of the elimination of any German element of interest in the Association. I want to state the position as it is to-day, and the views of the committee, quite clearly. So far as this Association is concerned, there is no German or pro-German support or interest in any shape or form. I would remind you of the resolution of the committee, which I referred to at the last meeting, and which was confirmed at a subsequent committee meeting: "That no person of alien enemy origin, whether naturalised or not, shall be elected as a member of the Association except by the unanimous vote of the Association Committee." That resolution has been rigidly adhered to, and I can say that when there has been any suspicion at all, the decision of the committee has been unanimously against election. Article 15 of the memorandum and articles of association specifically states that no person shall be a member of the Association Committee unless he is a British subject. Unfortunately, even our Allies are precluded from membership of the Association Committee under this article.

On this question I would like to refer to one of the criticisms which the Association has had to meet. It has often been said that the Association is not fully representative of the chemical trade because this firm or that is not a member, and it has been exceedingly interesting to observe cases in which the firm referred to is either definitely ineligible on account of German nationality or control, or would be unlikely (on account of German interest) to successfully run the gauntlet of the general committee's stringent scrutiny of all applications for membership. Our Association was brought into existence with definite objects, and chief among them is the fostering of British chemical interests: that will be our main policy in the future. We recognise that there are certain products which Germany, by her natural resources or special organisation, and to enable her to carry out her financial obligations under the Treaty of Peace, must be allowed to supply to this country, but our policy must be to foster first of all British production; secondly, that of our Allies; and only to go to our late enemies as a last resource. There is a brilliant future for the chemical trade in this country if the Government, as well as those engaged in the trade, whether as manufacturers, merchants, or consumers, do their duty. When the peace is signed the Government will find themselves compelled to turn their attention immediately to the question of trade policy, and it is for the chemical trade by the closest co-operation to bring all the pressure it can to bear upon the Government to see that the chemical industries in this country do not lose what they have gained during the war.

Mr. Walter Dexter then proposed that in accordance with the president's recommendation Mr. Hugh Hughes (J. H. Dennis and Co.) be elected vice-president. Mr. W. C. Castle seconded the resolution, which was carried.

THE WASTE AND POSSIBILITIES OF COAL.—The Automobile Association and Motor Union, in conjunction with the Gaumont Company, have produced a film entitled "Coal, Its Waste and Possibilities." A private exhibition was given in London recently, and later on the film will be shown throughout the country. The Fuel Department of the Automobile Association is anxious that more benzole shall be produced in this country, and this film demonstrates how, by treating coal scientifically, this may be done without in any way impairing the use of coal for its ordinary purposes.

AMERICAN OFFICERS IN GERMAN CHEMICAL PLANTS.

THIS is the full-page heading given by the *Journal of Industrial and Engineering Chemistry* to a paper entitled "The German Dyestuff Plants and Their War Activities," contributed by Major T. W. Sill, of the U.S. Chemical Warfare Service. It suggests a question: Are there any British officers competent to size up what they see in German chemical plants; and if not, why not? If so, will they be allowed to make public what they see through the columns of the *Chemical Trade Journal and Chemical Engineer*? Major Sill states that in February last, as a member of an Inter-Allied Commission, he had the opportunity of visiting most of the principal plants in the various occupied areas of Germany which were devoted to the manufacture of dyestuffs, medicinal products, and standard chemicals. He is frank enough to admit that he was prepared to find them in a disordered state through lack of operating personnel. He was wrong. To-day one finds these great German plants in splendid condition, with a large, highly-trained force of employees, and, moreover, with additional opportunities for increasing their production by utilising the extra equipment added for war materials production. Owing to the efficiency of the German system, all their man-power was registered and so classified that when war broke out they kept a large proportion of their trained workmen within these plants. Consequently, they still have the majority of them ready to take part in a new battle for commercial supremacy. At present the plants are operating at about 10 per cent. of their production capacity for peacetime products; but, nevertheless, they are keeping most of their labour to avoid their becoming mixed up in agitation or possible Bolshevism. With this surplus of labour marking time, one finds the plants in exceptionally good condition. The only apparent handicap is a lack of first-class lubricants, but substitutes have been found. What the gallant major wishes to impress on his compatriots, and what we wish to impress on our readers, is that this important part of Germany's industries is not crippled, but intact and ready to operate, and is consequently a dangerous factor in the struggle for commercial supremacy, and also a potential source of war material production unless properly controlled. At present they lack certain important raw materials which, fortunately, the Allies can control.

The intact condition of the German factories made the greater impression in that the author reached Germany through the devastated regions of France and Belgium. He made a tour of investigation of the works of the Bayer Company at Leverkusen—a city in itself before the war, and considerably expanded during the war,—during which, despite the contrary assertions of its directors, it was widely engaged in making war material, especially poison gas. The author met Dr. Duisberg, who lightly spoke of an early visit to the States to meet old friends. So little does your German, even the German of the Duisberg type, understand how the initial use of that poison gas has killed all hope of friendship till the crime be expiated. The Germans admit defeat, and promise to pay; but the payment will take years, and forgiveness will be as slow as the payment. If Dr. Duisberg and his like would only read the article by F. B. Garvan on "Industrial Germany" in the same *Journal of Industrial and Engineering Chemistry* (June, 1919) we have before us, it might help them to understand the detestation in which the civilised world holds men like the late Hugo Schweitzer, American citizen, German spy and president of the Bayer Company.

Major Sill also visited the works of Meister Lucius and Brüning, at Höchst. These people, who were pioneers in the development of poison gas, have also considerably enlarged their previously large works. The Badische at Ludwigshafen although heavily employed on war material, were able, nevertheless, to make dyestuffs on an appreciable scale during the war, and at present hold large stocks ready to turn loose on the world's markets when permission is granted. Their works at Oppau for the production of ammonia by Haber's process are also within the occupied zone, and the author saw this plant, which, he says, can produce 100,000 tons of ammonia per year. A duplicate plant, of the same estimated output, exists elsewhere outside the occupied zone. It would be difficult to exaggerate Germany's debt to Haber, yet he never attained a higher rank than that of Captain. His country, however, made proper use of him. Had he been born an Englishman, he would certainly have attained a higher rank, but almost as certainly he would not have been properly

utilised until it was nearly too late. They do some things better in Germany.

Our American observer was impressed by the high quality of the lead fittings in German works, by the superior design of their filter-presses as compared with most of those in use in America, and by a clever method of building their water-towers round their stacks, thus utilising waste heat and preventing freezing. On the other hand, he noticed, as Americans abroad always do, that in the matter of conveying equipment America had the advantage. Difference in wages sufficiently accounts for that; but it does not account for the fact, also observed several times on this tour, that some goods seemed to have put on them unnecessary transportation charges; process A carried out at one place, process B at another far up the Rhine, process C at a place near the starting-point, the plant in each case being simple and of much the same type. This does not square with what we know of German chemical industry, and since the final product in one case was certainly, and in the other was probably, war material, we think the arrangements might be justified as a temporary expedient, or the blame, if blame be due, laid at the door of officials in Berlin.

Major Sill says he understands that the Allies occupying the various areas intend to keep a "qualified corps of representatives" to participate in the control of operations of the factories in their area. "They will thus have command over the raw materials utilised and required, the methods of operation, and the export of the materials produced." We hope he is right. He sees the value of the information to be obtained in this way, and wishes his country to participate in the scheme. If some of those keen young Americans come over on this "stunt," they will learn something. Where is our "qualified corps of representatives?" We, too, have plenty of men of the right type, but have the British Government begun to look for them? Do the British Government see their opportunity?

RECONSTRUCTING THE GAS INDUSTRY.

THE deputation from the National Gas Council which waited upon the President of the Board of Trade on Friday of last week ventilated a few of the grievances under which it has suffered during, and as a consequence of, the war; and as there is a close relationship between the gas and the chemical industries, some references may be made to the matter. The deputation was introduced by Mr. D. Milne Watson, president of the National Gas Council and governor of the Gas Light and Coke Company, and he was supported, among others, by Sir Dugald Clerk, F.R.S., president of the Institution of Gas Engineers.

The main point put forward was that the legislative conditions under which the gas industry now works must be remodelled to suit the conditions which the war has placed it in. One feature peculiar to the industry is the sliding-scale of charging, under which, as the price of gas is reduced, so the dividends paid may be increased; or, conversely, as the price is increased, the dividends paid must be reduced. The precise basis—viz., a rise or fall of half-a-crown in the dividends for every penny rise or fall in the price of gas—was admittedly a fair one in the conditions which then prevailed. The conditions of the war, however, have compelled the companies to be continually increasing the price of gas, with the results that the dividends have simultaneously fallen. Quite apart, therefore, from the hardship inflicted upon the investor at a time when most other industries obviously made larger profits, the effect upon the gas industry of war conditions has been to render it impossible to raise new capital upon anything like reasonable terms, whilst, at the same time, Government loans are offered at 5 per cent. It is true that under the Temporary Increase of Price Act, passed in 1917, a small dividend has been preserved to the companies who have been mostly hardly hit, but it is now felt in the industry generally that if it is to be maintained upon an economic and commercial basis, the whole financial position must be reconsidered and readjusted in the light of the altered conditions which the cessation of the war has brought about. As an additional argument, the dependence of the chemical industries of the country upon the gas industry for many products was quoted in conjunction with the necessity for maintaining the position of the chemical industries which has been attained during the past five years.

The desire is that the Government should introduce legislation practically bringing the conditions under which the gas industry works up to date. The reply of the President of the Board of Trade was, in the reporter's usual phrase,

sympathetic; whilst admitting that he was not an expert in the carbonisation of coal—it had been urged that all coal should be carbonised in order to obtain the by-products needed by the chemical industries,—he knew enough of physics to take a very great interest in it, and, he added, there was no doubt that the future of the country depended to a larger extent than the public realised, both in peace and in war, upon the fuller utilisation of the by-products obtained through the carbonisation of coal, which were in themselves the basis of so many important industries. He assured the deputation that in approaching the Government at this stage they spoke to ears which understood and which were sympathetic. On the financial side, he recognised fully that steps must be taken in some direction which would make it possible for the industry to carry on and develop.

What the industry desires on the technical side is that the recommendations recently laid down in the report of the Fuel Research Board should be given legislative effect to. The main recommendation of that report was that gas should be made of certain calorific values according to the use to which it was to be put. In that way a comparatively low-grade gas could be made and improved to suit the particular needs, whereas at present a 500 British thermal unit standard is laid down. The feeling is that the industry is deprived of freedom in its scientific and technical development by out-of-date legislation. The facts were put forward in an undoubtedly restrained manner, and it is to be hoped that, in spite of the amount of legislation which the Government have to handle just now, time will be found to deal with this particular problem, because its solution is fundamental to so many other necessary developments.

PARLIAMENTARY NEWS.

Sale of Calcium Nitrate Factory.

In the House of Commons, Mr. Rose asked the Parliamentary Secretary to the Ministry of Munitions whether His Majesty's explosive factory, Victoria Works, Wincham, Cheshire, has been disposed of; to whom and upon what terms; and by what amount the cost of erection and equipment exceeded the original estimate?

Mr. Kellaway: After full advertisement, the major part of the property referred to has been sold to the Salt Union, Ltd., the original owners, for £60,000., this being the highest offer received. The factory was erected for the production of calcium nitrate. There was a very acute shortage of this material, which was essential for explosives. Over 100,000 tons was produced at the works. Prior to their erection we were dependent on the limited supply obtainable from Norway, which only provided one-sixth of our requirements. The total expenditure was £334,000., of which £117,000. was spent on buildings. This expenditure was useful only for war purposes, and exceeded the original estimate by £154,000. The actual work done represented a great deal more than was included in the original estimate.

Cellulose Acetate.

Lieutenant-Colonel Thorne asked (1) the Secretary of State for War the names of the firms referred to on page 5 of the Fifth Report of the Select Committee on National Expenditure who were invited to tender in July, 1915, for supplies of cellulose acetate, and what was the reason for refusing to send a tender form to the Cellon Company, of London, and who was the person responsible, and his name, who thus refused permission to an English company, and invited tenders from a firm of neutrals adjacent to enemy territory, the Cellonit Gesellschaft Dreyfus, of Basle, who were advertising their wares in the enemy press; and was the Department aware of this firm's advertisements in the *Chemiker Zeitung* when they invited them to tender; and (2) the Parliamentary Secretary to the Ministry of Munitions the reason why in March, 1918, his Department made an Order forbidding the exportation of cellulose acetate as indicated in the Fifth Report of the Select Committee on National Expenditure, in view of the fact that all that which was being produced in this country was pronounced to be defective; will he state the names of the contractors who carried out the erection and extension of the British Cellulose Company's work at Spondon, Derby; and whether this was a contract between the Ministry of Munitions and the builders or the British Cellulose Company and the builders?

Mr. Kellaway: I will reply to these questions at the same time. A Committee appointed by the Government is examining this question, and, as was stated by the Leader of the

House on July 1, it is hoped that their report will be ready by the end of the month. In these circumstances, I do not think it would be desirable to make any statement at present.

Private Wagons.

Mr. Sugden asked the President of the Board of Trade if he will at once return private wagons to their owners which now, in the majority of cases, are being used by the Government until they become in disrepair, when they are returned to the owners without such owners having the right of recovery of cost of such repair; and will he cause such cost of repair to be paid to the owners and compensation paid to them for loss of trade resulting therefrom?

Mr. Bridgeman: I am afraid I do not clearly understand to what wagons my hon. friend refers, or by whom they are being used. If, however, he will give me further particulars, I will look into the matter at once.

Oil Seeds and Nuts.

Captain R. Terrell asked whether all restrictions likely to check the free importation of oil seeds and nuts will be removed and every facility given to increase production?

The Minister of Food (Mr. Roberts): I am doing everything in my power to encourage the importation of seeds and kernels into this country, and I know of no restrictions likely to check the supply.

Sickness Rates in the Chemical Industries.

Mr. J. Davison asked the Minister of Health whether he is able to submit statistics for the United Kingdom showing separately the sickness rates obtaining in the great organic industries, such as agriculture, chemical trades (including gas-workers), mining, metal trades, and miscellaneous trades, for the years 1913-18?

Major Astor: My right hon. friend regrets to say that statistics do not exist at present in this country as to the sickness rates prevailing in the several organised industries. In so far as information exists at all on sickness rates, as, for instance, in the records of friendly societies and of approved societies under National Health Insurance, it does not afford any guidance as to the rates prevailing in the several industries, because those bodies are not organised according to occupation.

Royalties on Oil.

Mr. Holmes asked on Tuesday whether the Government had come to a decision concerning the payment of royalties on the oil discovered in Derbyshire?

Mr. Kellaway said the Government had this matter under consideration, and an announcement of their decision would be made as soon as possible.

Linseed Oil for Germany.

Captain Brown asked the President of the Board of Trade if his attention has been called to the allegation that, while Belgium is short of linseed oil and is paying £120. per ton for this article, the British Government are selling the same article to Germany at £75. per ton, thus giving preferential treatment?

Mr. McCurdy: In accordance with arrangements made at the Brussels Conference, 25,000 tons of linseed oil were sold to Germany at £78. per ton. When this price was fixed linseed oil could be purchased in the United Kingdom at £58. per ton, and Belgium had declined to purchase any part of the British surplus.

GAZETTE NEWS.

Gravesend Smelting and Refining Company, Ltd., London, E.C.—Resolved June 17: That the company be wound up. W. R. Wildridge, of Moore, Stephens and Co., 2, Gresham Buildings, Guildhall, E.C., chartered accountant, liquidator. Meeting of creditors July 2.

Kirk Chemical Company, Ltd.—Claims to R. Miller, 42, Spring Gardens, Manchester, chartered accountant, liquidator, by July 25.

Synthetic Coal Syndicate, Ltd.—Petition presented, June 6, by Vickery, Hunt and Co., Russell Road, Bowes Park, general engineers. Hearing, Royal Courts of Justice, Strand, July 8. Russell and Arnholz, 3, Great Winchester Street, E.C., solicitors.

Wohle Mineral Oil Products (1910), Ltd.—Meeting of creditors E. Hard's, 17, Fenchurch Street, E.C., July 9.

Yorkshire Vulcanising Company, Ltd.—By order of Court, dated April 30, C. H. Baker, 1, Abnon Street, Leeds, accountant, has been appointed liquidator in place of W. A. Judge, who was desirous of retiring, and retired accordingly.

ITEMS OF INTEREST.

FRENCH PURCHASE OF IRISH BOG.—A French syndicate have acquired a large tract of bog at Ballycumber, Athlone, for the purpose of making peat fuel. An elaborate plant for the manufacture is being laid down.

PATENTS IN ENEMY COUNTRIES.—The Board of Trade have issued a general licence authorising the payment of fees in respect of the grant and renewal of patents and of the registration of trade marks and designs in enemy countries or on behalf of enemies.

ACCIDENT AT CHEMICAL WORKS.—James Morgan (40) was admitted to Ancoats Hospital in a serious condition on Wednesday, suffering from burns to his head and arms, caused by the firing of the contents of a tar still at the chemical works of Messrs. Hardman and Holden, Ltd., Bradford, Manchester.

HARDSTOFT OIL WELL.—The Hardstoft oil well near Chesterfield showed renewed activity on Tuesday. Drilling is being continued through the limestone rock, and the oil surging up the borehole gushed out with considerable force. It is being stored in tanks, the erection of the large storage receptacle not having yet been completed.

PERSONAL.—Dr. G. G. Henderson has been appointed Regius Professor of Chemistry in the University of Glasgow in the room of the late Professor John Ferguson. Dr. Henderson has been Professor of Chemistry at the Technical College, Glasgow, since 1892. He is a past president of the Society of Chemical Industry and of Section B of the British Association.

NATIONAL FACTORIES FOR SALE.—The Disposal Board of the Ministry of Munitions are offering several National Factories, all well-equipped, in various parts of the country. Each of the factories will be sold by private treaty, in one lot, on application to the Controller, Land and Factories Section, Disposal Board, Charing Cross Buildings, Embankment, W.C. 2.

AMERICAN CYANAMID COMPANY.—Messrs. Sperling and Co. announce that operations at the plants at Niagara Falls and Warners, N.J., were on the basis of full capacity during May, but on May 3 the operations at the phosphate mines at Brewster, Fla., were suspended on account of a strike, which, however, is not peculiar to the company's plant, but general over the whole district. Early resumption of work is expected. The net value of the shipments of the various products for May totalled \$357,681., and sales represent a value of approximately \$344,000. Unfilled contracts as at May 31 represent a sales value in excess of \$835,000.

OBITUARY.—The death took place last week, at Birmingham, three days following the death of his wife, of Professor Adrian J. Brown, who since 1899 had been Professor of Biology and Chemistry of Fermentation at the University of Birmingham and Director of the School of Brewing. He was a M.Sc. and a Fellow of the Royal Society, and was the first to occupy the position of Professor of Brewing, to which he was appointed in 1899, and during two decades he was head of the department. At one time he was examiner in biological chemistry at the Institute of Chemistry.—We regret to announce the death of Mr. Holbrook Gaskell, which took place last week at Frodsham, Cheshire, after an illness of several months, at the age of 72. Mr. Gaskell was very well known in connection with the heavy chemical industries, and until recently was a director of the United Alkali Company, Ltd., Liverpool.

FUNERAL OF SIR JOHN BRUNNER.—The funeral of Sir John Brunner, Bart., Silverlands, Chertsey, took place at Lyne, near Chertsey, on Friday afternoon, July 4. The chief mourners were Sir John and Lady Brunner, Mr. Felix Brunner (grandson), Miss Joyce Brunner (granddaughter), Mr. and Mrs. Roscoe Brunner (son and daughter-in-law), Miss Shelagh Brunner (granddaughter), Mrs. Buckley (eldest daughter), Captain Buckley (grandson), Mrs. Parker Lowe (daughter), Captain and Mrs. Arthur Dillon (son-in-law and daughter), Major and Mrs. Guy Gold (son-in-law and daughter), the Hon. Mrs. Blythe (youngest daughter), Captain L. B. Brunner and Mrs. Stanley Brunner, Mr. Oswald Nettlefold, Dr. and Mrs. E. J. White, Mr. Ronald Wyman, the Right Hon. Sir Alfred Mond, Bart., M.P., Mr. Emile Mond, Mr. Robert Mond, Mr. Robert Mathias, Sir Robert Hudson, G.B.E. Representatives of the staffs from the various works of Messrs. Brunner, Mond and Co., Ltd., and of other organisations in the chemical industry, were among the large number of people present.

MALAY TIN EXPORTS.—An official cablegram from Kuala Lumpur states that 2,873 tons of tin were exported from the Federated Malay States in June, as compared with 3,404 tons in May and 2,950 tons in the corresponding month last year. The total export for six months of the present year was 18,389 tons, against 18,538 tons in 1918 and 19,752 tons in 1917.

COMBINATION IN THE GLASS INDUSTRY.—The British Glass Industries Company have acquired the whole of the shares of the Queensborough Glass Bottle Works, and also the business of Payne Bros., trading as the British and Foreign Bottle Company, the latter being one of the biggest dealers and factors in glassware in the country. The total purchase price is in the neighbourhood of £400,000.

A NEW SOURCE OF EDIBLE OIL.—A long-neglected material is the cohune nut, of which manaca palms in Honduras produce a yearly average of 300 pounds per tree. This was brought into temporary demand as a source of carbon for gas-masks, and U.S. Consul C. N. Willard notes that the utilisation is being made permanent and greater as a result of the discovery that the oil is equal or superior to coconut oil for cooking purposes. It is estimated that a single area of the trees, extending 60 or 70 miles along the Aguan River, with a width of 10 or 12 miles, could supply 10,000 tons of nuts a month.

ACID-PROOF ALLOYS.—With the aid of a suitable source of high temperature, especially the electric furnace, C. Rossi, of Legano, Italy, claims to produce substantially pure acid-proof alloys of iron with 13 to 21 per cent. of silicon. A mixture of pig iron and ferrosilicon may be melted with a small amount of iron sulphide or other flux, the impurities being allowed to crystallise out of the molten mass; or iron or steel scrap may be melted with ferrosilicon, with the addition of iron oxide to remove the carbon. The alloys are designed for resistant vessels in chemical manufacture and for anodes in electrolytic processes.

BUSINESS NOTICES.—Owing to the death of Sir Boverton Redwood, Bart., Mr. Arthur Eastlake and Mr. William Sutton, who have been associated with him for the past 28 and 23 years respectively, have arranged to enter into partnership for continuing inspection and advice on all matters in connection with the petroleum industry in a similar manner to that undertaken by Sir Boverton. Mr. Robert Redwood has consented to co-operate with them, to give them the benefit of his experience, and to undertake the examination of oil samples, etc. They will also be assisted by Mr. W. H. Dalton in geological matters, and by other gentlemen previously associated with the late Sir Boverton Redwood.—Viscount Drumlanrig and Mr. F. E. Holland have been elected directors of Messrs. Allen, Harding and Co., Limited, chemical manufacturers and merchants, 1, Leadenhall Street, London, E.C. 3.—Solway Dyes Company, Carlisle, has been incorporated as a private company under the name of Scottish Dyes, Limited. Additional works on a large scale are being erected at Grangemouth, but until these are completed all communications should be addressed to Scottish Dyes, Limited, Murrel Hill Works, Carlisle.

STORAGE OF EXPLOSIVES AT WOOLWICH ARSENAL.—The committee appointed by the Minister of Munitions in July last year to inquire into the Royal Ordnance Factories, Woolwich, made several reports, which are now issued altogether. One of them, which the committee regarded as urgent, states that there are at the present time (November, 1918), in addition to the large amount being handled in the filling houses, over 10,000 tons of explosives stored in the Woolwich Arsenal enclosure. This is contained in 254 magazines and store houses, concentrated in an area of 1,284 acres. Even the disastrous explosions which have occurred at Silvertown, Morecambe, and Chilwell, with their far-reaching effects, could hardly be compared with what might happen at Woolwich. The committee say that the risk taken is to a large extent unnecessary from the military point of view, and entirely unjustifiable in the interest of the public safety. Naval and military authorities agreed in their evidence that Woolwich might well be abandoned so far as the storage of filled ammunition is concerned. Of the 172 buildings, each containing over a ton of explosive, only 15 comply with the regulations of the Home Office governing the distance which should be preserved between magazines and other danger buildings, and between them and private dwellings. In their main report the committee give reasons why Woolwich should be retained as a Government arsenal in peace time, and indicate the methods by which it should be developed and controlled.

CORRESPONDENCE.

*** We do not hold ourselves responsible for the opinions expressed by our correspondents.*

Standard Chemical Stoneware.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—In your issue of April 13, 1918, Mr. Percy Kingsbury, of the General Ceramic Company, U.S.A., writes:—"We have already made some efforts in this direction in the United States—viz., the standardisation of chemical stoneware. The results of these have been very satisfactory." He proceeds to state that, in view of the close relationship which must inevitably arise between Great Britain and the United States after the war, it would be very desirable to make the standards international.

The standardisation movement seems to be speeding up in the United States, as again Mr. Kingsbury writes in *Metalurgical and Chemical Engineering*, September 27, 1918, on the chemical stoneware industry and the war, and remarks on the "phenomenal expansion" of the American industry, and how the United States manufacturers now have nothing to learn from Europe, etc., etc. He uses the same arguments and remarks advocating standardisation of shapes and a proper stoneware body as we did long ago in this journal, almost word for word; well, we forgive him. If it was done independently, it is only one more proof that we are right.

He pityingly refers to the efforts being made here in England, and how the standardisation of chemical stoneware does not seem to make much headway—presumably through lack of encouragement.

We sincerely wish that we could contradict him, but we cannot. In spite of the hard propaganda work we and others have carried out, including a paper read before the Ceramic Society of Great Britain early this year, where the chemical stoneware manufacturers were presented with a basis for carrying on the work, we find within the last week or so that a prominent chemical stoneware firm advertises and illustrates stop cocks and other plant, seemingly designed by a real artist, but without consulting any user or engineer. Tables giving overall dimensions for various sizes are also provided. The dimensions differ as far as it is possible from our suggested standards on engineering lines.

It would be highly interesting, therefore, to learn why they do so—that is, what is wrong with our standards. Through the medium of this journal we made a gift of these to everybody—without a fee,—and a thing given free is never much valued.

Perhaps the stoneware manufacturers have really arranged other standards, or the advertiser expects that all competing manufacturers as well as all users will adopt such empirical sizes as he gives, or is he indifferent to union and progress?

In the absence of any explanation, it seems that after eight months of propaganda work the British potter is in precisely the same position as before—each of the potteries following their own "ideas," no co-operation, no serious attempt to standardise: the result being the old muddle, with no possibility of quick replacements or exchange, etc. Meanwhile the huge market which could have been captured by the British potters, if an effort had been made in time, is now slipping away to other hands and other lands. Indeed, it is not difficult to imagine that a part of the trade will go across to the pushful West, and the rest to the east of the Rhine, where things are organised, and the advantages to maker and user of collaboration and standardisation in things scientific are better understood and appreciated or insisted upon.—Yours, etc.,

HARALD NIELSEN.
JAMES R. GARROW.

Westminster, July 7, 1919.

Ramsay Memorial Fund.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—May we, through your columns, invite the attention of all who are interested in the promotion of an intellectual entente between France and Great Britain to the appeal which is being issued to-day in France by the French branch of the Ramsay Memorial Fund?

The French branch of the Ramsay Memorial Fund, under the presidency of Mr. Lloyd George, are asking for contributions to a fund of one million francs for the purpose of founding Ramsay Memorial Fellowships in Chemical Science, similar to those to be founded in this country, such French Fellowships to be available for bringing to this country for

purposes of research chemists trained in the universities and technical colleges of France.

The appeal in France is being directed specially to British and American residents in France, and to the large number of persons of all nationalities who have for many months past been enjoying the hospitality of France during their duties in connection with the Peace Conference. It is hoped that many will wish to take this opportunity of signifying publicly their admiration and affection for France, and their esteem for the remarkable scientific achievements of France during the war.

Any subscribers in this country who wish to associate themselves with this branch of the Ramsay Memorial Fund can send their subscriptions to the Hon. Treasurer, Lord Glenconner, at University College, London, indicating their wish that the subscriptions should be earmarked for this purpose.—Yours, etc.,

GLENCONNER,
BURNHAM.
H. A. L. FISHER.
H. H. ASQUITH.
HUGH BELL.

Ramsay Memorial, University College, July 4.

Sulphuric Acid Association.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—We now have a National Sulphuric Acid Association, which includes all large and small makers, with the result that all practically quote the same, whether the buyer uses one tank a month or one hundred. Also the Association members say it is only by a narrow margin that they have avoided raising the price beyond the late maximum controlled price; yet sulphuric acid in America is available in unlimited quantities at half the price in Great Britain. Why? And how is it done? How are chemical manufacturers who do not produce their own acid going to compete with American exporters with £2. 10s. a ton on the sulphuric acid against them? We think it is time this question was ventilated. We are informed that a works with a siding enjoys an advantage of at least 15s. a ton over a works without a siding on carting costs alone, this being due, no doubt, to the present abnormal carting costs. Yet the works with sidings say they cannot undersell those without sidings. It seems to us that we have more to fear from an acid combine than from Germany. What do other large users (not makers) of sulphuric acid think, and how are they going to compete with America or Germany in the export trade if acid is going to cost twice as much in England? Will it not lead to a lot of new plants being erected, even though the erecting costs are abnormal—and we already have too many plants?—Yours, etc.,

p.p. VICTORS, LTD.,

B. LEVIN, Managing Director.

Manchester, July 7, 1919.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

(SPECIALLY CONTRIBUTED.)

THE outlook shows no sign of improvement. The dulness of the steel rail trade precludes any expansion of the make of ordinary iron, for the smelting of which the softer coke made in Cumberland can be almost entirely used. Only a boom in the steel rail industry can bring back to the by-product coking industry the activity which it exhibited during the war period from early 1915 until late 1918. At present the 80 by-product ovens are nearly all on slack blast. The greater proportion of them certainly are not producing within two-thirds of their ordinary output, and it is just possible that even this may have to be reduced shortly. The demand on export account of Cumberland coke is negligible, though persistent efforts have been made to market it. On the other hand, the demand for East Coast coke is constant, the Furness district furnaces absorbing 15,000 tons weekly and West Cumberland 8,600 tons. By-product manufacture is on a reduced scale, and the acid plant of one of the chemical works is idle. No difficulty is being experienced in disposing of sulphate of ammonia or benzole, pitch is firm, and creosote is in fair demand.

RESTRICTIONS ON EXPORTS OF CHEMICALS WITHDRAWN.—By an Order in Council, which appeared in the *London Gazette* on Tuesday, chemicals, drugs, and dyestuffs are deleted from the list of prohibited exports.

LEGAL INTELLIGENCE.

Chemical Workers' Wages: Applications to Reduce War Advances.

The question whether wages shall be reduced in certain trades now that the cost of living is stated to be declining occupied the attention of the Court of Arbitration under the presidency of Sir David Harrel at Westminster on Thursday, July 3. It was a new point raised before a tribunal which hitherto has mainly dealt with applications for increases of workmen's pay. While it is an accepted principle that rates of wages should be regulated by fluctuations in food prices, it was argued on behalf of the men that the high cost of commodities had undergone no material change, and in some instances is even more pronounced now than during the war.

Three cases were before the court. The Soap, Salt, and Candle Trades Employers' Federation submitted a claim to reduce the present minimum war advance of 28s. 6d. from August next by a percentage equal to the percentage reduction in the cost of living, as quoted in the *Labour Gazette* for July, 1919, when compared with the figure quoted in the *Gazette* for November, 1918—the date of the last general advance. A counter-claim for 15s. a week advance in wages for those over 18, and 7s. 6d. under that age, with proportionate increases for pieceworkers, and the establishment of a 44 hours working week throughout the industries, was presented on the men's behalf by the Joint Committee of Salt and Chemical Workers and the National Federation of General Workers, who further asked for the consolidation into permanent wages of all increases granted during the war.

The second case concerned a similar claim by employers to reduce wages in the chemical industries throughout the country, which was met by a counter-demand by the men for the conversion of war bonuses into established wages. In the third case, the National Federation of General Workers supported a claim made by workpeople employed in the manufacture of explosives for consolidating all increases of wages granted during the war.

Evidence on both sides was heard in private, and the decision of the court in each case will be given in due course.

Claim Against British Potash Company.

After a hearing which occupied several days, Mr. Pollock, High Court Official Referee, on Monday gave judgment in an action brought by Willcocks and Company, builders, of Wolverhampton, against the British Potash Company, Ltd., to recover £5,606. 3s. for work done in connection with their factory at Oldbury, near Birmingham. The defendants paid £3,500. into Court as sufficient to cover the cost of the work under the contract, but the plaintiffs contended that the circumstances were such that it would be improper to hold them to their original estimate, which had been departed from in spirit and detail partly owing to the time pressure which had been put upon them, and partly to omissions and additions. The work consisted of the erection of vats, a tank, and chimney shaft for the supply of potash under Government contracts.

The Referee, in the result, held that the £3,500. paid into Court by the defendant's company was amply sufficient to cover the plaintiff's claim, including any extras that might be allowed. He therefore gave judgment for the defendants, who would have, he said, to pay the costs up to the time of the payment in. The subsequent costs would have to be paid by the plaintiffs.

Synthetic Coal Syndicate.

The petition of Vickery, Hunt and Company for the compulsory winding-up of the Synthetic Coal Syndicate, Ltd., was again mentioned to Mr. Justice P. O. Lawrence on Tuesday.

Mr. Owen Thompson, K.C., for the petitioners, now stated that all the creditors had been paid, including his clients, and the costs of the petition provided for. He asked that the petition should be dismissed.

His Lordship assented.

Australian Coking and By-Products, Ltd.

In the Chancery Division on Tuesday, before Mr. Justice P. O. Lawrence, capital unrepresented by available assets was the plea in the petition of Australian Coking and By-Products, Ltd., for the confirmation of the court to a reduction of its capital.

Mr. Stamp said the company was formed in 1909 with the object of establishing and working coking ovens in Australia. The company could not find a sale for its coke, and the result was that it lost money—at least, £60,000.

His Lordship confirmed the reduction.

Abbey Chemical Company, Ltd.

Application was made to Mr. Justice Astbury in the Chancery Division on Friday of last week for the appointment of a receiver and manager in a debenture holder's action against the Abbey Chemical Company, Ltd.

His Lordship ordered that the proceedings should stand over for a week, an undertaking being given on behalf of the company not to part with any assets in the meantime.

Bankruptcy Examination.

At the London Bankruptcy Court on Tuesday last, before Mr. Registrar Mellor, the public examination was held of Charles Read, carrying on business at 5, Victoria Street, S.W. 1. The statement of affairs filed by the debtor disclosed gross liabilities amounting to £3,307. 13s. 6d., of which £3,288. 14s. 5d. was expected to rank against the estate for dividend. The assets were estimated to produce £246. 2s. 8d., thus showing a deficiency amounting to £3,042. 11s. 9d.

The debtor stated that he had acted as agent for the sale in the United Kingdom of "Heronite," a wood preservative, but owing to the delay in the delivery of goods, to the restrictions imposed by the Government on the shipment of goods, and to the fact that in September, 1918, he was fined £100. and costs for dealing in goods without a permit, his business fell off.

The examination was ordered to be closed.

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development of Intelligence), 73, Basinghall Street, London, E.C., whence further information may be obtained:—

Australia.

A representative of an Australian firm of repute is now in London, and is desirous of making arrangements to secure the agencies of British manufacturers, for Australia, of dyes for leather, woollens, and hat straw. (Reference No. 3.)

A representative of an established Australian firm is now in London, and is desirous of making arrangements to secure the agencies of British manufacturers, for Australia, of whale oil, cod oil, turpentine, and industrial chemicals. (Reference No. 10.)

British India.

A Rangoon firm, claiming to have a close connection with dealers and consumers, wish to secure an agency, either on a consignment or purchase basis, for aniline dyes. (Reference No. 20.)

A Madras firm are open to take up agencies for chemicals. (Reference No. 22.)

A Calcutta firm wishes to secure a sole agency, for India, for lubricating oils and greases, Portland cement, paints, disinfectants, etc. (Reference No. 24.)

A firm in Madras, who claim to have large industrial interests, are desirous of accepting a sole agency, either to buy outright or sell on commission, for aniline dyes. (Reference No. 28.)

British West Indies.

H.M. Trade Commissioner at Port of Spain, Trinidad, reports that a firm, doing a large import and export trade, wish to get into touch with reliable sources of supply in the United Kingdom for artificial fertilisers. (Reference No. 33.)

France.

An agent wishes to act for United Kingdom firms dealing in light chemicals and pharmaceutical products. (Reference No. 71a.)

Canada.

The following inquiry has been received at the Office of the High Commissioner for Canada, 19, Victoria Street, London, S.W. 1. All replies should be sent direct to the foregoing address.

A Montreal firm of wholesale druggists and manufacturing chemists are in the market for every variety of filter paper suitable for pharmaceutical laboratory purposes (sizes from 13 to 15in. in diameter), and would like to receive samples and quotations from United Kingdom makers.

REPORTS OF COMPANIES.

Esperanza Copper and Sulphur Company, Ltd.

For year to December 31 last the output of pyrites was 62,720 tons, being 23,913 tons less than in the previous year. Owing to the lack of shipments, work was carried on at a reduced rate throughout the year. Angostura and Forzosa mines were stopped altogether at the end of October, and Esperanza mine early in January of the present year. Work at Esperanza mine was resumed on June 18, 1919. The ore reserves, as re-estimated at the end of the year, were 886,000 tons. The development work in hand at San Daniel and Nueva Esperanza was concluded early in the year, and, the results being unsatisfactory, it was decided to abandon this part of the property meantime. All work was accordingly ceased, and the plant in use has been lifted for employment elsewhere. Sixty tons of copper precipitate were produced, or 44 tons less than in the previous year; 54,719 tons of pyrites were despatched from the mine to Huelva, being 38,539 tons less than in 1917. The shipments at Huelva were 67,546 tons, being 11,732 tons less than in the previous year. Practically all the markets for pyrites were closed, except that of the United Kingdom, which was under the strictest Government control. In these circumstances the shipments accomplished, although much below the normal quantity, cannot be regarded otherwise than as satisfactory. Profit for year, £4,761., and £17,897. was brought in, making £22,658. Deduct dividend of 5 per cent. paid August 17, 1918, £17,500.; balance, £5,158., which is carried forward. The profits for the year have failed to reach the standard aimed at, principally due to the stoppage of shipments arising out of the armistice, and more than half the profit actually made has been absorbed by income tax. Having regard to all the circumstances, the directors are, nevertheless, satisfied with the result of the year's work, which leaves the company's resources quite unimpaired, after a most trying period. During the year an opportunity arose of acquiring a small copper extraction works at Stockton-on-Tees on favourable terms. These works have since been put in operation. The bulk of the shareholders of New Lynni, Ltd., has been acquired by purchase. The property is situated in Cyprus, and is held on lease from the British Government. A considerable tonnage of low-grade copper ore has been proved, and it is proposed to develop and exploit same to the best advantage as soon as possible.

Pacific Phosphate Company, Ltd.

The report for year 1918 states that the war has seriously affected the company's business in many exceptional ways. Shipments of phosphate from Ocean Island and Nauru to neutral countries have been prohibited, and the British Shipping Controller has been unable to allocate tonnage for shipments to any part of the Empire or to Allied countries. Nauru now ceases to be a German possession, and it has been decided at the Peace Conference that the mandate for this island shall be given to the British Empire. It is not yet possible for the directors to indicate what may be the ultimate effect of this arrangement. There is ample evidence of an ever-increasing demand for phosphate in old and new markets, and as shipping becomes available sales should exceed both in value and quantity the best results achieved by the company.

The output in 1918 was considerably less than in the preceding year. Mainly on this account the profit for the year was smaller than in 1917. In former years, however, the directors placed £50,000. to a war contingency reserve, and as the conditions under which this fund was created are ceasing to exist, they have restored half of it (£25,000.) to profit and loss account. The directors propose a dividend on the ordinary for the half-year ended December 31, 1918, of 7½ per cent (making dividend for the year 10 per cent.); additional remuneration to directors, £2,812.; forward £13,830.

Alianza Company, Ltd.

For year 1918 gross profit was £180,571., from which have to be deducted: Exhaustion of raw material, £46,470.; depreciation of plant, £1,817.; London charges, debenture interest, income-tax, etc., £65,322.; leaving balance of net profit, £363,961. Adding balance brought forward, £135,928., and deducting interim dividend of 20 per cent., £100,000., there remains £399,889. Directors recommend final dividend of 20 per cent., free of tax (making 40 per cent. for year); forward, £299,889. Profit has been taken in profit and loss account on 2,010,799 quintals, of which 1,167,273 quintals

were produced at oficina Alianza, and 843,526 quintals at oficina Bellavista, and unsold stock at 292,943 quintals has been brought in at cost price. Oficina Bellavista was closed on October 5, 1918, and, owing to uncertainty of outlook in the industry, it has not been reopened.

Evans, Sons, Lescher and Webb, Ltd.

An extraordinary general meeting was held at Liverpool on July 3 for the purpose of confirming as a special resolution the resolution passed on June 18, removing the restrictions on the ordinary shares of the company, and also for the purpose of passing an extraordinary resolution authorising an increase in the capital of the company to £750,000 by the issue of an additional £150,000. ordinary shares.

The Chairman (Mr. William P. Evans, J.P.), said that now that the Treasury restriction as to capital issues had been removed, the directors considered it an opportune time to ask for the approval of the shareholders in respect of the new issue, and had originally intended to publish the prospectus at the beginning of the current month. In view of the great importance of the Victory Loan, however, and the special appeal of the Chancellor of the Exchequer that industrial issues should be postponed until the lists had been closed, they had decided to defer the issue of the ordinary shares until the autumn.

The resolutions were carried unanimously.

DIVIDENDS.

VIRGINIA CAROLINA CHEMICAL COMPANY.—Quarterly dividend of 2 per cent. (2dols. per share) on preferred, and 1dol. per share (1 per cent.) on common; also extra dividend of 2dols. per share (2 per cent.) on common.

CHAMPION AND SLEE, LTD.—Dividend of 5 per cent. per annum (6d. per share), less tax, on ordinary for half-year (interim).

REPORT ON SODIUM PICRATE EXPLOSION.

THE report was issued on Wednesday of Major H. Coningham, H.M. Inspector of Explosives, on the circumstances attending an explosion which occurred in May last in a barge moored alongside the jetty of the Scotswood works of Messrs. Sir W. G. Armstrong, Whitworth and Co., Newcastle, when 96 men were injured.

The accident occurred in connection with the removal of sodium picrate sludge from the company's factory at Lemington Point. At this factory, the report states, contents of lyddite shells are boiled out by means of a solution of soda ash. In this process picric acid from the shells combines with soda to form sodium picrate, which is very soluble, and this is taken in barges, and then out to sea. When the barge in question had a certain amount of sludge on board it was taken from the factory to the jetty, where about 20 tons of concrete blocks were taken on board. The sludge was kept under water in the barge.

From the evidence, the report adds, it seems clear that the explosion was due to the fall of heavy concrete blocks containing pebbles and flint stones on to the sodium picrate in the barge. The total quantity which exploded can only have been small in proportion to the sludge in the barge. It was contrary to the company's instructions for the barge to come back to the jetty. After loading picrate the barge should have been towed out to sea, and the contents dumped in deep water. The reason for the departure from the proper procedure was owing to the breakdown of the automatic grab. Owing to the large quantity of water in the barge, the possibility of some picrate getting dry was not sufficiently appreciated. "Otherwise," says Major Coningham, "I do not think anyone would have been so foolish as to drop large blocks of concrete upon it." Steps have been made to revert to the proper procedure, and in no circumstances will barges containing sodium picrate be again allowed to come near the jetty.

SPANISH EXPORT DUTY ON LEAD ORES.—The Board of Trade are in receipt, through the Foreign Office, of a translation of a Spanish Royal Order, dated May 31, by which the export duty of 1 peseta 50cts per 100kilogs. on galena, litharges, and other lead ores (Sec. 5 of the Spanish Export Tariff), and of 1 peseta per 100kilogs. on argentiferous lead (Sec. 6 of the Export Tariff), is further suspended for a period of three months—i.e., until August 31 next.

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

The specifications of the following applications are not printed by the Patent Office until the complete specifications have been accepted.

June 30th to July 5th (inclusive).

Feeding Granular or Powdered Material in Measured Quantities Associated Portland Cement Manufacturers; and Baxter, J. G. 16,509.
Purifiers Employed in Gasworks. Beard, G. F. H.; and Dempster, R. and J. 16,363.
Cyanamide. Luchemin, A. 16,359.
Radiation Pyrometers. Foster, C. E. 16,651.
Vulcanising Caoutchouc, etc., and Compounds Thereof. Gaisman, L.; and Rosenbaum, J. L. 16,340.
Oxidation Processes. Green, S. J.; and Langley, A. S. 16,887.
Nitration of Tung or Other Vegetable Oils. Howse, G. H. 16,741.
Oxidation Processes. Langley, A. S. 16,887.
Utilisation of Low-grade Carboniferous Material. Lesley, R. W. 16,817.
Purifying Liquids. Liénart, A. E. 16,383.
Ethylene Dichloride. Marks, E. C. R. (Union Carbide Company) 16,488.
Propylene Dichloride. Marks, E. C. R. (Union Carbide Company) 16,489.
Reduction of Metals to Powder. Mellor, J. P. 16,833.
Recovery of Varnish, etc., from Waste Micanite, etc. Micanite and Insulators Company; and Whalley, H. C. S. de. 16,907.
Cooling or Liquefying Gases, etc. Zich, M. 16,774.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 6d. in stamps to the Comptroller, Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane, W.C.

1917.

Safety Tank for the Carriage or Storage of Inflammable Liquids. Tompkin, A.; and Tompkin, A. 11,182. 128,604.
Pressure Furnaces for Use in the Synthesis of Ammonia. Maxted, E. B.; and Smith, T. A. 11,643. 128,623.
Recovery of Volatile Solvents. Bregcat, J. H. 11,994. 128,640.
Application of Varnishes Containing Volatile Solvents. Ward, G. L. 12,342. 128,658.
Dopes or Varnishes. Groves, S. E.; and Ward, T. W. H. 12,349. 128,659.
Destructive Distillation of Carbonaceous Materials. Perkin, F. M.; and Nitrogen Products and Carbide Company 12,350. 128,660.
Electrolytic Production of Zinc, Copper, or Other Metals. Soc. de Metallurgie Electrolytique. 15,629. 128,676.

1918.

Manufacture of Lactic Acid and Its Salts and the Recovery of the Volatile Fatty Acid By-products. Desborough, A. P. H.; Reilly, J.; and Thaysen, A. C. 6,729. 128,687.
Fermentation Products. Desborough, A. P. H.; Reilly, J.; Thaysen, A. C. and Henley, F. R. 10,220. 128,714.
Disazo-dyestuffs. Inray, O. (Soc. of Chemical Industry in Baste) 10,461. 128,726.
Treatment of Waste Liquors. Thompson, W. P. (Underwood, F. E.; and Illston, B. F.) 10,513. 128,730.
Portland Cement. Akerman, W. S. 10,801. 128,750.
Purifying Aluminous Materials. Norton Company 11,378. 118,605.
Aluminous Abrasive. Norton Company. 11,380. 121,721.
Blue Sulphurised Dye. Soc. l'Air Liquide. Soc. Anon. pour l'Etude et l'Exploitation des Procédés G. Claude. 11,949. 118,103.
Manufacture of Charcoal and Gas. Beccari, G. 13,161. 128,791.
Cracking Hydrocarbons. White, A. E. (Sinclair Refining Company) 14,865. 128,806.
Artificial Fuel. Evans, D. 15,991. 128,815.
Antimonious Oxide. Morris, E. F. 16,333. 128,818.
Recovery of Tin from Tinned Metals. Gregory, A. W. 18,818. 128,833.
Completely Gasifying Combustible Carbon Matter. Colson, L. 19,378. 121,124.
Preservative for Wood. Mehta, R. A. 19,988. 128,843.

1919.

Vulcanising Rubber Goods. Jackson, W. J. Mellersh- (American Rubber Company). 384. 128,852.
Draining-valve for the Delivery Pipes or Pumps. Hawes, G. T.; and Loders and Nocoline, Ltd. 11,001. 128,891.
Composition for Preventing and Removing Incrustation in Boilers. Urruty, J. 12,046. 126,966.

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Explosives. F. Howles, Broughton, Manchester. British Patent, 125,600, of 1916.

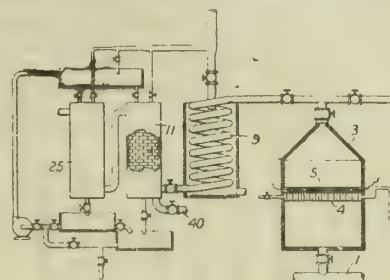
Consists in using as an explosive the known salt of dinitro-diazophenol obtained by reducing one nitro-group in picric acid, and treating the resulting amido compound with nitrous acid in the presence of nitric or hydrochloric acid.

Nitric Acid. J. W. Leitch, Huddersfield. British Patent, 125,616, of 1916.

Highly concentrated nitric acid, such as 91 per cent. acid, is prepared by distilling nitrate of soda or dilute nitric acid with relatively weak sulphuric acid as brown oil of vitriol of 84 per cent. strength, and passing the vapours through a fractionating-column or other dephlegmator so that water or the weaker acid flows back to the still. The temperature of the column may be regulated, as by a steam-jacket or by the heat of the vapours and the still, so regulating the strength of the distillate. The operation may be effected under reduced pressure.

Nitric Acid and Ammonium Nitrate. F. S. Washburn, New York. British Patent, 125,601, of 1916.

In the catalytic oxidation of ammonia, using preferably a platinum catalyst, the stream of ammonia and air is passed through the apparatus at such a rate that some of the ammonia escapes oxidation, so that a mixture of ammonium nitrate and nitric acid is obtained.



The gases are passed from a pipe 1 through a catalytic chamber 3, and traverse a cooler 4 to screen them from heat, radiated from an electrically-heated platinum catalyst 5. The oxidised gas is passed through a cooler 9 and absorption towers 11, 15. Ammonia may be admitted by a pipe 40 to convert the free nitric acid into ammonium nitrate; or the solution containing ammonium nitrate and nitric acid may be distilled to separate the acid and recover the salt; or sulphuric acid may be added to produce ammonium sulphate and nitric acid.

Extracting Copper and Nickel. B. Mohr and C. Hererlein, London. British Patent, 125,642, of 1916.

Copper and nickel in Bessemerised copper-nickel matte are separated by calcining the finely ground matte until the sulphides become oxides, reducing the calcined matte, treating the reduced matte with acid so as to dissolve the nickel but not the copper, and then electrolysis the nickel solution so as to deposit nickel. The anodes and cathodes of the electrolytic cell may be respectively of lead and nickel. From the anode compartment of the cell, the electrolyte, containing about 10 per cent. of free sulphuric acid, flows into the first of a series of leaching-vats, into which reduced matte is fed for the production of a fresh supply of electrolyte.

Vulcanising Indiarubber. Dunlop Rubber Company, Westminster; and D. F. Twiss, Sutton Coldfield, Warwickshire. British Patent, 125,696, of 1918.

An accelerator of vulcanisation consists of caustic alkali dissolved in an organic compound (other than glycerol or glycol) of predominant hydroxylic character such as butyl or amyl alcohol or phenol. The compounds in question are limited to those that are fluid at the ordinary temperatures or are fusible at about 120° C. Specification 110,059 is referred to.

Fertilisers. E. C. R. Marks. (A communication from the Soc. Anon. Italiana G. Ansaldo and Co., Genoa, Italy.) British Patent, 125,718, of 1918.

A fertiliser containing potassium compounds and also phosphorus compounds, soluble in, for example, ammonium citrate, is prepared by heating to incipient fusion a mixture of potash-containing minerals, such as feldspar, kaolin, silicate, etc., phosphate-containing substances such as mineral tricalcium phosphate and silica. The product is stated to contain a phosphate of potassium and calcium in presence of silicate of calcium.

Tin Oxide. A. W. Gregory, Greenwich, London. British Patent, 125,879, of 1918.

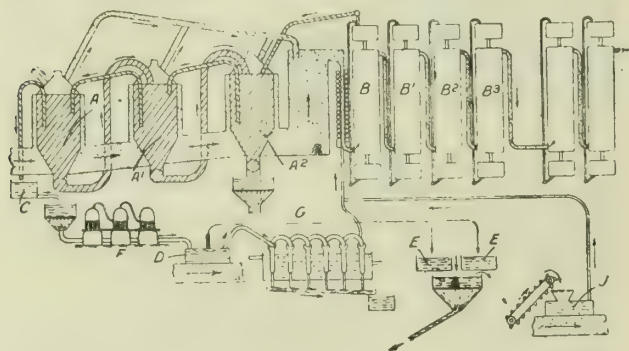
Sodium sulphostannate solution is treated with an ammonium salt and boiled in contact with air, tin oxide and sulphide being precipitated. If air is blown into the solution,

tin oxide only is obtained. Alternatively, air may be blown into the solution, producing sodium stannate, which is subsequently or concurrently treated with carbonic acid or ammonium carbonate or any bicarbonate to precipitate tin oxide, a final addition of an ammonium salt being made to precipitate any remaining tin. In another modification, air and carbonic acid are employed, with the addition of an ammonium salt. In an example, ammonium sulphate is employed, with or without a current of air.

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Alumina and Calcium and Alkali Nitrates. Norske Aktieselskab for Elektrokemisk Industri Norsk. Industri-Hypotekbank, Christiania, Norway. British Patent, 125,578. Convention date, April 8, 1918.

Alumina and calcium and alkali nitrates are obtained from labradorite or other minerals containing plagioclase by treatment with nitric acid, removing dissolved iron, evaporating to dryness, calcining to about 300° C. to decompose aluminium nitrate, and separating the other nitrates from the alumina by leaching. The labradorite is leached with 30 per cent. nitric acid in vats A, A¹, A² on the counter-current principle, the neutralised liquor being received in a vat C. After removal of iron by a basic substance—for instance, alumina



or limestone or potassium ferrocyanide,—the solution is evaporated in vacuum apparatus F to near dryness, so that on calcination of the residue in apparatus D, nitric acid of 30 per cent. strength may be obtained in a condenser G, though the evaporation may be carried so far that 60 per cent. acid is obtained on calcination. The calcined residue is lixiviated in vats E and the alumina is calcined in apparatus J. Nitrogen oxides from the vats A, A¹, A², the calcining apparatus D¹, and the condenser G are led to towers B, B¹, B², B³ for producing nitric acid from atmospheric nitrogen, the hot gases from the oxidation being used as indicated for heating the vats A, A¹, A² and the calcining apparatus D, J.

Aromatic Ureas. A. V. Blom, Bern. British Patent, 125,584. Convention date, April 17, 1918.

Asymmetric ureas are prepared by the reaction of phosgene at about 40° C., in the presence of agents neutralising hydrochloric acid, upon mixtures of equimolecular parts of an aminonaphthol sulphonic acid and an aromatic diamine, one of the amino groups of which is protected either by an *o*-substituent or by substitution by formyl, etc., groups, this group being subsequently split off. Examples are given of the preparation of ureas from 2 : 5 : 7-aminonaphthol sulphonic acid and *m*-toluylene-diamine or formyl-*m*-phenylenediamine; *p*-toluylenediamine, chlor-*m*-phenylenediamine; chlor-*p*-phenylenediamine, formyl-*p*-phenylenediamine, *m*- or *p*-diaminoanisole, *m*- or *p*-diaminophenetol, benzidine sulphonic acid, and diaminodiphenylurea, are also specified as parent diamines.

Electrolysis. Norsk Alkali A./S., Drontheim, Norway. British Patent, 125,935. Convention date, April 25.

To check excessive flow of an alkali-chloride solution at the cell wall past a substantially horizontal diaphragm, fillets, rods, pipes, or the like of stoneware, china, glass, concrete, etc., are placed on or partly embedded in the diaphragm near the wall, and the troughs thus formed are filled with material such as finely-powdered asbestos, alumina,

clay, barium, sulphate, or iron oxide, wetted with water or a salt solution. The fillets may constitute a single frame. The diaphragm, which rests on the perforated or netted cathode, is of asbestos board or cloth covered with an inert powder, or of pulverulent or fibrous material only.

AMERICAN NOTES.

[FROM OUR OWN CORRESPONDENT.]

NEW YORK, June 22, 1919.

IT developed at hearings in Washington this week relative to protecting the American dye industry that Count Johann von Bernstorff, while serving as German Ambassador to the United States, after the war had started but before the United States had become involved in it, tried to cripple the American industry in 1915 through stopping German dye importations. He hoped thereby to arouse American sentiment against the British blockade, and thus aid Germany. Bernstorff was advised by one Hossenfelder that the stock of dyes in this country was so small that such an embargo would throw 4,000,000 American workmen out of employment. This and other revelations of German activities were presented to the House Ways and Means Committee, which is investigating the subject of protecting the American dye industry.

Francis P. Garvan, Alien Property Custodian, and Joseph H. Choate, jun., President and General Counsel respectively for the Chemical Foundation (which has control over all German dye and chemical patents in the United States), have presented to the House Ways and Means Committee a brief in favour of a Bill establishing the licensing plan to control dye imports. In it they embrace excerpts from Bernstorff's despatches. The brief states that the late Dr. Hugo Schweitzer, president of the American branch of the great German house of Bayer, came to the United States, and became a citizen at the request of his Government, and led propaganda and espionage activities until his death in 1917. He was a direct secret service employee of the German Government, the brief asserts. The brief discloses that mustard gas was discovered in this country, and its formula transmitted to Germany by Dr. Schweitzer through Von Papen, the former Naval Attaché of the Germany Embassy after the war began.

The licensing plan for dye imports, recommended by the Chemical Foundation, is a temporary measure designed to cover the period necessary for the building up of a complete self-sustaining coal-tar chemical industry in this country. It permits the importation of coal-tar products in any quantity or any quality, at any price, from any source, when—and only when—the proposed import is licensed by a Licensing Commission appointed by the President, and consisting of, as has been suggested, four members chosen from among the dye manufacturers, an equal number from among the dye-using industries, and one member not connected with either industry and representing the Government itself. The duty of the Commission under the proposed Bill would be to admit by licence all dyes and other coal-tar chemicals found really necessary and not obtainable from domestic sources within a reasonable time and not replaceable by any entirely satisfactory domestic substitute. The Bill would exclude from importation all such products as are now or presently will be manufactured in the United States in satisfactory quantity and quality.

It is stated that the licensing system is not an embargo nor a substitute for a Customs tariff, which may be levied regardless of the licensing plan. The Chemical Foundation officials state that "no one would advocate its enactment for a period of more than, say, ten years. If at the end of that time our dye industry has not reached or nearly reached a self-sustaining status, it will have been proved that the Germans were right in their repeated assertions that we are incapable of establishing such an industry."

In stating several important reasons why the United States should have its own independent dye industry, the Chemical Foundation gives most prominence to the question of national defence. "Only a dye industry," it is stated, "can provide for national defence. It is common knowledge that nearly all modern military explosives are coal-tar products. Less well known is the fact that a complete dye works can be almost instantly converted into an explosives factory. If we allow Germany to regain her world monopoly of dyes, we offer her as a free gift capacity for world conquest. A hostile dye industry is an ideal centre of espionage and propaganda."

FERTILISER NEWS.

(SPECIALLY CONTRIBUTED.)

Nitrate of Soda.—Last month's shipments from Chili were again on a very small scale—i.e., 36,000 tons,—of which only 4,000 tons to Europe, 20,000 to the United States, and 12,000 to "other parts"; the respective figures in June last year were 107,000, 133,000, and 5,000 tons; together, 245,000 tons. The output was further reduced to 128,000 tons (against 236,000 tons last year), but a considerable addition, it will be seen, was made to the stocks on the West Coast, these reaching the record total of close on one and a half million tons. The prospects of moving these stocks have not improved so far as the Associated Producers are concerned, since the scarcity of tonnage continues, British vessels being precluded from loading nitrate, while "neutrals" can obtain elsewhere rates of freight far above the nominal quotation of 100s. per ton to the United Kingdom; shipments to this country are therefore practically confined to parcels by "liners," representing a more drop in the ocean. It is to be hoped that the veto on shipping will be removed in time for next season in Europe; but, in any case, it is quite evident that sufficient tonnage will not for some months be available to make much impression on the "centralised" supplies on the other side. While business in nitrate of soda is in abeyance during the dead season here, it is practically at a standstill in Chili, where, under ordinary circumstances, it would be brisk in the shape of "forward" sales. We will revert in our next issue to the large operations conducted by the Chilean Government on behalf of the producers outside the Association.

Algerian Phosphate Troubles.—According to an estimate made of the production of phosphates in Algiers during the year 1919, it appears that it is expected this would require to be not less than 2,490,000 tons in order to supply the requirements of France herself, the Allies, and neutral countries. It cannot be expected to exceed a total of 1,400,000 tons. This unfortunate outlook is brought about through a lack of labour and the poor condition of the ways of communications, as well as material. It appears that the French Government have begun to negotiate with the English Government for the purpose of obtaining the necessary freights to move the goods. On the other hand, the industrialists are calculating on being able to dispose of a certain number of German vessels as soon as they have been delivered to France, which, it is hoped, will be put on the service between France and Algiers.

A Prosperous Alsatian Potash Concern.—The Deutsche Kaliwerke, according to a report from Alsace, in which the property of the company is situated under sequestration since the armistice, raised its capital last year from 30,000,000 marks to 40,850,000 marks. The profit realised during the 1918 working year makes a total of 7,130,000 marks, as against 5,200,000 marks in the year 1917. The net profit is put at 4,588,600 marks, as against 3,859,724 marks. The dividend is recommended to be 7 per cent., as compared with 8 per cent. distributed in the preceding year.

Sulphate of Ammonia.—Not a great deal of interest is moving in this market at the present time. Prices are arranged for the next few months, and the farmer can well afford to pay these in view of the high prices he himself is securing for his produce. Should, however, the tendency of the markets go against the farmer, and his own prices fall, there is no doubt he will seek to persuade manufacturers that he deserves help in the way of lower sulphate and allied prices. How these are to mature, however, is not certain, because there, again, higher costs are prevailing, and seem likely to prevail in the absence of any unforeseen developments. News from New York indicates that sulphate of ammonia there is firm, with recent sales notified ranging from 1,000 to 1,200 tons for export. Domestic requirements are moderate, although there is sufficient business passing to prevent the market sagging away.

Basic Slag.—In a somewhat dull period, slag movements are perhaps the most active spot. Bookings are now taking place in this for deliveries throughout the season. Representative prices as arranged are: Prime quality slag, guaranteed 12-22 per cent. phosphate, in bags, carriage paid, £3. 2s. to £3. 12s. per ton, with 24-42 per cent. at £3. 15s. to £5. 2s. per ton.

Superphosphate.—This is quiet, but higher prices are looked for. During last season phosphate rock and other materials were supplied to the makers by the Government at under market prices. With the discontinuance of this help, costs must be more substantial. Current quotations for a good brand, guaranteed 30 per cent. soluble, in bags,

are £6. 10s. per ton, ex works, with 33 per cent. at £7. 2s., and 35 per cent. at £7. 10s.

Potash.—No especial changes are notified in potash prices here this week, either for sulphate or kainit. From America it is reported that muriate of potash realises 10s. to 10s. 6d. per unit. This material does not appear to be regularly quoted here. A paper read before a recent meeting of American mining engineers speaks of a new form of fertiliser called ionised potash. The inventor claims to have found a process for treating felspar and other rocks which gives them a rate of dissolution five million times that of nature. So treated they will give up their potash, not to water, but directly to the plant through the action of plant acids. It is asserted that this does not wash away as German potash does. Whilst admitting that it does not fertilise as quickly, it is said to stay in the soil much longer, and to be cheaper and more effective in the long run than German potash.

Other Fertilisers.—Imported bones are a firmer market, and bone meal is all the time in fair demand, without any special change in prices. Meat meal is somewhat difficult to obtain at present, and fish meal is said to be in good demand at prices which sometimes run up to 27s. 6d. There is a moderate inquiry for dried blood at recent values, and a fair call for foreign tankage, at prices which in one quarter are mentioned as 25s. per unit for ammonia and 2s. for phosphate.

Italian Fertiliser Production Extends.—It is announced that the Unione Concimi has decided to construct two large factories, each capable of producing 600,000 quintals of superphosphates. One of these factories will be situated at Venice and the other near Naples. It is hoped they will be ready for producing superphosphates by the autumn of 1920.

SOUTH WALES NOTES.

(SPECIALLY CONTRIBUTED.)

Tinplate manufacturers are unwilling to commit themselves to any great extent for forward deliveries owing to the unsettled state of the industrial problems, and they state that at present they cannot perceive any safeguard as to the future prices of raw material and cost of labour. A temporary general additional bonus of 12½ per cent. has been granted to the tinplate employees as from June 30 to September 27.

The Cardiff Pure Ice Company have given out a contract for the erection of an additional ice factory at the Docks, and machinery is to be installed capable of manufacturing nearly 20,000 tons per annum, besides providing cold storage. Additions are also to be made at the Newport works of the company.

There is no falling-off in the demand for patent fuel, and there are indications that this important industry is to be still further enlarged in the near future. Cardiff makers have executed foreign orders during the week for St. Nazaire and Algiers, nearly 8,000 tons going to these two ports. Newport shipped to Rouen 2,300 tons. Cargoes left Swansea for Catania 2,000 tons; St. Nazaire, 2,300 tons; Casa Blanca, 3,600 tons; and Valencia, 300 tons.

The demand for coke is better. The coke ovens are working well, and the supply of sulphate of ammonia is very regular.

Matters in the spelter industry are a little brighter, and there is more interest being shown by consumers of this metal. During the week 2,000 tons of zinc concentrates arrived from Australia, and two cargoes from Port Pirie, besides 4,862 tons of zinc ore transhipped at Manchester to Swansea.

Indications of an extensive oilfield are reported to have been discovered in Cardiganshire, and investigations are being made by Lord Cowdrey's geological experts. Paraffin wax, indicating that the peat generates paraffin, has been found in the great peat bog at Tregaron. Some years ago this bog was explored by German chemists, who, by distillation, obtained the following products: Lubricating oil, vegetable naphtha, camphor, ammonia, paraffin wax, and tar. The bog extends to 4,000 acres.

ZINC AND ZINC DUST PRICES.—The quotation for Australian high-grade zinc dust (88-92 per cent. metallic zinc) is unchanged at £70. per ton, f.o.r. Probably owing to the continuous rise in the market price of spelter, inquiries for zinc dust have been more abundant during the past week. The price of Australian electrolytic zinc (99.95 per cent. metallic zinc) remains at £40. per ton, f.o.b. Australia for direct shipment to New Zealand, India, South Africa, and the Far East.

NEW COMPANIES.

Lowe, Clayton and Hicks, Ltd.—Capital £5,000., £1. shares. Object: To acquire the business of colour merchants carried on by W. D. Hicks-Ussher, under the style of Lowe, Clayton and Hicks. Office: 18, Stratford Road, Acton, W. 3.

Caledonian Metal Company, Ltd.—Private company. Capital £1,000., £1. shares (500 "A" and 500 "B"). Object: To acquire patents for metallurgical processes. Office: 400, Caledonian Road, N. 1.

Chambers Bros., Ltd.—Private company. Capital £6,000., £1. shares. Object: To acquire the business of a manufacturer of refractory materials of every description carried on by Samson Chambers, trading as "Chambers Bros." Office: Effingham Mills, Stoke Street, Attercliffe, Sheffield.

International Icilma Trading Company, Ltd.—Private company. Capital £250,000., £1. shares (125,000 preference). Manufacturers of and dealers in soaps, creams, etc. Solicitors: Ashurst, Morris, Crisp and Co., 17, Throgmorton Avenue, E.C.

MARKET REPORTS.

FRENCH CHEMICAL MARKET.

PARIS, July 4.

The market has been firm during the last fortnight, but business has been still unimportant. It is hoped, however, that transactions will soon resume, but things are not yet sufficiently settled to allow a normal course of business. Alum has been in fair demand, and stocks are cleared to a certain extent. Some orders have been handed to English manufacturers at rather low prices. Sulphate of alumina is still quiet. The position of white arsenic has not improved, and demand is exceedingly small, though there are low offers to hand. Liquid ammonia is quite scarce, and prices are hardening. Home manufacturers are busy, and some quantities have been imported from England. Sal ammoniac powder is quiet at reduced prices, whereas lumps are in fair request at unchanged prices. Phosphate of ammonia is firm and in good demand from the South of France. Barium salts are dull, which applies to barium chloride as well as carbonate. Barium binoxide is more active. Natural French barytes are now freely to hand and ready for export. Sulphate of copper is quiet at about 125frs. per 100kilogs., delivered buyer's station, equal to £40. per ton, c.i.f. Channel port. The demand for borax and boric acid is considerable, and available lots are sold at high prices. Calcium chloride is in poor demand, stocks being still extensive. The 70/75 grade, in free drums, is valued to-day at 38frs. to 40frs., ex stock Paris, equal to £11. per ton, c.i.f. Channel port. Bleaching powder, 35/37%, is wanted in large quantities, the most of which is supplied by French manufacturers, delivered free buyer's station, at 50frs. per 100kilogs. Some lots have been imported from England at low prices—viz., 38frs. per 100kilogs., or £13. per ton, c.i.f., French port. Carbonate and phosphate of lime are almost left aside. Epsom salts are in better demand at somewhat reduced prices, and orders have been placed abroad. Carbonate of magnesia is dull, and prices are weak. Calcined magnesia is firm, but business has been very small. Glauber salts are freely to hand, and offered at low prices. Caustic soda is rather scarce, but quotations remain at a low level, as previously. The same applies to soda ash and bicarbonate of soda. Sodium sulphide is in good demand, and manufacturers are quite busy. Sodium fluoride is produced now in France in sufficient quantities. The price of phosphate of soda is low, the demand being very small from silk manufacturers. This product is now offered at 80frs. per 100kilogs., delivered free, equal to £24. per ton, c.i.f. Channel port. Zinc compounds are as inactive as before, and practically nothing has been imported. White lead is still in huge demand at high prices, whereas red lead and litharge are dull. Bichromate of soda and potash are offered at greatly reduced rates by American manufacturers, and prices are at present at an exceedingly low level, the demand being fairly good. Chrome alum is in good request at unchanged prices. Oxalic acid is scarce, but prices are rather low, which applies also to salacetas. On June 18 several important overtaxes *ad valorem* were added to existing Customs duties.

TAR AND AMMONIA PRODUCTS.

WEDNESDAY.

Benzole: London, 90%, 1s. 11d. to 2s.; North, 1s. 9d. to 1s. 10d.; 50%, 1s. 9d. to 1s. 10d.; North, 1s. 9d., naked. Carboic acid, crude, 60%, East and West Coast, nominally 1s.; crystals, 30-40%, 5d. to 5½d., f.o.b. Crude tar, London, 42s. to 43s.; Midlands, 37s. to 38s.; North, 36s. to 37s. per ton, ex works. Pitch, 72s. 6d. to 75s.; East Coast, 62s. 6d. to 63s. 6d., f.o.b.; West Coast, 51s. to 53s., f.a.s. Solvent naphtha, naked, London, 90-100%, 2s. 5d.; North, 2s. 3d. to 2s. 4d.; 90-100%, naked, London, 2s. 1d.; North, 1s. 10d. to 1s. 11d. Crude naphtha, naked, 30%, 8d. to 8½d.; North, 7½d. to 7¾d. Refined naphthaline, £18. to £22.; salts, £6. to £7. Toluol, naked, London, 2s. 1d.; North, 2s. Creosote,

naked, London, 5½d. to 5¾d.; North, 5d. to 5½d.; heavy oil, 7½d. to 7¾d. Anthracene, 40-45%, 6d. per unit. Cresylic acid, 95%, 2s. 7d. to 2s. 8d.; 97-99%, 2s. 9d. to 2s. 10d., ex works, London, and f.o.b. other ports. Sulphate of ammonia: Home trade, £19. 10s. per ton; basis 24½%. Nitrate of soda, £21. to £22.

FERTILISER MATERIALS.

LIVERPOOL, THURSDAY.

Nitrate of soda is firmer, and the quotation for 95/96% quality has been advanced to £21. 2s. 6d. per ton, net cash, f.o.r., prompt delivery. East Indian bone meal: Shippers of this material are firmer in their views, the nearest value of 4½% ammonia and 52% phosphates, August-September shipment, being now £13. per ton, net cash, ex ship Liverpool. On spot, holders are also firmer, and now require £14. per ton, net cash, for 4½% and 45% quality. Mineral phosphates are without alteration, and values are at present only nominal. Dried blood is rather irregular, the nearest value being about 25s. to 30s. per unit of ammonia per ton; net cash.

LONDON METAL MARKET.

THURSDAY.

Copper: Standard brands, £97. 10s. to £97. 15s., cash; £98. 10s. to £98. 15s.; three months; electrolytic, £100. to £105. Tin: Standard, £249. 10s. to £250., cash; £247. 10s. to £247. 15s.; three months; Straits, £250.; English, £247., f.o.r. Lead: Soft foreign, £23. 12s. 6d.; English, £24. 10s. Spelter, £41. 10s.; hard, £32. Antimony, English regulus, 90%, £45. Aluminium, £150. Nickel, £195., delivered, packages extra. Quicksilver, £21. to £21. 10s. Bismuth, 12s. 6d. Platinum, 442s. per oz. Wolfram, 30s. per unit.

SWANSEA MARKET REPORT.

THURSDAY.

Tinplate prices have become somewhat irregular, and quotations are round 32s. 6d. per box, standard basis. Copper is in a stronger position, and purchasers more numerous. For prompt delivery £93. 10s. has been given, and for three months £95. per ton. Tin slightly dearer at £240. cash and £245. three months. Lead quiet, but steady; Spanish, £22. 15s. per ton; English, £23. 15s. prompt, and 10s. less for delivery next quarter. Spelter has a firmer tone at £40. per ton prompt. Zinc sheets, £65. per ton, f.o.b. New York. Silver, 53½d. per ounce. Aluminium unchanged at £150. Nickel quiet at £195., delivered free London or equal. Quicksilver, £21. per bottle. Antimony unchanged, with English 90% regulus at £45. Linseed oil very scarce at 122s. per cwt. Cotton seed oil, 135s. Turpentine, 88s. 6d. per cwt. Sulphate of copper quiet, with home trade prices at £45. per ton, and export £47. to £48., f.o.b. Sulphate of ammonia remains steady, and is for home requirements £19. 10s. per ton for forward delivery. Nitrate of soda selling better at 21s. 6d. per cwt., in bags, net. Arsenic in better demand at £35. per ton for white powdered, f.o.b. Oxalic acid remains somewhat quiet at 1s. 3d. per lb.

MANCHESTER CHEMICAL MARKET.

THURSDAY.

There is a slight improvement in demand for heavy chemicals both on export and home trade account, and values as a whole show only small variation during the past week. White caustic soda, 70%, is quiet at £18. 10s. per ton. Refined bicarbonate of soda, bags, £8. net; and 58% alkali at £6. 5s. per ton. Bleaching powder steady at £15., on rails, softwood casks. Roasted saltcake firm at 60s. per ton, carriage paid. Chlorates are unaltered at 1s. 3d. and 7½d. per lb. for potash and soda respectively. Bichromates remain at recent rates. Soda crystals, bags, £4. 2s. 6d., on rails. Recovered rock sulphur easy at £19., on rails works. Sulphate of copper continues flat, and export quotation nominal at £45. per ton, f.o.b. Nitrite of soda is higher on the spot at £56. per ton.

Phosphate of soda has an upward tendency. Concentrated sodium sulphide in small request at £22. per ton. White powdered arsenic is again in short supply, and price higher at £40. per ton for Cornish brands. Yellow prussiate of potash steady at 1s. 9d. per lb. Soda, 7½d. per lb. Carbonate of potash, 80-85%, quoted at £85. per ton. Lead salts are moving off fairly well, and prices are unchanged. Acetate of soda, £54. per ton. Acetic acid in fair demand, and quotations steady. English brown acetate of lime in good request at £10. per ton. American grey is dearer on account of increased freights, at £19. to £20. per ton. Miscible and solvent wood naphtha unaltered at 10s. 6d. per gallon. Owing to increase in output, price of green copperas is steadily falling. Oxalic acid moves well at 1s. 2½d. to 1s. 3d., delivered.

LIVERPOOL CHEMICAL MARKET.

THURSDAY.

A very fair inquiry for chemicals has been experienced. The stoppage of work in branches of the cotton trade has affected business in some chemicals unfavourably, but inquiries have come in more freely from other directions and also on export account. This is maintaining a fair degree of activity in the home and export branches of the trade. Bleaching powder has again been in moderate demand, and is £14. 10s. to £15. per ton, free on rail or conveyance, in buyer's packages, and £15. to £17. per ton, for export. Chloride of calcium has been more inquired for, and is £8. to £11. per ton, in casks, f.o.r. Caustic soda has again been in good request on home and on export accounts. Prices may be given as £24. per ton, for 76 per cent.; £22. per ton for 70 to 72 per cent., and £19. per ton for 60 to 62 per cent. Nitrate of soda has been rather more in demand, and is £20. 10s. to £21. per ton. Sulphate of soda has again been in very fair request, and is £6. 10s. per ton, in casks, f.o.b. Soda crystals have sold with some freedom, and are £5. per ton, in 2cwt. bags, f.o.r. at works. Bicarbonate of soda continues in fairly active demand, and is £7. 5s. to £10. per ton, according to terms of delivery. Hyposulphite has met with a steady inquiry, rather more interest being visible in the export branch of the trade. Prices are £19. to £20. per ton for "ordinary" crystals, in 2cwt. bags, and £25. per ton for "pea" crystals, in 1cwt. kegs. Sulphite of soda has been in moderate request, and is £11. per ton for "ordinary" and £18. to £19. per ton for "pea" crystals, in 1cwt. kegs. Ammonia alkali has been steadily called for, and is £6. to £6. 5s. per ton, f.o.r. at works. Borax has been in very fair demand, and is £42. per ton for ordinary and £44. per ton for powdered, in bags. Bichromate of soda has been rather more in request, and is 9d. per lb. Phosphate of soda has been quiet, and is £25. per ton. Sulphide of sodium has been but little in demand, and is £20. per ton, in casks, and £22. per ton, in drums. Chlorate of potash has been more inquired for, and is 1s. 1d. to 1s. 2d. per lb. Permanganate of potash has been steadily called for, and is 3s. 6d. per lb. Sulphate of potash has moved but slowly, and is £40. per ton. Carbonate of potash has again been in fair demand, and is £85. to £90. per ton, for 80 to 85 per cent. Caustic potash has been in good request, and is £160. per ton, for 35° Bé. Nitrate of potash has met with a very fair inquiry, and is £58. to £60. per ton for refined and £40. per ton for ordinary. Canadian ashes have been but little called for. First quality Montreal are £220. to £225. per ton, and second quality £215. to £220. per ton. Bichromate of potash has been rather more in demand, and is 1s. 6d. per lb. Yellow prussiate of potash has had a moderate sale, and is 1s. 10d. to 2s. per lb. Sal ammoniac has been in quietly steady demand, and is £80. per ton for lump, £75. per ton for seconds, and £5. per ton extra for ground. Sulphate of ammonia has had a fair sale, and is £19. 10s. per ton to September 30. Carbonate of ammonia has been rather quiet, and is 6½d. per lb. Muriate has been inactive, and is £50. to £60. per ton, according to quality. Magnesia has been more in request. Carbonate is £3. 10s. per cwt., and sulphate £10. to £16. per ton, according to grade. Alum has been in good request, and is £18. 10s. for the home trade, and £18. 10s. to £19. 10s. per ton for export. Aluminoferric has been but little inquired for, and is £8. 10s. to £12. per ton, according to quality. Sulphate of alumina has had a very limited sale, and is £13. to £18. per ton, according to grade. Sulphur has been rather more in demand, and English flowers are still in small supply. Prices are: Flowers, £32. per ton; roll, £28. per ton; and rock, £22. per ton, in bags, f.o.r. Sicilian kinds are: Flowers,

£28. per ton; roll, £22. 10s. per ton; and third quality, £17. 15s. per ton. Cream of tartar has had a moderate sale, and is £11. 5s. per cwt. Tartaric acid has been in quietly steady demand, and is 3s. 1d. per lb. Boracic acid has been more inquired for. It is £72. per ton for crystals and £74. per ton for powdered. Oxalic acid has been but little called for, and is 1s. 3d. per lb. Citric acid has again been in fair request, and is 4s. 4d. per lb. White acetate of lead has been very quiet, and is £85. to £90. per ton. Arsenic has met with a somewhat freer inquiry, and the price has been raised. It may be given as £39. per ton for white powdered. Sulphate of copper has had a limited sale for farm uses in the United Kingdom. For these uses it is £45. per ton, and for export £47. to £48. per ton, less 5 per cent., in casks, f.o.b. at Liverpool.

TYNE CHEMICAL REPORT.

TUESDAY.

Market is steady, and there is a slightly better demand for home consumption. For export also there is an increased inquiry. Soda crystals locally are firm at £5. per ton, 2cwt. bags. Sulphur is very scarce and firm at £22. 10s. to £23. per ton.

The following prices are per ton, net: Bleaching powder, softs and hard, £15.; caustic soda, 74-77%, £23. 5s.; do., 70%, £22.; do., 60%, £20.; recovered sulphur, 2cwt. bags, £23.; hyposulphite of soda, 5-7cwt. casks, £19.; do., 1cwt. keg, £25.; sulphite of soda, 5-7cwt. casks, £12.; do., 1cwt. kegs, £20.; silicate of soda, 74° Tw., £9. 12s. 6d.; do., 100° Tw., £10.; do., 140° Tw., £10. 10s.; soda crystals, 2cwt. bags, £5.; sulphate of soda (saltcake) in bulk, £3. 10s.; pure white sulphate of alumina, 14-15%, £19. 10s.; blanc fixe, £22.; chloride of barium, £27.; sulphide of sodium, crystals, £18.; do., refined concentrated solid, 60-62%, £25.; hydrate of barium, crystals, £36.

COALS.—Market remains very firm, and prices are fully maintained. Allies' quotations:—Best Northumbrian steam, 70s. per ton; do., second qualities, 60s. to 65s.; Northumberland small coals, 45s.; do., seconds, 40s. to 44s.; best Durham gas coals, 55s. to 57s.; do., seconds, 52s. 6d.; Durham bunkers, 50s. to 55s.; foundry coke, 49s. 6d.; gas coke, 67s. 6d.

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Wednesday.

During the past week there has been no perceptible change among the heavy chemicals as far as quotations are concerned, and the tendency meantime is for prices to remain on a very steady basis. Business continues to be somewhat limited, and is confined, generally speaking, to small demands. The Glasgow Fair holiday season is now approaching, and the local chemical works (in company with other industrial concerns in this locality) will close down for the usual Fair vacation somewhere about next week-end. Prices continue to rule as under: Arsenic, £40. per ton, net, Glasgow; bicarbonate of soda, £8. 15s. and £10. per ton for 6-8 casks and 1cwt. kegs, Liverpool; boracic acid crystals, English refined, £72. for 2cwt. bags, and borax crystals, £39. for 2cwt. bags, carriage paid; caustic soda, white, 70-72%, £24. per ton, net, Glasgow; chlorate of potash, 1s. 3d. per lb., net, Glasgow; chlorate of soda, 10d. per lb., net, Glasgow; citric acid, 4s. 4d. per lb., 5%, Glasgow; cream of tartar, 88%, £11. 5s. per cwt., net, Glasgow; sal ammoniac, £80. and £75. per ton, net, any port, for first and second lump respectively; sal ammoniac crystals £85. per ton, net, Glasgow; saltpetre, £3. 5s. per cwt., net, Glasgow; tartaric acid, 3s. 1d. per lb., 5%, Glasgow.

Among the sea oils there continues a good demand for everything which is on sale, but very often it is a case of the demand being in excess of the supply. Whale oils are on the market in very limited quantities, and neither pale nor yellow is at all obtainable; while brown at 78s. and black at 76s. remain at the old previously quoted levels. Newfound-land cod has been inclined to stiffen in value during the past week, and its current price may be said to be 75s., as against the previous level of 74s.; with a steady demand for everything on offer. Neither pale seal nor Menhaden is on the market.

Coal trade conditions continue on the old footing, and there is no great outcry as far as inadequate supplies are concerned. The industrial demand has slackened off considerably as far as a goodly number of firms are concerned, and the domestic demand is very easy. There is little or nothing doing in the export line, and most of the output continues to be absorbed by the home market.

IMPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

BRISTOL.

Publication of Official Returns Suspended.

GLASGOW.

Week ending July 5.

DYESTUFFS—
Chestnut Extract
Italy 500 bgs.
Shumac
Italy 800 bgs.
Tartar
Oporto and Cadiz, 10 cks.
GLUE—
Antwerp, 100 bgs.
LITHOPONE—
New York, 700 brls.
PITCH—
New York, 106 brls.
ROSIN—
Almeria, 213 cks.
SOAP (COTTONSEED)—
New York, 524 brls.
TALLOW—
Zarate (Argentina), 278 cks.
TARTARIC ACID—
Italy 8 brls.
WAX—
Rouen, 7 cs.
WHITE LEAD—
New York, 152 cks.
ZINC OXIDE—
New York, 700 brls.

GOOLE.

Week ending July 5.

NIL.

GRANGEMOUTH.

Week ending July 5.

NIL.

GRIMSBY.

Week ending July 5.

DYESTUFFS (otherwise undescribed)
Dieppe, 655 pkgs.; 77 cks.

HULL.

Week ending July 5.

ACETIC ACID—
New York, 100 blns.
BARYTES—
Montreal, 828 brls.; 8 bgs.
CARBON BLACK—
New York, 701 cs.
CAUSTIC POTASH—
Rotterdam, 149 drms.
GLUE—
Rotterdam, 20 bgs.
SILICA—
New York, 1,493 bgs.
WHITE LEAD—
New York, 200 cs.
ZINC OXIDE—
Rotterdam, 25 cks.
ZINC WHITE—
Rotterdam, 80 brls.

LEITH.

Week ending July 5.

NIL.

LIVERPOOL.

Week ending July 5.

ACETIC ACID—
Philadelphia, 100 brls.

AMMONIA—
New York, 100 brls.
BARIUM SULPHATE—
Alicante, 400 sks.; 40 brls.
BARYTES—
New York, 461 pkgs., 151 brls.;
Philadelphia, 200 brls.
BORATE OF LIME—
Buenos Ayres, 1,757 pkgs.
CALCIUM LACTATE—
New York, 3 cs.
DEXTRINE—
New York, 645 cs.
DYESTUFFS—
Chestnut Extract
Naples, 350 cs.; 170 brls.
Logwood
Hayti, 142 t. 10 c.
Logwood Crystals
New York, 20 brls.
Quebracho Extract
Buenos Ayres, 2,000 bgs.
Tanning Extract
New York, 75 brls.
GLUE—
New York, 359 cks.
LITHIUM CARBONATE—
New York, 5 brls.
LITHOPONE—
Philadelphia, 275 pkgs.
PARAFFIN—
Philadelphia, 920 brls.
PARAFFIN WAX—
New York, 694 brls.; Phila-
delphia, 1,210 brls.
POTASSIUM CARBONATE—
New York, 30 pkgs.
SOAP—
New York, 499 brls.
SODA CRYSTALS—
New York, 33 cks.
SODIUM BENZOATE—
New York, 1 brl.
SODIUM BICHROMATE—
New York, 71 brls.
SODIUM BROMIDE—
New York, 100 cs.
SODIUM GLYCEROPHOSPHATE—
New York, 20 cs.
SODIUM PHOSPHATE—
Antwerp, 52 cks.
STEARINE—
Buenos Ayres, 486 tcs.; Balti-
more, 165 bgs.; New York,
224 bgs.
TALLOW—
Adelaide, 1,262 cks.; Buenos
Ayres, 1,599 pkgs., 551 tcs., 113
pps.; Boston, 200 tcs.; Yoko-
hama, 200 pkgs.; Zarale, 3,189
pkgs.
TAR—
Boston, 1 cs.; Philadelphia,
200 brls.
WAX—
New York, 805 brls., 21 bgs.,
1 bx.
ZINC OXIDE—
New York, 1,350 brls.

LONDON.

Week ending July 5.

ACETIC ACID—
U.S., 107 pkgs.
ARSENIOUS ACID—
Greece, 481 cks.
CAMPHOR—
Japan, 25 cs.
CANDELILLA WAX—
U.S., 264 bgs.
CHEMICALS (otherwise undescribed)
Brit. India, 1 cs., 2 pkgs.;
Denmark, 7 cs.; France, 100 cs.,
11 pkgs.; Italy, 9 cks.; Switzer-
land, 6 cs.; U.S., 50 cs., 36 pkgs.

CITRATE OF LIME—
France, 44 pkgs.
COAL PRODUCTS—
Pitch
Belgium, 2 t. 10 c.; France, 6 t.
COPPER PRECIPITATE—
Straits, 6 t.
COPPER PYRITES—
Spain, 4,468 t.
DYESTUFFS (otherwise undescribed)
France, 1 pkg.; Japan, 3 cs.;
Switzerland, 189 pkgs.; U.S.,
6 pkgs.
DYESTUFFS—
Argols
France, 97 pkgs.; Greece, 304
pkgs.; Spain, 82 pkgs.
Cutch
Brit. India, 2 cs.; Straits,
560 pkgs.
Gambier
Straits, 77 pkgs.
Myrobalan Extract
Brit. India, 1,850 bgs.
Quebracho Extract
Argentina (Rep.), 600 bgs.
Tartars
France, 90 cks.
FORMALDEHYDE—
U.S.A., 134 cs.
GELATINE—
France, £2,550.
GLUE—
Belgium, £1,200.; Italy, £170.;
France, £1,734.; U.S., £2,485.
HYDROGEN PEROXIDE—
France, £1,321.
LITHOPONE—
U.S., 500 brls.
MANGANESE SUPEROXIDE—
Sweden, 50 bgs.
OCHRE—
France, 40 cks.
PARAFFIN WAX—
France, 116 t. 14 c.; U.S.,
57 t. 7 c.
PHENAZONE—
Switzerland, 4 cs.
PHOSPHATE OF LIME—
Canada, 100 cks.
PITCH—
France, 92 cks.
PLUMBAGO—
France, 61 bgs.; Japan, 630
cks.; U.S.A., 140 brls., 10 kgs.
POTASSIUM CHLORIDE—
Alsace, 250 pkgs.
QUININE—
Java, 932,932 ozs.
ROSIN—
Portugal, 100 cks.
SALTPETRE—
Brit. India, 70 t.
SOAP—
France, £1,200.; Holland, £9.
Spain, £261.; U.S., £4,033.
SOAP STOCK—
Channel Isles, £65.
SODA—
France, 6 c.; U.S.A., 20 t.
TALLOW—
China, 199 t.; N.S.W., 38 t.
19 c.; N.Z., 668 t. 12 c.; S.
Australia, 245 t. 6 c.; U.S.A.,
17 t. 16 c.; Victoria, 79 t. 3 c.
TAR—
Sweden, 600 brls.; U.S.A., 900
brls.
TARTARIC ACID—
France, 20 pkgs.
TARTRATE OF LIME—
Greece, 615 pkgs.
TURPENTINE—
Sweden, 219 cks.

ULTRAMARINE—
Holland, 3 brls.

WAX—
Aden, 750 blcks.

WHITE LEAD—
U.S.A., 125 cks.

WOOD OIL—
China, 288 cks.; Hong Kong
303 cks.

WOOD TAR—
Sweden, 109 brls.

ZINC OXIDE—
Holland, 500 cks.

MANCHESTER.

Week ending July 5.

ACETIC ACID—
New York, 83 brls.
CALCIUM SILICIDE—
Rouen, 250 drms.
COAL PRODUCTS—
Betanaphthol
New York, 349 brls., 19 pkgs.
DYESTUFFS—
Chestnut Extract
Genoa, 520 brls.; New York,
2,051 brls.
Dyewood Extract
New York, 96 bds.
Fustic Extract
New York, 38 brls.
FERRO CHROME—
Rouen, 75 cs.
FORMIC ACID—
Rotterdam, 144 drms.
GLUCOSE—
New York, 591 brls.
HEMATINE CRYSTALS—
New York, 28 brls.
MINERAL WHITE—
Genoa, 200 bgs.
OLEINE—
Bombay, 254 cs.
PARAFFIN SCALE—
New York, 1,614 brls.
PLUMBAGO—
Genoa, 108 bgs.
SOAPSTONE—
Genoa, 500 bgs.
TALLOW—
Bombay, 721 cks.
WAX—
New York, 500 brls.
WHITE LEAD—
New York, 24 cs.

MIDDLESBROUGH.

Week ending July 5.

NIL.

NEWCASTLE-ON-TYNE.

Week ending July 5.

ZINC OXIDE—
Rotterdam, 195 cks.

N. & S. SHIELDS.

Week ending July 5.

NIL.

STOCKTON-ON-TEES.

Week ending July 5.

NIL.

SWANSEA.

Week ending July 5.

ZINC ASH—
Gothenburg, 53 t. 12 c., £220.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

GLASGOW.

Week ending July 5.

AMMONIUM SULPHATE—
Mauritius, 415 t.

BLEACHING POWDER—
Lisbon, 10 t. 7 c.

CAUSTIC SODA—
Brazil, 1 t. 9 c.

CHEMICALS (*otherwise undescribed*)
Algoa Bay, 3 c.; Lisbon, 3 t. 13 c.; Bilbao, 1 t.; Delagoa Bay, 1 t. 4 c.

CHLOROFORM—
Natal, £26.

COAL PRODUCTS (*otherwise undes.*)
Cape Town, £270.; Delagoa Bay, £28.; Natal, £1,508.

COAL PRODUCTS—
Creosote Oil
Algoa Bay, 1,000 gals.
Cresylic Acid
Philadelphia, 27 t. 6 c.; San Francisco, 3 t. 9 c.

DISINFECTANTS (*otherwise undes.*)
Lisbon, 1 t.

DYESTUFFS (*otherwise undescribed*)
Lisbon, 1 t. 10 c.

MAGNESIUM CARBONATE—
Bilbao, 7 t. 2 c.

MAGNESIUM OXIDE—
Genoa, 3 t. 4 c.

MINERAL WHITE—
Lisbon, 10 t.

PARAFFIN WAX—
Bilbao, 10 t.; Genoa, 92 t. 18 c.; Lisbon, 1 t. 2 c.

POTASSIUM SULPHATE—
Brazil, 4 t. 3 c.

RED LEAD—
Mauritius, 1 t.; Vancouver, 1 t.

SHEEP DIP—
Algoa Bay, £900.; Cape Town, £256.; Delagoa Bay, 24 t. 18 c.; East London, £1,160.; Mauritius, 10 t.

SOAP—
Vancouver, 2 t.

SODA ASH—
Huelva, 1 t.; Lisbon, 1 t.

SODA CRYSTALS—
Brazil, 8 t.

SODIUM BICARBONATE—
Genoa, 71 t. 5 c.

WHITE LEAD—
Algoa Bay, 15 c.; Brazil, 10 c.; Delagoa Bay, 2 t. 5 c.; Natal, 1 t.

GRANGEMOUTH.

Week ending July 5.

AMMONIUM CARBONATE—
Christiania, 1 t.

ANTIMONY—
Sandeford, 54 lbs.

COAL PRODUCTS—
Creosote Oil
Christiania, 14,877 gals.
Pitch
Antwerp, 493 t.; Christiania, 55 t.

Tar
Christiania, 4 t. 10 c.
Tar (Refined)
Christiania, 4,000 gals.

FATTY ACID—
Christiania, 16 t.

HULL.

Week ending July 5.

BLEACHING POWDER—
Ghent, 14 cks.

CHEMICALS (*otherwise undescribed*)
Antwerp, 40 kgs., 15 bxs.; Christiania, 50 bgs.; Copenhagen, 40 cks., 6 drms., 1 brl., 1 bx.; Gothenburg, 33 cks., 120 drms.; Rotterdam, 4 cks., 4 drms.

DYESTUFFS (*otherwise undescribed*)
Gothenburg, 2 cks.

GLUE—
Antwerp, 4 bgs.

PITCH—
Antwerp, 355 t.; Ghent, 1 brl.

SOAP—
Antwerp, 52 brls., 40 cs.; Copenhagen, 83 brls.; Gothenburg, 1 cs.

TAR—
Rotterdam, 5 brls.

TURPENTINE—
Antwerp, 6 brls.

LEITH.

Week ending July 5.

CAUSTIC SODA—
Iceland, 25 t., £55.

MAGNESIUM CARBONATE—
Rouen, 10 t., £390.

POTASSIUM BICHRONATE—
Amsterdam, 1 t. 4 c., £258.; Rotterdam, 8 c., £71.

SODIUM BICHRONATE—
Rouen, 169 t. 11 c.

SODIUM CARBONATE—
Iceland, £1.

TANNIC ACID—
Rouen, 1 t., £19.

LIVERPOOL.

Week ending July 3.

ACETIC ACID—
Cartagena, 2 c., £13.; Calcutta, 5 c., £35.; Rotterdam, 1 t. 18 c., £155.

ALUM—
Adelaide, 10 c., £10.; Bilbao, 1 t., £31.; Cartagena, 2 c., £3.; Calcutta, 21 t. 7 c., £304.; La Libertad, 3 c., £25.; Saltpond, 3 c., £3.; Singapore, 9 t. 11 c., £145.

ALUMINA SULPHATE—
Havre, 20 t., £286.

ALUMINO FERRIC—
Bandjermasin, 13 c., £8.

AMMONIA—
Lisbon, 1 t. 15 c., £65.; Madeira, 15 c., £61.

AMMONIUM CARBONATE—
Callao, 10 c., £25.; Panama, 2 c., £10.

AMMONIUM CHLORIDE—
Bilbao, 5 c., £22.; La Libertad, 1 c., £7.

AMMONIUM MURIATE—
Shanghai, 10 t., £514.

BARIUM CHLORIDE—
Santander, 1 t. 1 c., £40.

BICARBONATE (*otherwise undes.*)—
Santos, 500 pkgs.

BLEACHING POWDER—
Antwerp, 3 t. 8 c., £51.; Bilbao, 10 t. 7 c., £142.; Bombay, 93 t. 2 c., £1,629.; Calcutta, 140 t. 1 c., £1,922.; Dunkirk, 5 t., £85.; Fremantle, 1 t., £18.; Rouen, 19 t. 5 c., £227.; San Francisco, 52 t., £900.

BORAX—
Amsterdam, 3 t. 3 c., £129.; Antwerp, 4 t. 18 c., £196.; Auckland, 2 t., £87.; Christchurch, 1 t. 12 c., £92.; Lyttleton, 5 t., £210.; Osaka, 40 t. 1 c., £1,573.; Valencia, 10 c., £23.; Zaragoza, 4 c., £30.

BORIC ACID—
Amsterdam, 2 t. 1 c., £152.; Auckland, 11 c., £40.; Christchurch, 1 t. 8 c., £108.; Colombo, 2 c., £8.; Helsingfors, 12 c., £49.; Puerto Barrios, 1 c., £6.; Tamerfors, 3 t., £247.

CALCIUM CHLORATE—
Shanghai, 75 drms.

CALCIUM CHLORIDE—
Shanghai, 19 t. 19 c., £153.

CAUSTIC SODA—
Algoa Bay, 467 drms.; Amersfort, 30 drms.; Brisbane, 25 cs.; Colombo, 15 drms.; Copenhagen, 120 drms.; Fremantle, 13 pkgs.; Karachi, 459 drms.; Kilindini, 10 drms.; Kobe, 45 drms.; Lima, 150 pkgs.; Melbourne, 75 drms.; Mossel Bay, 4 cs.; Punta Arenas, 53 drms.; Rangoon, 150 drms.; Rustchuck, 20 pkgs.; Rotterdam, 47 drms.; Rouen, 60 drms.; Sydney, 40 pkgs.; Teneriffe, 6 pkgs.; Tientsin, 15 drms.

CHEMICALS (*otherwise undescribed*)
Colombo, 7 c., £32.

CHINA CLAY—
Calcutta, 72 cks.

COAL PRODUCTS—
Carbolacene
Cartagena, 9 c., £19.

Citric Acid
La Libertad, 2 c., £52.

Creosote Oil
San Francisco, 7 t. 16 c., £200.

Cresylic Acid
Boston, 17 t. 13 c., £613.

Dyes
Bombay, 8 t. 18 c., £3,435.; Boston, 1 t., £392.; Barcelona, 10 c., £179.; Havre, 2 t. 4 c., £1,125.; Osaka, 2 t. 4 c., £1,233.

Tar
Champerico, 3 c., £2.; Danoo, 13 c., £8.; Quittah, 2 t., £15.; Sherbro, 1 t. 5 c., £9.

COPPER SULPHATE—
Barcelona, 5 t., £250.

CREAM OF TARTAR—
Cartagena, 2 c., £35.; Kobe, 2 t., £508.

DISINFECTANTS (*otherwise undes.*)
Adelaide, 5 t. 6 c., £117.; Bombay, 2 t. 10 c., £53.; Cartagena, 2 t. 3 c., £125.; Colombo, 2 t. 12 c., £86.; Delagoa Bay, 11 c., £13.; Guatemala, 5 t. 6 c., £272.; Kilindini, 1 c., £2.; Lagos, 3 t. 15 c., £122.; Madras, 19 c., £37.; Perth, 11 c., £22.; Sydney, 1 t. 6 c., £64.; Yokohama, 6 t. 8 c., £268.

DYESTUFFS—
Aniline Dyes
Antwerp, 10 c., £56.; Barcelona, 15 c., £103.; Bombay, 4 t. 8 c., £2,866.; Rangoon, 5 c., £17.; Talcahuano, 10 c., £65.

FERRO MANGANESE—
Baltimore, 50 t.; Antwerp, 4 t.

FORMIC ACID—
Antwerp, 1 t., £170.

GLUE—
Manila, 60 pkgs.

GLUE, SIZE AND GELATINE—
Antwerp, 3 pkgs.; Barcelona, 10 pkgs.; Bombay, 35 pkgs.; Cartagena, 1 pkg.; Kobe, 100 pkgs.; New York, 1 pkg.; Rangoon, 77 pkgs.; Singapore, 46 pkgs.; Shanghai, 100 pkgs.

GLYCERINE—
Lisbon, 30 cs.

IRON PERCHLORIDE—
Barcelona, 10 c., £15.

LEAD ACETATE—
Lisbon, 7 c., £133.; Marseilles, 1 t. 10 c., £130.

MAGNESIA—
Barcelona, 2 pkgs.; Bilbao, 2 pkgs.

MAGNESITE—
Antwerp, 20 t.

MAGNESIUM CHLORIDE—
Bombay, 50 t. 15 c., £774.; Lisbon, 5 t., £77.; Madras, 3 t., £53.; Saigon, 3 t. 2 c., £65.

MANGANESE OXIDE—
Barcelona, 15 c., £32.

NICKEL SULPHATE—
Kobe, 10 t. 10 c., £623.; Yokohama, 1 t. 10 c., £87.

OXALIC ACID—
Barcelona, 1 t., £136.; Bilbao, 1 c., £8.

PARAFFIN WAX—
Funchal, 3 bgs.; Lisbon, 20 cs.

PHOSPHORIC ACID—
Barcelona, 2 c., £12.

PHOSPHORUS—
Calcutta, 6 c., £96.

POTASSIUM ANTIMONIATE—
Oporto, 10 c., £16.

POTASSIUM CHLORATE—
Alexandria, 2 c., £27.; Calcutta, 5 c., £34.

POTASSIUM NITRATE—
Barranquilla, 3 c., £10.; Barbados, 1 c., £5.; Cartagena, 1 c., £5.

POTASSIUM PRUSSATE—
Buenos Ayres, 1 t., £258.

POTASSIUM SILICATE—
Buenos Ayres, 9 c., £24.

SALAMMONIAC—
Bordeaux, 10 c., £42.; Colombo, 1 c., £4.

SALT—
Abidjan, 50 t.; Accra, 67 t.; Antwerp, 770 t.; Barbados, 77 t.; Calabar, 8 t.; Degama, 20 t.; Duala, 126 t.; Fernando, Po., 8 t.; Grand Bassam, 144 t.; Halifax, 23 t.; Helsingfors, 200 t.; Ibadan, 20 t.; Ilorin, 16 t.; Kano, 293 t.; Kingston, 70 t.; Lagos, 425 t.; Lokoja, 50 t.; Maranhham, 4 t.; Montreal, 400 t.; Okrika, 20 t.; Para, 79 t.; Pt Harcourt, 107 t.; Reval, 300 t.; Rio Grande do Sul, 100 t.; Sapele, 6 t.; Sassandra, 40 pkgs.; Sibaga, 1 pkg.; Sydney, 150 t.; Sierra Leone, 196 t.

SALTPETRE—
Antwerp, 3 c., £12.

SHEEP DIP—
Antofagasta, 4 t. 14 c., £386.; Barranquilla, 17 c., £66.; Buenaventura, 10 c., £29.; Belize, 5 c., £17.; La Guaira, 1 t. 19 c., £173.; Maracaibo, 3 t. 16 c., £364.; Puerto Cabello, 15 c., £59.

SOAP—
Acara, 300 cs.; Alexandria, 20 bxs.; Antwerp, 583 bxs., 3,269 cs.; Arica, 100 cs.; Auckland, 5 bxs.; Bangkok, 10 pkgs.; Banjoewangie, 50 bxs.; Barbados, 2,338 bxs., 1,200 pkgs.; Batavia, 100 bxs.; Belewian, 1 cs.; Belize, 300 pkgs.; Benoa, 50 bxs.; Bermuda, 20 bxs.; Bilbao, 16 bxs.; Bombay, 10 bxs.; Boeileleng, 100 bxs.; Buenos Ayres, 58 pkgs.; Calcutta, 532 bxs.; Callao, 225 cs.; Cape Town, 71 bxs.; Cayenne, 100 bxs.; Cologne, 12,000 cs.; Colombo, 45 cs.; Copenhagen, 240 cs.; Dakar, 25 bxs.; Degama, 500 bxs.; Demerara, 1,000 bxs., 4 cs.; Duala, 300 bxs.; Gaboon, 112 bxs.; Grand Bassam, 210 bxs.; Guayaquil, 1,051 cs.; Helsingfors, 1,500 bxs.; Iquique, 15 bxs.; Karachi, 38 cs.; Kilindini, 1 bxs.; Lagos, 670 bxs., 1 cs.; Las Palmas, 583 bxs., 56 cs.; Limon, 100 bxs., 300 pkgs.; Lisbon, 24 cs., 1 ck.; Macassar, 275 bxs., 1,325 cs.; Madras, 138 cs.; Majunga, 25 cs.; Manta, 112 cs.; Mollendo, 2 cs.; New York, 6 bxs.; Opo, 224 bxs.; Oran, 85 cs.; Pisco, 30 bxs.; Pt. Stanley, F.I., 99 bxs., 1 pkg.; Pt. Sudan, 542 pkgs.; Punta Arenas, 1,469 bxs.; Rangoon, 1,014 bxs.; Rabat, 100 pkgs.; Rotterdam, 2,692 bxs.; Samarang, 100 bxs., 625 cs.; San Salvador, 10 cs.; Shanghai, 100 cs.; Sourabaya, 991 pkgs., 500 bxs.; Stanley, 4 cs.; Tangier, 100 pkgs.; Ternate, 100 pkgs.; Tientsin, 40 drms.; Warri, 70 bxs.; Zanzibar, 8 cs.

SODA ASH—

Brisbane, 40 cks.; Calcutta, 3,214 pkgs.; Colombo, 20 pkgs.; Copenhagen, 3,197 pkgs.; Durban, 200 pkgs.; Halifax, N.S., 50 pkgs.; Hong Kong, 3,752 pkgs.; Kingston, 19 pkgs.; Kobe, 1,267 pkgs.; Lima, 50 pkgs.; Moji, 800 pkgs.; New Orleans, 2,000 pkgs.; Punta Arenas, 38 pkgs.; Rangoon, 566 pkgs.; Sourabaya, 287 pkgs.; Samarang, 200 pkgs.; Singapore, 1,848 pkgs.; Sydney, 285 pkgs.; Townsville, 27 cks.; Valparaiso, 115 pkgs.; Yokohama, 2,108 bgs.

SODA CRYSTALS—

Lima, 150 pkgs.; Mauritius, 14 pkgs.; Mellila, 30 pkgs.; Pt. Said, 250 pkgs.; Rangoon, 145 pkgs.; Singapore, 15 pkgs.; Tientsin 11 cks.

SODIUM BICARBONATE—

Abo (Finland), 600 pkgs.; Antwerp, 160 pkgs.; Brisbane, 100 kgs.; Christchurch, 30 pkgs.; Christiania, 34 pkgs.; Colombo, 140 pkgs.; Durban, 140 pkgs.; Hong Kong, 168 pkgs.; Karachi, 3,987 pkgs.; Kobe, 1,000 pkgs.; Lima, 20 pkgs.; Lytleton, 120 pkgs.; Montreal, 1,250 pkgs.; Napier, 20 kgs.; Pt. Sudan, 20 pkgs.; Rotterdam, 400 pkgs.; Rustchuck, 100 pkgs.; Shanghai, 224 pkgs.; Singapore, 300 pkgs.; Stockholm, 40 pkgs.; Sydney, 21 pkgs.; Timaru, 20 pkgs.; Valparaiso, 100 pkgs.; Wellington, 54 kgs.

SODIUM CYANIDE—

Batavia, 15 pkgs.; Arica, 5 pkgs.; Totok, 20 cks.

SODIUM SILICATE—

Monte Video, 96 pkgs.

SULPHUR—

Barcelona, 15 c., £55.; Punta Arenas (Costa Rica), 1 c., £7.

SULPHURIC ACID—

Kilindini, 2 c., £9.; Tientsin, 3 c., £14.

SUPERPHOSPHATE OF LIME—

Orotava, 10 t.

TALLOW—

Bordeaux, 80 cks.; Rotterdam, 3 pkgs.

TANNIC ACID—

Barcelona, 4 c., £20.

TARTARIC ACID—

New York, 4 t., £1,268.; Puerto Barrios, 2 c., £45.

WOOD ACID—

Malacca, 7 t. 10 c., £51.

WOOD PRESERVATIVE—

Bombay, 15 c., £9.; Guatemala, 1 t. 5 c., £42.; Lagos, 6 c., £15.

ZINC CHLORIDE—

Alexandria, 7 t. 14 c., £574.; Bombay, 3 t. 5 c., £148.

LONDON.

Week ending July 2.

ACETIC ACID—

Antwerp (F.), 6 brls., £75.; Bangkok, 14 cs., £50.; Calcutta, 2 cs., £5.; Rotterdam (F.), 16 brls., £224.; St. Michaels, 2 brls., £31.; Salonika (F.), 28 cks., £320.

ACETO SALICYLIC ACID—

Constantinople, 13 cs., £338.; Hankow, 1 cs. (pt.), £9.; Naples, 1 cs. (pt.), £6.; Paris, 20 cs., £513.; Pt. Elizabeth, 1 cs., £14.; Sydney, 1 cs. (pt.), £11.; Shanghai, 7 cs. (pt.), £9.

ALUM—

Salonika, 19 c., £19.

ALUM (AMMONIA)—

East London, 4 c., £7.

ALUMINA CHLORIDE—

Genoa, 1 cs., £8.

AMMONIA—

Alexandria, 8 cs., £16.; Bathurst 2 cs., £5.; Bombay, 8 cs., £16.; Calcutta, 10 cs., £20.; Canton, 5 cs., £17.; Madras, 4 cs., £8.; Malta, 6 cs., £12.; Rangoon, 6 cs., £14.; Trinidad, 3 cs., £6.

AMMONIUM ACETATE—

Durban, 2 cs., £19.

AMMONIA (ANHYDROUS)—

Antwerp, 11 cys., £202.; Rangoon, 1 cys., £7.

AMMONIUM BENZOATE—

Melbourne, 1 cs. (pt.), £7.

AMMONIUM BROMIDE—

Bombay, 2 cs. (pt.), £24.; Constantinople, 2 cs., £38.

AMMONIUM CARBONATE—

Auckland, 2 cs. (pt.), £5.; Piraeus, 1 c., £6.; Sibolga, 3 c.; £15.; Segli, 5 c., £24.

AMMONIUM CHLORIDE—

Canton, 1 kg., £7.

AMMONIUM HYDRATE—

Melbourne, 1 cs. (pt.), £9.

AMMONIUM MOLYBDATE—

Adelaide, 3 cs. (pt.), £20.

AMMONIUM MURIATE—

Antwerp, 1 t., £74.; Fremantle, 3 c., £12.

AMMONIUM NITRATE—

Lisbon, 1 t., £45.

AMMONIUM SULPHATE—

Dunkirk, 25 t., £775.; Granville, 300 t., £8,400.; Paris, 20 t., £560.; Samarang, 148 t., £3774.; Soerabaya, 640 t., £16,320.

AMYL ACETATE—

Batavia, 1 cs. (pt.), £19.; Barcelona, 3 drms., £24.

ANTIMONY REGULUS—

Calcutta, 2 c.

ANTIMONY SULPHIDE—

Boulogne, 15 pkgs., £277.; Fecamp, 2 cks., £81.; Lisbon, 11 cks., £15.; Trelborg, 2 cks., £74.

ARSENIC—

Boulogne, 10 t., £390.; Santos, 19 t. 4 c., £1,073.

BARBITONE—

Adelaide (F.), 5 pkgs. (pt.), £18.

BARIUM NITRATE—

Bombay, 15 cks., £98.

BENZOIC ACID—

Italy, 3 cs., £136.; Melbourne, 1 cs. (pt.), £8.; Naples, 3 cs. (pt.), £45.

BISMUTH CARBONATE—

Amsterdam, 2 cs. (pt.), £18.; Dunedin, 1 cs. (pt.), £22.; East London, 1 cs. (pt.), £11.; Madras, 1 cs. (pt.), £16.; Melbourne, 1 cs. (pt.), £40.; Shanghai, 8 cs. (pt.), £38.; Trinidad, 1 cs. (pt.), £22.

BISMUTH CITRATE—

Brisbane, 1 cs., £26.

BISMUTH OXYDIOGALLATE—

Amsterdam, 2 cs. (pt.), £8.; Batoum, 1 cs. (pt.), £12.

BISMUTH SALICYLATE—

Constantinople, 2 cs., £41.; Madras, 1 cs. (pt.), £7.; Sydney, 1 cs. (pt.), £20.

BISMUTH SUBGALLATE—

Amsterdam, 2 cs. (pt.), £17.; Shanghai, 7 cs. (pt.), £8.

BISMUTH SUBNITRATE—

Amsterdam, 2 cs. (pt.), £16.; Batoum, 1 cs. (pt.), £20.; Constantinople, 1 cs. (pt.), £40.; East London, 1 cs. (pt.), £10.; Madras, 1 cs. (pt.), £14.; Melbourne, 1 cs. (pt.), £18.; Rotterdam, 1 cs. (pt.), £80.; Shanghai, 7 cs. (pt.), £35.; Trinidad, 1 cs. (pt.), £20.

BISMUTH SUBSALICYLATE—

Amsterdam, 2 cs. (pt.), £8.

BLEACHING POWDER—

Antwerp, 10 t. 6 c., £135.

BORAX—

Amsterdam, 1 t., £60.; Switzerland, via Antwerp, 10 t., £390.; Batoum, 10 c., £21.; Beyrouth, 10 c., £20.; Cape Town, 10 c., £20.; Colombo, 2 c., £5.; East London, 2 c., £7.; Para, 10 c., £32.; Rotterdam, 37 t. 17 c., £1,891.

BORIC ACID—

Amoy, 3 c., £17.; Batoum, 8 c., £31.; Bombay, 3 c., £7.

BORIC ACID—

B. Ayres, 7½ t., £790.; Durban, 3 c., £12.; Hankow, 4 c., £16.; Launceston, 1 c., £6.; Melbourne, 2 c., £8.; Rotterdam, 4 t. 19 c., £364.; Swatow, 1 c., £6.; Trinidad, 2 c., £7.

CALCIUM CARBIDE—

Aden, 2 t. 10 c., £80.

CALCIUM CHLORIDE—

Bombay, 1 t. 7 c., £17.

CALCIUM LACTATE—

Cape Town, 1 cs. (pt.), £12.

CARNAUBA WAX—

Durban, 10 c.

CAUSTIC SODA—

Batoum, 19 t. 18 c., £398.; Paris, 9 t. 19 c., £300.

CERESINE WAX—

Amsterdam, 2 t.; Antwerp, 12 c.; Rotterdam, 11 t.

CHEMICALS (otherwise undescribed)

Adelaide, 9 pkgs., £101.; Antwerp, 1 cs., £26.; Brussels, 80 brls., £98.; Colombo, 4 cs. (pt.), £19.; Durban, 1 cs. (pt.), £20.; East London, 1 cs. (pt.), £12.; Fremantle, 14 cs., £130.; Karachi, 15 cs., £47.; Madras, 1 cs., £12.; Melbourne, 67 pkgs., £536.; Pt. Elizabeth, 1 cs., £9.; Rangoon, 2 brls., £21.; Seville, 2 cs., £76.; Shanghai, 2 cs. (pt.), £32.

CHLORIDE OF LIME—

Pt. Elizabeth, 2 c., £5.

CHROMIC ACID—

Soerabaya, 2 cs., £120.

CHRYSOGRAPHIC ACID—

Madras, 1 cs. (pt.), £9.; Rangoon, 1 cs., £6.

CITRIC ACID—

Amsterdam, 5 c. (F.), £130.; Cape Town, 5 c., £120.; Jaffa, 2 c., £15.; Karachi, 1 cs. (F.), £9.; Madras, 1 c., £13.; Malta, 1 c. (F.), £25.; Montreal, 5 c., £113.; Shanghai, 2 c., £33.; Toronto, 5 c., £113.; Trinidad, 1 cs. (pt.), £6.

COAL PRODUCTS—

Alizarine
New York, 4 kgs., £96.

Aniline Colour

Hong Kong, 1 cs. (pt.), £16.; Penang, 2 cs. (pt.), £50.; Singapore, 2 cs., £44.

Aniline Dye

Adelaide, 1 cs., £8.; Amsterdam, 2 kgs., £66.; Bombay, 2 kgs., £246.; Calcutta, 5 pkgs., £563.; Lytleton, 5 kgs., £112.; Melbourne, 100 pkgs., £2,450.; Para, 1 pkg. (pt.), £9.; Sourabaya, 1 kg., £9.; Sydney, 2 cks., £74.

Bitumen

Dunkirk 30 pkgs., £94.

Carbolic Acid

Bangkok, 4 drms., £27.; Brisbane, 1 cs., £6.; Canton, 1 cs. (pt.), £8.; Haarlem, 2 cs., £9.; Karachi, 2 cs., £17.; Kilindini, 3 cs. £8.; Shanghai, 3 cs., £12.; Singapore, 10 drms., £14.

Creosote

Lisbon, 83,455 gals., £2,081.; Paris, 50 brls., £330.; Switzerland, 6 brls., £78.

Cresylic Acid

Paris, 53 cks., £453.

Naphthalene

Alexandria, 8 cks., £42.; Archangel, 1 ok., £12.; Batoum, 39 cks., £125.; Durban, 14 cks., £32.

Pitch

Alexandria, 90 cks., £105.; Antwerp, 710 t., £2,364.

Tar

Beira, 100 drms., £33.; Cape Town, 72 drms., £7.; Delagoa Bay, 50 drms., £14.; Durban, 150 drms., £27.; Lisbon, 100 cks., £158.; Singapore, 40 drms., £18.; Stockholm, 270 drms., £425.

Terebine

Cape Town, 2 cs. (pt.), £14.; Durban, 5 cs., £29.

COCOANUT OIL ACID—

Paris, 10 t. 2 c.

COPPER SULPHATE—

Rotterdam, 282 t. 4 c., £16,946.; San Thome, 1 t. 5 c., £58.

CREAM OF TARTAR—

Cape Town, 1 c., £14.; Cape Town, 7 c. (F.), £83.; East London, 4 c., £62.; Jaffa, 2 c., £23.; Karachi, 3 c. (F.), £49.; Madras, 1 c. (F.), £12.; Maranham, 1 c., £27.; Pt. Said, 1 c. (F.), £12.; Shanghai, 7 cs., £6.; Brisbane (transit), 1 t. 2 c. (F.), £300.

DISINFECTANTS (otherwise undescribed)

Auckland, 2 c., £8.; Batavia, 13 c., £25.; Bombay, 4 c., £44.; Brisbane, 1 t. 7 c., £59.; Brussels, 4 c., £7.; Calcutta, 1 c., £12.; Canton, 2 c., £15.; Cape Town, 10 t. 9 c., £461.; Channel Islands, 10 c., £6.; East London, 2 c., £7.; Ghent, 1 t. 7 c., £51.; Hankow, 1 c. (F.), £8.; Hobart, 2 c., £7.; Ipoth, 2 c., £10.; Karachi, 1 c., £6.; Lisbon, 2 c. (F.), £10.; Malta, 1 c., £9.; Montreal, 2 t., £143.; New York, 6 t. 15 c., £350.; Paris, 9 t. 4 c., £240.; Penang, 1 t. 16 c., £78.; Punta Arenas, 1 c., £8.; Rangoon, 1 t. 10 c., £74.; Singapore, 2 c., £24.; Toronto, 2 c., £14.; Wellington, 15 c., £32.; Zanzibar, 19 c., £45.

EMYL ACETATE—

Paris, 1 cs., £62.

ETHER (SULPHUR)—

Jaffa, 1 cs., £7.

ETHYL CHLORIDE—

Calcutta, 1 cs., £16.

FATTY ACIDS—

Dunkirk, £50.

FORMIC ACID—

Cape Town, 1 brl., £11.

GELATINE—

Kilindini, 5 c.

GLUE—

New York, 2 t.

GLUE, SIZE, AND GELATINE—

Adelaide, 3 c.; Antwerp, 3 t. 15 c.; Alexandria, 5 t.; Archangel, 1 t. 10 c.; Batoum, 1 c.; Barcelona, 2 t. 18 c.; Bombay, 4 c.; Brisbane, 17 c.; Casablanca, 1 t.; Dieppe, 1 t. 3 c.; Pt. Said, 1 c.; Shanghai, 5 c.

GLYCERINE—

Alexandria, 7 c., £57.; Amoy, 4 c., £33.; Athens, 1 t. 10 c., £195.; Bombay, 7 c., £97.; Calcutta, 11 c., £117.; Canton, 3 c., £25.; Constantinople, 1 t., £138.; Durban, 11 c., £64.; Jaffa, 2 c., £17.; Paris, 10 t. 16 c., £1,370.; Rangoon, 1 c., £7.; Rouen, 2 t., £300.; Seville, 2 c., £19.

HYDROBROMIC ACID—

Rotterdam, 1 cs. (pt.), £5.

HYDROGEN PEROXIDE—

Alexandria, 3 cs. (pt.), £6.; Bombay, 2 cs., £12.; Cape Town, 2 cs. (pt.), £13.; Durban, 2 cs., £12.; Pt. Elizabeth, 2 cs., £13.; Tangier, 2 cs., £13.

IODINE—

Antwerp, 1 cs., £90.

IODINE (RESUBLIMED)—

Amsterdam, 1 t. (pt.), £45.; Batoum, 1 t. (pt.), £12.; Constantinople, 4 t., £395.

IODIFORM—

Karachi, 1 cs. (pt.), £8.

IRON AND AMMONIUM CITRATE

Amsterdam, 1 cs., £20.; Batavia, 1 cs. (pt.), £9.; Dunedin, 1 cs. (pt.), £7.; Melbourne, 4 cs. (pt.), £25.; Rangoon, 2 cs., £20.; Rotterdam, 2 cs., £62.; Soerabaya, 4 cs., £60.; Shanghai, 1 cs. (pt.), £9.

IRON PERCHLORIDE—

Calcutta, 2 cs., £6.

IRON REDACTATE—

Trinidad, 1 cs. (pt.), £9.

LACTIC ACID—

Brussels, 13 c., £50.

LEAD ACETATE—

Antwerp (F.), 10 cks., £250.; Vancouver, 1 kg., £5.

- LEAD ARSENIATE**—
Durban, 7 pkgs., £9.
- LITHIUM CARBONATE**—
Naples, 1 cs., £44.
- LITHIUM CITRATE**—
New York (F.), 12 cks., £160.
- MAGNESIA (CALCINED)**—
Bombay, 6 cs., £47.; Cape Town, 2 cs., £6.; Pt. Said, 1 cs., £8.
- MAGNESIUM CARBONATE**—
Bombay, 1 cs., £6.; Bushire, 1 cs., £5.; Dunedin, 2 cs., £7.; Paris, 10 bgs., £100.; Sydney, 4 cs., £15.; Vancouver, 2 cs., £9.
- MAGNESIUM CITRATE**—
Lisbon, 1 t. 15 c., £370.
- MAGNESIUM SULPHATE**—
Aden, 2 c., £5.; Amoy, 4 c., £7.; Barbados, 8 c., £18.; Brisbane, 17 c., £36.; Bushire, 3 c., £9.; Casablanca, 5 c., £10.; Pt. Swettenham, 5 c., £10.; Vancouver, 6 c., £6.; Zanzibar, 6 c., £23.
- MANGANESE DIOXIDE**—
Genoa, 3 cks., £25.
- MERCURY CHLORIDE**—
Constantinople, 1 cs., £71.
- MERCURY OXIDE**—
Amsterdam, 10 cs., £679.
- MERCURY PERCHLORIDE**—
Rangoon, 4 cs., 1 cs. (pt.), £161.
- MERCURY SUBCHLORIDE**—
Bangkok, 1 cs. (pt.), £25.
- METHYL SALICYLATE**—
Antwerp, 1 dr., £18.; Athens, 2 cs., £22.
- NICKEL SALTS**—
Paris, 15 cs., £38.
- NITRIC ACID**—
Durban, 5 c., £32.
- OXALIC ACID**—
Alexandria, 2 kgs., £15.; Bombay, 1 c., £8.; Fremantle, 1 cs., £8.
- PARAFFIN WAX**—
Dieppe, 6 c.
- PEARL ASH**—
Fremantle, 1 ck., £14.
- PHOSPHORIC ACID**—
Calais, 5 crbys., £10.; Rangoon, 2 cs., £8.
- PHOSPHORUS**—
Rotterdam (F.), 2 cs., £70.; Wellington, 10 cs., £121.
- PLUMBAGO**—
Bombay, 2 c.; Christchurch, 7 c.; Lyttleton, 1 t.
- POTASSIUM ACETATE**—
Bombay, 1 cs. (pt.), £5.
- POTASSIUM BICARBONATE**—
Fremantle, 2 kgs., £15.; Madras, 1 cs. (pt.), £5.
- POTASSIUM BICHROMATE**—
Amsterdam, 1 ck., £51.
- POTASSIUM BROMIDE**—
Bombay, 5 cs., £88.; Madras, (F.), 1 cs. (pt.), £9.
- POTASSIUM CARBONATE**—
Brisbane, 1 cs., £15.
- POTASSIUM CHLORATE**—
Colombo, 1 c., £7.
- POTASSIUM CHLORIDE**—
Penang, 1 c., £19.
- POTASSIUM CITRATE**—
Shanghai, 1 cs. (pt.), £8.
- POTASSIUM CYANIDE**—
Canton, 3 c., £65.; Paris, 60 cs., £1,433.; Shanghai, 1 c., £20.
- POTASSIUM IODIDE**—
Dunedin, 1 cs. (pt.), £6.; Hobart, 1 cs. (pt.), £6.; Madras, 1 cs. (pt.), £5.; Maranham, 2 cs. (pt.), £164.; Shanghai, 7 cs. (pt.), £7.; Trinidad, 1 cs. (pt.), £14.; Tientsin, 6 cs. (pt.), £24.
- POTASSIUM PERMANGANATE**—
Bombay, 1 cs., £22.; Karachi, 1 cs. (pt.), £5.
- POTASSIUM PRUSSIAN**—
Alexandria, 2 brls., 1 kg., £55.
- POTASSIUM SULPHATE**—
Bombay, 1 cs., £10.
- PYROGALLIC ACID**—
Durban, 1 cs., £8.; Shanghai, 2 cs., £38.
- QUININE**—
Auckland, 224 ozs.; Bombay, 3,000 ozs.; Calcutta, 2,000 ozs.; Cyprus, 634 ozs.
- SALICYLIC ACID**—
Naples, 2 cs., £44.
- SALT**—
Beira, 19 c.; Colombo, 12 c.; Launceston, 6 t.; Mombasa, 2 t.
- SALTPETRE**—
Alicante, 1 t. 10 c., £97.; Antwerp, 5 c., £18.; Barcelona, 13 t. 10 c., £702.; East London, 9 c., £27.; Hankow, 1 c., £9.; Montreal, 10 c., £30.; Toronto, 1 t., £60.; Valencia, 7 t. 4 c., £406.
- SHEEP DIP**—
Cape Town, 1 t. 17 c., £50.
- SILVER NITRATE**—
Amsterdam, 1 cs. (pt.), £11.; Dunedin, 2 cs. (pt.), £16.; Shanghai, 1 cs. (pt.), £5.
- SOAP**—
Adelaide, 2 c.; Aden, 3 c.; Alexandria, 12 c.; Amsterdam, 1 t. 13 c.; Antwerp, 463 t. 8 c.; Archangel, 40 t. 5 c.; Antofagasta, 5 c.; Bangkok, 16 c.; Batavia, 6 c.; Bombay, 3 t. 3 c.; Bathurst, 2 c.; Belawan, 6 c.; Brisbane, 7 c.; Beira, 2 c.; Buenos Ayres, 15 c.; Calcutta, 1 t. 7 c.; Casablanca, 2 c.; Cape Town, 13 c.; Colombo, 1 c.; Christchurch, 1 c.; Delagoa Bay, 1 c.; Djibouti, 2 c.; Durban, 3 c.; Dunedin, 1 c.; East London, 1 c.; Ghent, 1 t. 3 c.; Hobart, 3 c.; Ipoh, 3 c.; Italy, 2 c.; Karachi, 6 c.; Kilindini, 1 c.; Launceston, 8 c.; Macassar, 1 c.; Malmo, 4 c.; Mazagan, 3 t. 8 c.; Malta, 10 c.; Mogador, 1 t. 3 c.; Mombasa, 6 c.; Monte Video, 12 c.; Montreal, 1 c.; Naples, 8 c.; New York, 1 t. 10 c.; Penang, 9 c.; Piraeus, 4 c.; Pt. Said, 1 t. 9 c.; Pt. Swettenham, 4 c.; Pt. Elizabeth, 1 c.; Rotterdam, 15 t. 11 c.; St. Helena, 1 c.; Singapore, 1 t. 1 c.; Soerabaya, 1 t. 5 c.; Smyrna, 19 c.; Stavanger, 3 c.; Stockholm, 7 c.; Sydney, 2 c.; Trondhjem, 4 t.
- SODA (CALCINED)**—
Havre, 3 cks., £6.
- SODA ASH**—
Rotterdam, 50 t., £393
- SODA CRYSTALS**—
Cyprus, 10 t., £60.; Rabat, 4 t. 1 c., £30.
- SODIUM ARSENIATE**—
Durban, 1 t. 18 c., £99.
- SODIUM BENZOATE**—
Athens, 2 cs., £26.; Calcutta 1 cs., £30.
- SODIUM BICARBONATE**—
Batavia, 1 t. 5 c., £30.; Bombay, 2 c., £5.; Brussels, 10 c., £19.; Constantinople, 3 c., £11.; Canton, 10 c., £8.; Switzerland, via Dieppe, 20 t., £300.; Durban, 6 c., £9.; East London, 10 c., £15.; Swatow, 5 c., £7.; Sydney, 6 c., £7.; Vancouver, 5 c., £10.
- SODIUM BISULPHATE**—
Soerabaya, 1 t., £30.
- SODIUM BISULPHITE**—
Antwerp, 15 c., £25.
- SODIUM BROMIDE**—
Bombay, 2 cs. (pt.), £18.; Hong Kong, 1 cs. (pt.), £8.; Madras (F.), 2 cs. (pt.), £5.
- SODIUM CITRATE**—
Madras, 1 cs. (pt.), £20.; Rangoon, 1 cs. (pt.), £7.
- SODIUM GLYCEROPHOSPHATE**—
Antwerp, 1 cs., £12.
- SODIUM IODIDE**—
Amsterdam, 1 cs. (pt.), £11.; Batoum, 1 cs. (pt.), £52.; Calcutta, 1 cs. (pt.), £5.
- SODIUM NITRATE**—
Bombay, 17 cks., £165.
- SODIUM PHOSPHATE**—
Barcelona, 5 t. 2 c., £136.; Brussels, 2 cs., £7.; Delagoa Bay, 10 t. 1 c., £316.
- SODIUM SALICYLATE**—
Adelaide, 1 cs. (pt.), £14.; Antwerp, 2 kgs., £28.; Bombay, 1 cs. (pt.), £8.; Athens, 2 cs., £25.; Naples, 1 cs. (pt.), £20.; Sydney, 1 cs. (pt.), £20.
- SODIUM SULPHATE (GLAUBER)**—
Barbados, 5 c., £7. SALTS—
- SODIUM SULPHIDE**—
Zanzibar, 3 cks., £26.
- SODIUM SULPHITE**—
Antwerp, 2 t. 10 c., £30.
- SODIUM TARTRATE**—
Amsterdam, 2 cs. (pt.), £10.; Brisbane, 2 cs. (pt.), £21.
- TARTRINE**—
Antwerp, 15 t.
- SULPHUR**—
Antwerp, 4 c., £6.; New York, 2 t. 14 c., £150.; Swatow, 1 c., £6.
- SULPHUR (BLACK)**—
Barcelona, 11 brls., £250.
- SULPHUR (FLOWERS)**—
Bordeaux, 48 t. 4 c., £1,397.; Cape Town, 8 t. 19 c., £250.
- SULPHURIC ACID**—
Batoum, 20 t., £345.; Rotterdam, 250 cks., £588.; Singapore, 1 t., £39.; Tarquah, 8 c., £9.
- TALLOW**—
Alexandria, 3 t. 6 c.
- TANNIC ACID**—
Fremantle (F.), 2 cs. (pt.), £12.; Madras (F.), 1 cs. (pt.), £6.
- TAR (STOCKHOLM)**—
Singapore, £119.
- TARTARIC ACID**—
Bombay, 1 c., £18.; Calcutta, 1 c., £21.; East London, 6 c., £127.; Karachi, 12 c. (F.), £211.; Montreal, 6 t. 10 c., £2,138.; Pt. Elizabeth, 3 c., £57.; Pt. Said, 1 c. (F.), £13.; Pt. Sudan, 1 cs. (F.), £9.; Rotterdam, 5 t., (F.), £1,750.; Shanghai, 1 c., £24.; Tangier, 1 c., £20.; Toronto, 1 t. 10 c., £481.
- TERPINE HYDRATE**—
Brussels, 1 cs. (pt.), £10.
- URANUM NITRATE**—
Madras, 1 cs. (pt.), £10.
- WAX**—
Malmo, 1 t. 11 c.; Malta, 11 c.
- WHITE LEAD**—
Antwerp, £805.; Auckland, £125.; Bombay, £247.; Calais, £250.; Casablanca, £65.; Durban, £101.; Melbourne, £120.; Pt. Elizabeth, £15.; Paris, £353.; Pernambuco, £17.; Rabat, £125.; Rangoon, £190.
- MANCHESTER.**
Week ending July 2.
- ALUM (LUMP)**—
Alexandria, 13 brls.
- ALUMINA SULPHATE**—
Antwerp, 60 cs.
- AMMONIA**—
Rouen, 30 drms.
- AMMONIUM CARBONATE**—
Aalesund, 30 pkgs.; Copenhagen, 60 kgs.; Trondhjem, 120 kgs.
- AMMONIUM CHLORIDE**—
Rouen, 19 cks.
- BORAX**—
Alexandria, 1 cs.; Newcastle, 14 brls.
- BORIC ACID**—
Newcastle, 5 kgs.
- CITROCHLORIC ACID**—
Melbourne 5 cs.
- COAL PRODUCTS (otherwise undes.)**—
Antwerp, £33.; Boston, £1,988.; Copenhagen, £75.; Melbourne, £2,852.; Philadelphia, £169.
- DYESTUFFS (otherwise undescribed)**—
Alexandria, 4 drms.
- GLYCERINE (DISTILLED)**—
Alexandria, 2 cs.
- MAGNESIUM BISULPHITE**—
Montreal, 11 cks.
- MAGNESIUM CHLORIDE**—
Rouen, 20 drms.
- MAGNESIUM SULPHATE**—
Rouen, 56 bgs.
- OLEINE**—
Antwerp, 51 brls.
- SALAMMONIAC**—
Alexandria, 60 cs.; Brisbane, 2 cks.
- SALT**—
Adelaide, 100 cs.
- SOADINE**—
Boston, 50 cks.
- SOAP**—
Alexandria, 180 bxs.; Antwerp, 310 cs.
- SODA ASH**—
Alexandria, 20 bgs.
- SODA CRYSTALS**—
Alexandria, 220 bgs.
- SODIUM BICARBONATE**—
Adelaide, 127 pkgs.; Alexandria, 50 bgs.
- SODIUM BICHROMATE**—
Wellington, 6 cs.
- SODIUM BISULPHITE**—
Havre, 70 pkgs.
- SODIUM HYDROSULPHITE**—
Philadelphia, 60 kgs.
- TANNIC ACID**—
Havre, 3 pkgs.
- TARTARIC ACID CRYSTALS**—
Montreal, 2 cks.
- WHITE LEAD**—
Quebec, 2,400 pkgs.
- MIDDLESBROUGH.**
Week ending July 5.
- COAL PRODUCTS**—
Benzole
Gothenburg, 110 t., £3,720.; Rotterdam, 29 t. 5 c., £705.
Naphthalene
Rotterdam, 8 t. 2 c., £190.
Pitch
Antwerp, 3,827 t. 16 c., £8,779.
- SODIUM SULPHIDE**—
Wellington, 23 t. 5 c., £1,270.
- NEWCASTLE-ON-TYNE**
Week ending July 5.
- CAUSTIC SODA**—
Narvik, 100 t. 2 c.
- CHROME ORE**—
Rotterdam, 387 t.
- COAL PRODUCTS**—
Pitch
Antwerp, 1,260 t.
- FERRO MANGANESE**—
Bergen, 5 t. 7 c.
- WHITE LEAD**—
Bergen, 6 c.
- N. & S. SHIELDS.**
Week ending July 5.
- NIL.**
- STOCKTON-ON-TEES.**
Week ending July 5.
- NIL.**
- SWANSEA.**
Week ending July 5.
- NICKEL SALTS**—
Genoa, 2 t., £100.; Gothenburg, 49 t. 16 c., £2,100.; Hankow, 5 t. 5 c., £1,000.
- OXALIC ACID**—
Genoa, 3 t., £400.
- ZINC OXIDE**—
Barcelona, 1 t. 6 c., £88.; Havre, 2 t. 2 c., £135.; Treport, 20 t., £1,600.

PRICES CURRENT.

THURSDAY, July 10, 1919.

PREPARED BY MESSRS. HIGGINBOTTOM AND CO., 21, SPRING GARDENS, MANCHESTER.

The values stated are F.O.R. at makers' works, or at usual ports of shipment in U.K., unless otherwise specified
The prices in different localities may vary.

Acids:—

		£	s.	d.
*Acetic 40% and 60%	per cwt.	32/-	&	48/-
* " Glacial	per ton	82	0	0
Arsenic, S.G. 2,000°	per ton	50	0	0
Boric Crystals	"	72	0	0
*Fluoric	per lb.	0	0	7
*Muriatic (Tower Salts), 28° Tw.	per carboy	0	6	6
*Nitric, 80° Tw.	per ton	31	10	0
*Nitrous	per ton	29	0	0
Oxalic	per lb.	0	1	2½
Phosphoric, 1,750°	"	0	1	9
*Sulphuric (fuming, 70%)	per ton	—	—	—
* " (Pyrites, 168°)	"	7	18	9
* " (" 140°)	"	4	10	0
* " (free from arsenic, 144°)	"	5	7	4
Tannic (commercial)	per lb.	0	2	9
Tartaric (crystals)	"	0	3	2
*Acetone	per ton	80	0	0
*Alum, loose lump (delivered)	"	17	0	0
Alumina Sulphate (pure)	"	17	0	0
Aluminoferrie (in slabs)	"	8	10	0
Aluminium (Ingot Metal, 98/99%)	per ton	150	0	0
*Ammonia, Anhydrous	per lb.	0	1	10
* " 880	per ton	33	0	0
* " 920	"	20	0	0
" Carbonate	per lb.	0	0	6½
" Muriate (grey)	per ton	50	0	0
" (salammoniac) 1st & 2nd, per cwt.	80/-	&	75/-	
" Nitrate	per ton	56	0	0
" Phosphate	"	114	0	0
" Sulphate (grey), London, net	"	—	—	—
" " Hull	"	—	—	—
" " Manchester	"	—	—	—
*Aniline Oil (pure)	per lb.	0	1	2
Aniline Salt	"	0	1	2
Antimony	per ton	45	0	0
" (tartar emetic), 43/44%	per lb.	0	3	4
" (golden sulphide)	"	0	1	3
Arsenic, white powdered	per ton	39	0	0
Barium Chloride (in bags)	"	28	0	0
" Carbonate (native), 92/94%	"	11	10	0
" Sulphate (native levigated)	"	£7	to	£14
*Bisulphide of Carbon	"	54	0	0
Bleaching Powder, 35%	"	15	0	0
* " Liquor, 7%	"	6	0	0
Casein (commercial)	"	82	0	0
Chromium Acetate (crystals)	per lb.	0	1	6
Calcium Chloride	per ton	8	0	0
China Clay (at Runcorn), in bulk	"	40/-	to	70/-

Coal-tar Products and Dyes:—

Alizarine (artificial), 20%	per lb.	0	2	0
Magenta	"	18/-	to	35/-
Anthracene, 40/50% A, f.o.b., L'don, per unit,	"	6	to	7
Benzol, 90's (naked)	per gal.	0	1	11½
" 50/90's	"	0	1	9½
Carbolic Acid (crude, 60°)	"	—	—	—
" (crystallised, 40°)	per lb.	0	0	5½
" Acid (pale liquid, 97/98%)	per gal.	0	2	9
*Creosote (ordinary), naked	"	0	0	5½
*Crude Naphtha, 30% at 120°C.	"	0	0	8½
*Grease Oils, 18° Tw. (naked)	per ton	6	10	0
Pitch, f.o.b., Liverpool or Garston	"	2	11	0
*Solvent Naphtha, 90% at 160°	per gal.	0	2	1
Copper	per ton	97	10	0
" Sulphate	"	45	0	0
" Oxide (copper scales)	"	70	0	0
Dross Salts	"	39	0	0
*Glycerine (crude), 80%	"	72	0	0
* " industrial, S.G. 1,260	"	110	0	0
*Iodine	per oz.	0	0	10½
*Iron Nitrate, 80° Tw.	per ton	12	10	0
" Sulphate (copperas), delivered	"	4	10	0
" Sulphide	"	7	15	0
Lead (Foreign Pig)	"	23	10	0
" Litharge Flake	"	45	0	0
" Acetate (white), (ex ship)	"	85	0	0
" " (brown)	"	75	0	0

Lead, Carbonate (White lead), pure	per ton	51	0	0
" Nitrate	"	58	0	0
Lime, Acetate (brown)	"	10	0	0
" (grey), 80% (ex ship)	"	19	10	0
Magnesium Chloride	"	15	10	0
" Carbonate (light)	per cwt.	3	7	8
" Calcined Magnesite	per ton	25	0	0
" Sulphate (Epsom Salts) (coml.)	"	10	10	0
" (druggists)	"	16	0	0
Manganese, Sulphate	"	80	0	0
" Borate	"	100	0	0
*Methylated Spirit, 64° (industrial)	per gal.	0	5	7
*Naphtha (Wood), Solvent	"	0	10	6
" " Miscible, 60° p.	"	0	10	6
Oils:—				
*Cottonseed	per ton	135	0	0
*Linseed	"	125	0	0
Stearine, 115-120° M.P.	"	95	0	0
Potassium, Bichromate	per lb.	0	1	6
" Carbonate, 80/82%	per ton	85	0	0
" Chlorate	per lb.	0	1	3
" Cyanide, 98%	"	—	—	—
" Hydrate (Caustic Potash) 90%	per ton	150	0	0
" " 75/80%	"	135	0	0
" Potash Hydrate Liquid, 38° B.	"	70	0	0
" Nitrate (refined)	"	60	0	0
" Permanganate (B.P. crystals)	per lb.	0	3	6
" Prussiate (yellow)	"	0	1	9
" (red)	"	0	5	6
" Sulphate, 90% (ex ship)	per ton	40	0	0
" Muriate, 80%	"	30	0	0
Silver (metal)	per oz.	0	4	5 3/16
Sodium (metal)	per lb.	0	1	3
" Acetate	per ton	52	10	0
" Arseniate, 45%	"	48	0	0
" Borate (Borax), Crystals	"	39	0	0
" Bicarbonate (1 cwt. kegs)	"	9	10	0
" Bichromate	per lb.	0	0	11
" Carb. (Caustic Soda-ash), 48%	per ton	10	0	0
" (Alkali), 58% (bags)	" f.o.r. wks.	6	0	0
" (Soda Crystals), (bags)	"	4	2	6
" Chlorate	per lb.	0	0	7½
" Cyanide (100% basis)	"	0	0	10
" Hydrate (76% C. Soda) (f.o.r.)	per ton	23	10	0
" (74% C. Soda)	"	23	0	0
" (70% C. Soda)	"	22	0	0
" (60% C. Soda)	"	21	0	0
" (pure liquid, 90° Tw.)	"	9	0	0
" 77/78% Powdered (99%) Hydrate	"	25	10	0
" Hyposulphite (commercial)	"	16	10	0
" Manganate, 25%	"	65	0	0
" Nitrate, 96%, reld., f.o.r., L'pool	"	21	0	0
" Nitrite, 100%	"	55	0	0
" Phosphate	"	25	10	0
" Prussiate	per lb.	0	0	7½
" Silicate (glass) Alkaline	per ton	12	5	0
" (liquid, 100° Tw.)	"	9	10	0
" Sulphate (Saltcake), delivered	"	3	0	0
" (Glauber's Salt)	"	3	0	0
" Sulphide (conc.), 60/65% casks	"	22	0	0
" Sulphite	"	10	0	0
Sulphocyanide, Ammonium, 95%	per lb.	0	2	1
" Barium, 95%	"	0	1	4
" Potassium	"	0	2	4
" Calcium, 70%	per lb.	0	1	4
Sulphur, (Flowers)	Sicilian per ton	21	0	0
" (Roll Brimstone)	"	20	0	0
" Brimstone (best thirds)	"	—	—	—
" (ex ship)	"	13	0	0
Tallow	"	100	0	0
Tin Crystals	per lb.	0	1	3
" English Ingots	per ton	24½	10	0
Titanium, Potass. Oxalate	per lb.	0	1	6
Titanous Chloride	per cwt.	4	10	9
Zinc (Spelter)	per ton	41	12	6
" Powder, 88/92%	"	70	0	0
" Chloride (solution, 102° Tw.)	"	13	0	0
" Sulphate, Crystal	"	22	0	0

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THE
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NEW ARRANGEMENTS.

The "Chemical Trade Journal" will be published in future a day earlier.

SUBSCRIBERS to whom the Journal is posted direct will therefore receive it each week on Friday.

EDITORIAL NOTICES.

Readers are invited to forward items of intelligence, company reports and balance-sheets, or cuttings from local newspapers of interest to the trades concerned.

Articles, reports, and correspondence on all matters of interest to the chemical and allied industries, home and foreign, are solicited. Correspondents should condense their matter as much as possible, write on one side only of the paper, and in all cases give their names and addresses, not necessarily for publication. Sketches should be sent on separate sheets.

Communications for the Editor, if intended for insertion in the current week's issue, should reach the office not later than Wednesday morning.

CURRENT TOPICS.

SOCIETY OF CHEMICAL INDUSTRY: ANNUAL MEETING.

IT is peculiarly fitting that this year's annual meeting of members of the Society of Chemical Industry, closely coinciding with the termination of the peace negotiations, should be held in London. It is equally appropriate that the gathering, after four years of incessant war strain unparalleled in the history of the chemical industry, should be one of, if not the, most successful held under the auspices of the Society. The magnitude of the task which British chemical science and industry have successfully accomplished, and the weight of the responsibility which they were called upon to bear, will probably never be revealed in full. Certainly what the public until now have been permitted to see of the achievements of the chemists and chemical manufacturers of this country have been but fragments of the whole. The presidential address of Professor Henry Louis does not lend itself to criticism, but it is none the less interesting on that account. He has set out to review some of the more prominent aspects of the activities of the chemical and allied industries since 1914, and though he makes no pretence of having covered by any means the whole field, he has served the valuable purpose of marshalling available facts and figures, and presenting them in connected form. Viewed retrospectively, the results, even to chemists themselves, are nothing less than amazing. That the value of these achievements has not been more widely appreciated is not altogether surprising. The necessary secrecy in which the operations have been carried on is, of course, one reason; but another, and one which very largely is inseparable from the work of the chemist, is, as Professor Louis pointed out, the absence of anything of a spectacular character attached to it. Dealing with the immediate future which lies before the British chemical industries, the President emphasised the importance of increased production in order to meet

successfully the competition of chemical manufacturers of other nations. This problem is uppermost in the minds of manufacturers, and has been for months, but few of them in the present state of things look upon it hopefully. Increased production, desirable as it is in the interests of all classes of the community, is not only being retarded by the unfathomable attitude of labour generally, but in many cases output per unit is actually on the decline. Allowance has been generously made for the "reaction from war strain" theory, and it is now time that labour recovered its mental balance. Until that recovery takes place, and labour becomes once more a reasonably reliable quantity, "reconstruction" will remain but a will-o'-the-wisp.

The proceedings of the Annual Meeting this year are noteworthy in that they include the first conference of the much-discussed Chemical Engineering Group of the Society, and also that instead of a lengthy list of papers each dealing with a separate branch of the chemical industry, the communications are now grouped, each group being the subject of a special conference, two of which proceed simultaneously. Thus the chief point which was urged upon the Council of the Society in support of the movement to form the Chemical Engineering Group has been unobtrusively applied in other directions with what we hope will prove to be beneficial results.

The Government and Trade.

THE resignation of Sir Arthur Steel-Maitland, head of the Department of Overseas Trade, is no surprise to the business world. The wonder is that it did not come before. It is less than two years since the old Board of Trade Commercial Intelligence Department was remodelled as the Department of Overseas Trade at the moment when there was an insistent demand for the formation of a Ministry of Commerce. There was strong criticism at the time for the simple reason that the reorganisation, though it seemed to achieve something, in terms of well-chosen phrases in Parliament, obviously had in it all the makings of a failure from the business point of view, in that it was not a complete department to deal with the trade of the country, both home and foreign. What happened was that the strong antipathy of the Foreign Office to have the control of the Consular Service taken out of its hands prevailed, and we were presented with an Overseas Trade Department tacked on to the Foreign Office, whose past record in dealing with foreign trade affairs is not a particularly happy one. The terms of the letter in which Sir Arthur Steel-Maitland sent in his resignation are sufficiently explicit, not to say blunt, to indicate at once that what was feared all along has happened. He said: "I do not know whether the Government is really in earnest as regards re-establishing our international trade (which I myself consider vital), but at least, so far as I am concerned, I cannot continue to take the responsibility for work under such conditions that I cannot develop it or indeed carry it on properly, and when I am hung up, as, for example, with the Consular and kindred services." There we have a vindication of the first criticisms of the scheme under which the Overseas Trade Department came into being. One of the prominent things which were promised in the early days of the war was a reorganisation of our Consular service, presumably in the direction of greater efficiency. It is evident that the methods which the Foreign Office have of effecting this change do not coincide with those of a business man like Sir Arthur Steel-Maitland, who was specially appointed to the post of head of the Depart-

ment of Overseas Trade for his business abilities, and we are not surprised that they do not. At the same time, the businesslike working of the Consular Service is surely antecedent to an improvement in our general trade organisation, the whole of which it has been for so long argued should be placed in the hands of a Ministry of Commerce. Some time ago, in the days of Sir Albert Stanley as President of the Board of Trade, we were told that the Board of Trade was to form the nucleus of a Ministry of Commerce, but apparently the old antagonism of the Foreign Office to being relieved of its inefficient handling of the Consular Service was immediately revived, because quite recently the fact was dragged to light through the medium of a question in the House of Commons that a committee had been appointed to inquire into the question of separating the Consular Service from the Foreign Office. What has happened is a full justification for the creation of the foreign trade organisations of such bodies as the Federation of British Industries, and we are not at all sure that British trade would not be all the better if its interests were left entirely in private hands, and there was no such thing as a Government department which was even supposed to watch over trade interests. Our trade has prospered in spite of that in the past, and the domestic quarrel between the Foreign Office and the Board of Trade is ample warning to British traders and commercial men not to rely for any assistance upon any Government department, which experience has shown to be more a hindrance than a help.

MONOCLINIC DOUBLE SELENATES OF THE COBALT GROUP.

AT a recent meeting of the Royal Society, Dr. A. E. H. Tutton, F.R.S., read a paper dealing with the four double selenates of the series $R_2M(SeO_4)_2 \cdot 6H_2O$, in which M is cobalt and R is potassium, rubidium, caesium, or ammonium. A complete crystallographic and physical investigation has been carried out on parallel lines to the work previously published concerning the magnesium, zinc, iron, and nickel groups, and to that concerning the completed analogous series of double sulphates. The results are in full accord with those derived from the previous investigations. It is an interesting fact, said the author, that while each group of four salts containing the same M-metal and the four respective alkali bases presents its own absolute values for the various constants, and displays its own idiosyncrasies and individuality, yet the relations of the four salts to each other invariably exhibit the same regularities, gradations, and numerical progressions, even to the most apparently insignificant details, each group thus affording an independent confirmation of the truth of the general conclusions.

Two dominant facts emerge—namely, (1) the progressive order of all the crystallographic and physical properties, following the progression of the atomic numbers (and, therefore, atomic weights) of the interchangeable alkali metals concerned, potassium, rubidium, and caesium; and (2) the almost perfect isostructure—that is, congruency, coincidence, and equality of dimension of the elementary cells of the monoclinic space-lattices—of the crystals of the ammonium and rubidium salts of the group. The progression with atomic number referred to under (1) is completely explained by the operation of Moseley's law, governing the progressive structural complexity of the atoms in accordance with the sequence of the atomic number.

PROPOSED FRENCH GOVERNMENT OIL MONOPOLY. —A Government Bill (No. 6312) was introduced into the French Chamber of Deputies last month to institute a complete Government monopoly in the purchase and importation of refined oils and petroleum spirit in France, Algeria, and the French Colonies, through the medium of a central office attached to the Ministry of Finance. Further measures are also foreshadowed dealing with the distribution of the monopolised products.

SOCIETY OF CHEMICAL INDUSTRY.

ANNUAL GENERAL MEETING.

THE annual general meeting of the Society of Chemical Industry was held in London on July 15, 16, and 17. Professor Henry Louis was in the chair.

WELCOME BY THE LORD MAYOR.

The opening meeting was held at the Mansion House on the morning of July 15, when the Society was welcomed by the Lord Mayor of London (Sir Horace Marshall).

The Lord Mayor said it was right that a special welcome should be given to the Society in the City of London, the great centre of commerce. Chemistry had sometimes been described as the handmaid of commerce, but he was not sure that it did not merit the title of mistress of commerce, for to-day there was hardly a thing that was bought or sold or that we needed in our daily life—from a postage stamp to the R 34—in the production of which the chemist did not have an important part. It was indeed a fortunate thing that at the outbreak of the war the Government were able, principally through the instrumentality of Lord Moulton, to enlist at once through the Society's organisation the services of highly trained chemists and chemical manufacturers for countering the war devices of our chief enemy in the field, and whilst he could not pretend to know all the chemical discoveries, or the full extent of the impetus to chemical research, due to the activity of the past five years, he did know that British chemists had risen illustriously to the occasion of our national need, and had done literally wonders. In paying this tribute, they must not overlook the benefits gained by the co-operation of the chemists of the Allied countries. He understood that there were now in London distinguished delegates from the chemical societies of our Allies. Happily, this alliance with us for the purposes of war was no longer required, yet the alliance continued. This was analagous to the position of the Allied countries themselves which joined together for the purpose of the war. The purpose of this union had now passed, but the bond of their union remained unweakened. It was a profound pleasure to him as Lord Mayor of the City of London to welcome the Society to the Mansion House, and he hoped that the deliberations of the meetings would be happy, harmonious, and good for the community.

The President, in thanking the Lord Mayor for his kind welcome, said it was no small honour to be received by the first magistrate of the first city in the world, and they thoroughly and keenly appreciated the honour that had been done to the Society. They had been feeling urgently the great need the country had for the closest possible association between technologists and men of science on the one side and the commercial side of our great industries. These had been too long divorced. We had unfortunately always put the business side before the technical side, and we thought more of the man—and incidentally paid more to the man—who sold the goods than the man who made them. That was in principle wrong, and those who were engaged on the technological side and the scientific side of technology were only too anxious to come into the closest possible touch with those who were on the commercial side of the great industries of the country. The fact that they had been welcomed by the Lord Mayor of London showed that the City of London reciprocated that feeling. When both parties felt that close co-operation was to the benefit of both they might be quite certain that that co-operation would be brought about and would be fruitful.

The Lord Mayor had truly said that the chemical industries of the country had been one of the greatest factors in winning the war; might he point out that chemistry and the allied sciences were necessarily going to be one of the leading factors in the reconstruction that must necessarily follow that war, and, unless science and scientific technology had the place in the thoughts of the country which it deserved, we should be placed in even greater difficulties than could be foreseen at the moment.

ANNUAL MEETING.

The minutes of the last annual general meeting were read and confirmed.

The President said the following telegram of congratulation would be sent by the Society of Chemical Industry to His Majesty the King:—

The members of the Society of Chemical Industry gathered at the Mansion House on the occasion of their first annual meeting in London since the commencement of the war send to your Most Gracious Majesty their sincere congratulations on the peace that has been secured by the great victory of your forces in conjunction with those of your Allies and their heartfelt wish that it may be followed by many years of prosperity and happiness.

Messrs. H. Talbot and J. H. West were appointed scrutineers for the ballot for new members of Council, and the President announced that the ballot was closed.

The annual report of the Council was then dealt with, and taken as read.

Report of Council.

The report of the Council for the year shows that the membership now consists of 5,263 members, compared with 4,826 last year. No fewer than 65 members of the Society have died during the year, including Sir William Crookes, F.R.S., O.M., who was president in 1913, and Sir Boverton Redwood, Bart., president from 1907 to 1908. Three members have died on active service.

The Council has nominated Mr. John Gray, of Bromborough, Cheshire, as president to succeed Professor Henry Louis, who has been nominated a vice-president. To the other vacancies caused by the retirement of four vice-presidents, Professor J. W. Cobb, Mr. E. V. Evans, and Dr. A. Reé have been nominated. Four ordinary members of Council retire, and eleven nominations were received.

The Council has appointed a committee consisting of Dr. Charles Carpenter, Mr. W. McD Mackey, and Dr. S. Miall to revise the Society's bye-laws. Reference is made to the formation of the Chemical Engineering Group, the membership of which is now about 500. An alteration has been made in the bye-laws whereby this group and similar subject groups which may be formed in the future will be duly represented. The Canadian Section has, with the approval of the Council, been reorganised, and branches of this section have now been formed at Toronto, Montreal, and Ottawa, and it is proposed to establish other branches in important centres.

The Council has learned with pleasure that the Grasselli Chemical Company has founded a gold medal to be awarded annually to a member of the New York Section for a thesis offering the most useful suggestions in applied chemistry.

The formation of the Inter-Allied Conference of Chemists is referred to. The committee of ten has arranged to hold meetings during the annual meeting of the Society. The report also referred to the report of the Empire Sugar Supply (Technical) Committee and the appointment of a committee to confer with other interested bodies on the question of the standardisation of chemical laboratory glassware, with a view to assisting the glass manufacturers in limiting the supply of various classes of apparatus to a certain number of standard sizes. That committee was formed on the suggestion of Dr. Morris Travers, F.R.S., at the last annual meeting. Mr. K. M. Chance has resigned, and a number of additional members have been appointed.

The draft scheme prepared by the General Committee of Chemical and Allied Societies on the question of publishing chemical bibliographies in the English language has been adopted.

The Council was represented at two conferences held by the Imperial Mineral Resources Bureau dealing with mineral resources and production.

The President proposed the adoption of the report. Mr. Robert Mond seconded. The report was then put to the meeting and adopted.

The Honorary Treasurer, in submitting the statement of accounts, said they would see from the figures that the Society had passed through a very difficult period financially. The expenses had mounted enormously, and the measures that had been taken to increase the revenue had not yet been fully felt. It was very fortunate that it was only in the last 18 months of the war that the Society really felt the war pinch. Had the difficulties occurred earlier, or had the war gone on for another year, the position would indeed have given

rise to grave anxiety, whereas at the moment he did not think it did. The net result, however, was that for the year 1918 there was an excess of expenditure over revenue of £3,145. 0s. 9d. He would like to mention the very great personal debt of gratitude which he owed to the Finance Committee.

The President formally moved the adoption of the statement of accounts.

Mr. C. S. Garland, in seconding, said that whilst it might not seem altogether satisfactory that there should be a deficit of over £3,000., he thought they were to be congratulated in these times that with an increase of subscription of only 40 per cent., the deficit was not greater.

The motion was put to the meeting and carried unanimously.

PRESIDENTIAL ADDRESS.

Professor Henry Louis then delivered his Presidential Address:—

When we look back upon what the British chemical industry was before the war and on what it has accomplished during these five strenuous years, some faint idea may be gained of what the chemist's share has been in the great conflict.

The consumption of sulphuric acid is very often taken as a standard of the progress of chemical industries in general. Before the war our annual consumption of 100 per cent. sulphuric acid was about one million tons per annum, of which 25,000 tons were oleum; at the close of the war it was about one and three-quarter millions, of which 310,000 tons were oleum. This increase is significant enough as it stands, but when it is remembered that over half of the former figure was absorbed in two manufactures—namely, superphosphates and sulphate of ammonia—while only about 30,000 tons were used in the manufacture of explosives, and consider further that during the war sulphuric acid was mainly used in producing explosives, it is easy to see how enormously the consumption of acid for the latter purpose must have increased, and how much chemical engineering must have done towards making that increase possible.

In a general review of the chemist's war work, it would seem almost inevitable to assign the first place to the production of explosives. At the outbreak of war our manufacture of explosives was practically confined to those used for mining and other industrial purposes. When the needs of war demanded explosives of every kind, and particularly high explosives in quantities hitherto unimagined, it was soon found that our position was a perilous one, owing to the fact that Germany had for many years before the war practically monopolised all organic chemical products. Five years ago we found ourselves with neither the plant nor the experience required to produce a whole range of indispensable substances such as trinitrotoluene, trinitroxyline, dinitrophenol, tetryl, synthetic phenol, acetone, etc. The immense amount of research and experiment needed before these manufactures could be successfully set going on the required scale of magnitude is difficult to conceive except by those actually engaged in the work. In the manufacture of T.N.T. entirely new methods had to be devised and worked out on the required manufacturing scale, and the requisite plant for its production designed and constructed. The demand for picric acid soon rose to about 1,000 tons per week; it had become evident at an early stage of the war that the supplies of coal-tar phenol would be far below our requirements, and other sources of supply had to be found. We had never made synthetic phenol in this country, and a vast amount of experimental work had to be done before its manufacture from benzene through benzene sulphonic acid could be successfully undertaken. Even with these developments, our production of explosives was less than half of our requirements; for shell filling alone no less than 220,000 tons of high explosives were needed for 1917. Here, again, the resourcefulness of our chemists came to the rescue by the invention of a new explosive, amatol, consisting of a mixture of T.N.T. with from two to four times its weight of ammonium nitrate. Again, the demand for huge quantities of ammonium nitrate for this and other purposes could no longer conveniently be met by the older methods of manufacture, and new and more direct methods of production were worked out. The production of propellants rose to 2,000 tons per week. The shortage of acetone necessitated the use of ether-alcohol as solvent to the extent of about three-fourths of the output. This change involved the use of a different nitro-cotton, and practically a new method of manufacture, in the course of which a very large proportion of the solvents used—acetone, ether, and alcohol—were recovered.

When war broke out, we may be said to have had no acetone manufactured in this country and to have relied ex-

clusively upon importation to cover our needs. There was a relatively small works in the Forest of Dean capable of carbonising about 80 tons of cordwood weekly. This works was first enlarged, and then a number of other works were started, until a total carbonising capacity of 1,400 tons per week was reached. Eventually calcium acetate of a purity of about 90 per cent. was prepared, the chief impurity being calcium carbonate. The best conditions for the decomposition of the acetate so as to get the maximum yield of acetone had further to be determined, it being ultimately found that it was necessary to maintain steadily a temperature of between 450° and 500° C. in the retorts. Even with all precautions, the acetone was not quite up to the desired high standard of purity, and an elaborate series of researches on its purification had to be undertaken, until finally a product was obtained that satisfactorily passed the required tests. Various other methods of producing acetone were developed, such as synthesis from alcohol, which was used on a considerable scale, and its production by the anaerobic fermentation of potato or maize starch. It is to be hoped that some, at any rate, of the plants devised for acetone production will be maintained in operation, and that the country will not be allowed to fall back into its previous dependent position for the supply of this important substance.

After referring to many other phases of chemical activity during the war—e.g., pharmaceutical and photographic chemicals, and work in connection with aircraft production, etc.,—Professor Louis said: The one great fact that emerges from this mass of detail is that our chemical industry has shown itself capable of sustaining successfully the fiercest and most strenuous competition that it has ever been called upon to face. Utterly unprepared for war conditions and apparently unsuited to war emergencies, it has shown itself more resourceful, more energetic, and more successful than any of us had dared to hope. I venture to submit to you that we could never have built up so rapidly this vast edifice of chemical industry if the foundations upon which we had to build had not been thoroughly sound. I see in these results a triumphal vindication of the thesis that I have more than once urged—namely, that in the teaching of science, and more particularly of scientific technology, we are quite on a par with any other nation.

One other reflection, and I have done: We beat Germany in war because of our superior productivity. What is true of the fierce clash of warfare is equally true of the less spectacular but no less severe competition of peace; if we are to hold what we have gained, if we are to maintain our leading place among the nations of the world, it can only be by maintaining our productive capacity and increasing our outputs. This is a task that cannot be accomplished by scientists and technologists alone, they can but devise and organise the methods by which the work is to be done, but they must call upon the body of workers of the country to execute them. We won the war by the huge outputs that our industries were able to produce; in this way, and in this way alone, can we hold what we have gained through the years of strenuous competition that unquestionably lie before us.

Mr. John Gray (president-elect), in proposing a hearty vote of thanks to the president, said they had listened to a very interesting address from him, in which he had given a resumé of the great part which the chemical industries had played during the struggle which we had recently passed through, and it was a right thing that we should all take stock of ourselves at times. Professor Louis had taken stock of what the chemical industries had done during the past five years, and he thought they would all agree with him that the result of that stocktaking was eminently satisfactory. We had now entered upon the great period of reconstruction, and during that period their activities, which had been so very marked during the last few years, must not be slackened nor cease, otherwise the outlook for the future would be very dark.

Mr. Evans seconded the proposal. As a member of the Council, he could speak as to the amount of work which Professor Louis had put into the affairs of the Society, and for these reasons he had very much pleasure in seconding the vote of thanks.

The vote of thanks having been given with acclamation.

The President said he could only thank them sincerely for the manner in which it had been received. He would not conceal the fact that the last two years' work as president of the Society had been distinctly hard, but it had been distinctly pleasurable. He thought the history of the chemical industries during the past five years would always remain as a brilliant patch in the records of the industries of the country.

The meeting then adjourned to the Connaught Rooms for luncheon by invitation of the London Section.

OFFICIAL LUNCHEON.

There was a large attendance of members, ladies, and visitors at the luncheon at the Connaught Rooms, at which Dr. Charles A. Keane was in the chair.

In proposing the toast of "The King,"

The Chairman said that for the first time in the history of the Society they had been honoured by the patronage of His Majesty the King on the occasion of an annual meeting. It was a tribute to their labours which would be appreciated by all, and they should welcome it and appreciate it as evidence of that greater claim that science was obtaining in the affairs of the nation.

M. Paul Kestner (president of the Société de Chimie Industrielle) proposed the toast of "The London Section of the Society of Chemical Industry."

Dr. Keane, replying, said it was at the time of the previous visit of M. Kestner to London that the first link in the chain of inter-Allied co-operation was forged, and he hoped it would form a true league of nations for the advancement of the interests of applied and pure chemistry.

Dr. E. F. Armstrong proposed the toast of "The Guests."

Dr. Charles L. Parsons (secretary to the American Chemical Society), replying to the toast, said he had been in England a week, and during that time he had come into contact with many things which could not but inspire American chemists. It had been a pleasure to him to hear the president's address that morning and to realise how parallel the problems which had been solved here were with those which had had to be solved in America. He regretted that the two countries had not come into contact sooner on some of these problems, because in many of them Americans had already worked out their own salvation. America having come into the war, however—he wished she had done so sooner.—it was his good fortune to come into contact with many chemists from Great Britain, France, and Italy, and he wished to say a word of tribute to their ability, their spirit, and the activity they showed as well as the help they gave. There was one thing they were striving to accomplish in America, and he thought they would succeed, and that was in bringing together those who were interested in pure science and those who were interested in applied science. They had convinced the applied science man that it paid him to keep up with modern chemistry; and they had convinced the pure science man that something might be gained if his science was made fruitful to mankind. The two were now working hand in hand.

M. Behan, speaking in French, also replied.

On Tuesday afternoon the Society met again in the Mansion House, the president being in the chair.

INTER-ALLIED CHEMICAL FEDERATION.

Sir William J. Pope, F.R.S. (chairman of the British Federal Council for Pure and Applied Science), in opening a discussion on the subject of inter-Allied chemical federation, to which a great deal of attention had been given in this and Allied countries during the past few years, said that federation called for the organisation of co-operative effort. A fairly comprehensive scheme for the co-ordination of scientific effort was at present in course of formation under the direction of an International Research Council. This body was the co-ordinating head of a series of organisations, each dealing with the international aspect of some specific branch of science. Amongst these the International Chemical Council represented our own subject. Each country concerned in the movement had either formed or was in the course of forming a National Research Council, which covered the national aspects of science and formed the organising head of the Councils representing the separate sciences. Our own Federal Council for Pure and Applied Chemistry would no doubt ultimately represent chemistry as a constituent committee of the British National Research Council. The Federal Council was composed of nominees of all the large societies in this country whose interests were concerned with the various branches of pure and applied chemistry. Whilst the precise terms of constitution of these various bodies were not yet defined, it would be seen that the draft scheme, now rapidly approaching completion, aimed at the organisation of a network of bodies, each representing one science in one country, and that each of these units is under the aegis of the National Research Council of its own country, and was in communication with the body representing its own science in other countries. Thus the British Federal Council for Chemistry came under

the British National Research Council, and was to be brought into communication with the corresponding foreign chemical councils by forming an integral part of the Inter-Allied Confederation of Chemical Societies or the International Chemical Council.

The events of the last few years had led to certain limitations in the scope of the International Research Council. The work of organisation was now proceeding between the Allied nations, enemy and neutral nations at present taking no part in the deliberations. The whole organisation was thus not international but inter-Allied. The Inter-Allied Conference on International Scientific Relations, held at the Royal Society's Rooms on October 9—11, 1918, had made a declaration with regard to enemy nations in this connection, and the ultimate entry of the Central Powers into the organisation would seem to be postponed indefinitely or at least until a new generation assumed the administration of scientific affairs. The possibility of the admission of neutral nations into such a confederation had led to much discussion, and presented difficulties, and the whole question called for free and candid discussion and the earnest attention of the International Research Council.

Discussing a few of the advantages to be derived from co-operation, he said that in chemistry there existed the utmost need for the publication of compendia in which were abstracted within a moderate compass all the essentials concerning any branch of our knowledge. If it were possible, whenever information was desired on the state of knowledge concerning any chemical subject, to turn to a book of reference with the certainty of finding all the necessary particulars recorded, it was obvious that the velocity of increase of chemical knowledge would be very greatly accelerated. Beilstein attempted to provide such a compendium of the preparative side of organic chemistry, and the invaluable character of his handbook led to its ultimate acquirement by the German Chemical Society. Friedlander's compilation and annotation of patents bearing on the coal-tar colour industry in part also filled a gap. The great fields of physical, inorganic, and technical chemistry had not yet been summarised and indexed with similar completeness. The establishment of an organisation for the compilation and publication of compendia covering the whole field of chemical knowledge naturally fell to an inter-Allied chemical federation. It was a huge task, and would call for the co-operative expenditure of vast amounts of effort and money. It was impossible to doubt, however, that its achievement would repay its cost manyfold in the stimulus which would result to chemical discovery.

Regarding the publication of abstracts of chemical literature, Professor Pope said that an Inter-Allied Chemical Council would not encounter great difficulty in selecting all the papers of permanent value which have been published hitherto and presenting them for fresh publication in a new journal. These essential contributions might be published in chronological order with cross-references. Such a publication should furnish a powerful stimulus to original work not only by placing all the past technical literature of permanent value in the hands of the chemist of moderate means, but by setting a standard for attainment which could not fail to raise the general level of original chemical research. If an organisation for the production of abstracts were in existence, together with an efficient system of indexing, the production of a compendium of knowledge on any branch of chemistry would involve little more than a condensed transcription from the index. The question of the language in which these abstracts should be printed might present some difficulty, but he thought the needs would be met if the simultaneous publication of collective chemical works in French and English was made.

Dr. Washburn said that before the war we were content to a large degree to depend upon Germany for the compilation of compendia of scientific literature. Since the war we had appreciated one of the great dangers of permitting Germany to undertake this great field of chemical effort, for it had been used as propaganda, in as much as the world had come to believe in many quarters that because of the voluminous nature of this chemical literature, chemistry was a German science. We appreciated now the necessity for taking over this important part of chemical work and carrying it out ourselves. It seemed to them in America that the most practical way of carrying out the bibliographic work which they had under consideration was not to attempt to finance and direct it from one central authority, such as an inter-Allied chemical union, but rather for the union to let out the field in regard to the different branches and to assign the

responsibility, financial and otherwise, for each of the undertakings to the different nations gathered together in the organisation. In carrying out the work each nation would make use of chemists and investigators wherever they might be in the world who were best qualified to deal with the different sections of the work undertaken.

Professor H. E. Armstrong, F.R.S., said he thought such a system as that indicated by Dr. Washburn would have greater advantages than he had suggested, both from the point of view of time and expense, if we only had the will to come together and work together.

Dr. Wynne thought we should have to recognise that the model which the German Chemical Society had put forward had been found to be the most convenient for the purpose of reference, and that was what was required in a compendia. It was essential to be able to find out whether the substance which was being investigated had already been investigated or whether they were dealing with a new substance. There was a great gap to be bridged, and unless we could produce some of these volumes quickly we should have to rely on German compendia once again.

Dr. T. M. Lowry said there was need for information as to stocks of uncommon chemical materials which would prevent many a research which at present had to be carried out for want of knowledge as to whether stocks were held or not.

Professor Armstrong said that matter was under consideration at the moment by the Federal Council.

A hearty vote of thanks was accorded Sir William Pope.

"SIR WILLIAM RAMSAY."

Professor C. Moureu (president of the Inter-Allied Council of Federations for Pure and Applied Chemistry), then gave a long lecture in French on "Sir William Ramsay," at the conclusion of which he was accorded a hearty vote of thanks.

CHEMICAL ENGINEERING GROUP.

On Wednesday, the Chemical Engineering Group held its first annual conference, as part of the annual meeting, at the Salter's Hall. The conference continued throughout the day, and Professor Louis, Dr. M. O. Forster, and Dr. Charles Carpenter took the chair at various times during the proceedings.

Professor Henry Louis, who opened the conference, said he hoped that the energy and activity with which the newly formed group was attacking its duties would galvanise some of the more lethargic, older, and staid sections into activities which they all hoped to see. The work of the conference came at a psychological moment, in that it dealt directly or indirectly with fuel economy, and all engineers were keenly alive to the importance of exercising the utmost economy in the use of fuel, both from the commercial and technical points of view. It had been said that coal in the past had been too cheap, and that we had not treated it with the respect it deserved; but he did not think that reproach would be uttered any more in the future. Not only were we faced with a great increase in the price of coal, which was not an unmixed evil, but we were face to face with a very serious diminution in the output, and that, on the contrary, was a matter of the utmost gravity. It was only quite recently that the public had been rudely awakened to the fact that our coal output was falling off, and what had happened was a vindication of the views expressed by many people when the Minimum Wage Act was introduced, for with every successive increase in the minimum wage there had been a corresponding diminution in output. The coal industry was the only one, he believed, which had a minimum wage definitely fixed, and it was the only one in which the output per man was steadily falling. He personally was convinced that our low output of coal was due to the high minimum wage, and whilst the position that whether a man liked to work or not existed, we should necessarily be faced with low production. It was, however, their duty to make the best of the conditions as they existed, and that be the output large or small, it was utilised to the best advantage. He therefore looked upon the work of the conference as of importance not only to the chemical industry, but to the nation at large.

M. Paul Kestner, president of the Société de Chimie Industrielle, also spoke in support of the president as to the value of the work before the Chemical Engineering Group, and recalled that it was in this country that he had always received more encouragement and support for his inventions than he had received in any other country.

The following paper was then read by Captain C. J. Goodwin:—

"WASTE-HEAT BOILERS AND PULVERISED FUEL IN CHEMICAL FACTORIES."

In introducing the paper, the author said that they had only to remember that many prominent members of the gas industry belonged to the Society, and to look at their work, to know that the gas industry would do its full share as regards economy in fuel utilisation; but could they say the same of the chemical industry generally, or of the rest of the chemical industry? It was a debatable point whether chemical factories before the war were using their fuel in such a way that, after allowing for all charges, and bearing in mind the total amount of plant and capital involved, the cost was the lowest possible in relation to output. In the past chemical factories had not done their best so much in the national interests as in their own individual interests, but he thought that in the future they would be judged by what they did in the national interest. Referring to the use of powdered fuel, he said that 11,000,000 tons were being burned annually in America, and it had to be taken into account as a serious factor in our coal situation.

The author divided his paper into two parts—the first dealing with waste-heat boilers, and the second with pulverised fuel. Whilst the waste heat of factory chimneys is often partly recovered in Green or other economisers, and for puddling and other metallurgical furnaces waste-heat boilers are being increasingly adopted, the heat from the exhausts of internal-combustion engines is frequently allowed to go to waste. In chemical factories the gases from lime kilns, fusion pots, roasting, reverberatory, and other furnaces is but rarely used. The gasworks and coke ovens are probably the principal users of fuel in the chemical industries, and the author records his surprise that so little has been done in the past to utilise fully the available heat in suitable cases. In gasworks coke is no longer a drug on the market, and steam is required for producers and various purposes. In these and in coke-oven plant working regeneratively the objection may be raised that if any more heat is taken out of the gases their temperature would be insufficient to maintain a proper draught. Induced draught, however, would overcome this objection, and, given suitable conditions for utilising the steam, waste-heat boilers should be quite remunerative after allowing for the power required to drive the fans. An illustration is given of a waste-heat boiler designed by the Bonecourt Waste Heat Boiler Company, Ltd., and ordered as a trial installation for a standard set of continuous vertical retorts working under natural draught. By the adjustment of the dampers the volume of gas passing through the boiler can be adjusted to correspond with working requirements. The gases enter the boiler at 700° C., and are purposely designed to leave it at 300° C., in order to leave sufficient draught in the chimney. A better utilisation of the gases would be possible by using induced draught. A boiler working with the waste gases from a single retort setting will give 500lb. of steam per hour at 100lb. pressure, so that a gasworks comprising, say, 60 retorts could raise 7,500lb. of steam per hour from and at 100° C., in return for a capital outlay of about £4,000., and with relatively small operating costs. When the enormous number of gas retorts, coke-ovens, and also future low-temperature distillation plants, are considered, it is evident, says the author, that waste-heat boilers should be increasingly adopted in such works, and in connection with the utilisation of the sensible heat in gases produced by the super-power stations and by-product works of the future. In chemical processes high steam pressure is the exception, and in many factories quantities of hot water are required or can be efficiently utilised. Waste-heat boilers are therefore particularly suitable for chemical factories.

Dealing with the combustion of pulverised fuel, the author states that this partakes more, perhaps, of the nature of chemical engineering than the subject of waste-heat boilers, and considerable data, together with some general considerations, are given. A special report on the subject was recently issued by the Fuel Research Board, in which the large amount of work done in America in connection with pulverised fuel is detailed as the result of a special visit by Mr. L. C. Harvey. [An experimental plant is now being erected in this country at the works of Sir William Beardmore and Co., Glasgow, and the results will be published as soon as available.—Ed., C.T.J.]

Dr. W. R. Ormandy said that whilst it was true that in the past and at the present time a great deal of fuel was being used uneconomically, there was at the same time

no possible prospect of being able to use it more economically. It was stated, for instance, that the efficiency of a glass-melting furnace was something of the order of 2 per cent., and that a very large proportion of the heat was radiated through the brickwork of the furnace; but if any attempt were made to stop that, the inevitable consequence would be the utter failure of the brickwork. Thus, although much was said about the waste of fuel, there was in many instances no immediate prospect of effecting a saving. It required careful examination to find out at what point it was worth while putting in induced draught; but if it made possible the use of fuel such as roofing shale, containing only 55 per cent. of combustible material, which it would be utterly impossible to use with the ordinary type of stoker, then the question should be seriously considered. There was at present very little experience in the use of powdered fuel, and it seemed to him that more information was required as to the type of fuel to be used.

Mr. L. C. Harvey said that having made an investigation of the use of powdered fuel in America last year, he was very much struck by the possibilities. The difficulties with the old types of pulverisers had now been overcome, and boilers fired with pulverised fuel were giving efficiencies of 75 to 85 per cent., the fuel being such as was not previously usable. Sir Auckland Geddes recently referred to the loss of 7d. per ton of coal delivered in London due to the loss of smalls. That was material suitable for pulverisation, and, generally speaking, there was a large quantity of small coal—almost dirt—left at the mines which could be used in this way. In the United States they were using the lowest class of anthracite washings, containing 5 per cent. of volatile matter and 30 per cent. of ash. We had been told that 18 million tons of coal were used in the mines annually, and that six million tons were distributed to the miners. He did not believe the latter could burn such a large quantity. However, the scope for economy in coal-mining plants was seen in the fact that he knew of one Lancashire boiler installation at a mine where only 3lb. of water were evaporated per pound of fuel. The objection often taken to installing pulverised fuel plant was that plant working on this system could not be seen in this country, notwithstanding that he had shown in many cases that considerable savings would be effected by its use. One of the deterrents to the use of pulverised fuel was the initial cost of the plant for pulverising, but that would soon be got over, because pulverised coal would probably soon be available to small consumers, and that would obviate the necessity for installing their own pulverising plant. The present position with regard to the price of coal made the use of pulverised fuel a very attractive proposition.

Captain F. S. Sinnatt said pulverised fuel ought to have a very great future. In Lancashire to-day material suitable for the purpose was being wasted every day. In one case practically the whole field was covered with cannel coal of an inferior quality, the quantity of ash being anything from 20 to 60 per cent. An attempt was made to use it during the war for low-temperature distillation, but it was not a complete success. On the other hand, although this material was very hard to break, it was extraordinarily easy to grind, and that brought him to his next point—viz., that a great deal more study was needed of the chemical characteristics of our coals. It was a curious fact that soft coal was extremely difficult to grind to the degree required for pulverisation, and that was a chemical problem which required study.

Mr. H. M. Ridge said that the use of waste-heat boilers must not be assumed to be a panacea for all evils. He was of the opinion that the best economy was obtained by restricting the heating use to the primary object which was desired. By using an excessive quantity of coal in a puddling furnace, by which an excessive quantity of waste gaseous products was produced, and then putting in a waste-heat boiler to recover the heat units in these products was not a primary object. They wanted to make the puddling furnace more efficient, and should not try to make steam in more than one operation if it could be helped. The waste-steam boiler was one way out of the difficulty, but it was a poor way, if something else could be done. In a case he had had to deal with, in which the operation necessitated the waste gases leaving the furnace at about 300° or 400° C., he had made arrangements, and reduced the fuel consumption, so that the temperature of the stack gases was about 250°, and he could not have obtained the same financial results by passing the hot gases in the first place into waste-heat boilers. That could be done either by preheating the secondary air or actually reducing the temperature. It was preferable to preheat the secondary air, and he had done the same thing in a number of installations

working on a comparatively small scale, and obtained a good efficiency. In one such case, using only a few tons of coal per 24 hours, the waste gases left the furnace at about 1,000° or 1,100°, and by preheating the secondary air to between 600° and 850° the reduction in the coal consumption was more than 50 per cent.

Captain Goodwin, replying to the discussion, said that whilst he did not argue that chemical factories should not look to the primary efficiency of their furnaces, what Mr. Ridge had suggested was not applicable in all cases. With regard to induced draught, mentioned by Dr. Ormandy in connection with the use of powdered coal, he would like to point out that in a powdered-coal furnace, if they got a decently designed waste-heat boiler, they did not require much extra draught in order to take the gases through, and he submitted that in order to get that small draught they did not require anything like the amount of power for the fans which Dr. Ormandy seemed to think was necessary. He agreed with nearly everything that Mr. Harvey had said. The fact that such high efficiencies as 75 to 85 per cent. could be obtained with furnaces using pulverised fuel was of very great importance. Mechanical stokers were really only efficient when working at their normal steaming rate, and there was nearly always difficulty when they were tried on any considerable overload. There ought to be some organisation which would collect the dust and smalls referred to by Mr. Harvey, and concentrate them at some central point in every large town.

A hearty vote of thanks was accorded the author at the conclusion of the discussion.

The following paper was then read by Mr. J. L. Hodgson:—

"DIFFERENTIAL PRESSURE METERS FOR MEASURING AIR, GAS, AND STEAM FLOWS."

This paper contains a summary of the more interesting features of the metering problems mentioned in the title. The differential pressure required to actuate the indicating or recording devices is obtained in the meters for which the author is responsible, either by means of a constriction placed in the pipe line, or by means of a special form of Pitot tube consisting of a cylindrical rod, at one end of which two pressure holes are bored, the one facing exactly upstream, and the other exactly downstream. These pressure holes are connected by means of suitable passages and pressure pipes to the indicator or recorder. The Pitot tube is inserted in the main so that the pressure holes are at the centre of the main.

From the point of view of the indicating or recording instrument, the Pitot tube has, in spite of its simplicity, two important defects: (a) On account of the low velocities found in air and gas mains, the differential pressure produced is usually very small; (b) owing to the fact that the maximum differential pressure produced depends on the maximum velocity in the pipe line, and that this varies in practice between very wide limits—e.g., 15ft. per second in a gas main to 300ft. per second in a main carrying superheated steam,—the indicating and recording instruments would, if the Pitot tube were used as the basis of the measurements, have to be designed to deal with the numerous maximum "heads" from the next minute upwards, or else the diameter of the pipe line would have to be altered at the point where the Pitot tube was inserted in order to obtain a reasonable uniformity in the maximum heads dealt with.

Because of these defects, the author has developed only one instrument for use with the Pitot tube; the differential pressure in all other cases being obtained by means of constrictions placed in the pipe line, which can be designed to give the differential pressure required by the instruments over a very large range of maximum velocities.

In addition to the above defects, the Pitot tube is much more dependent upon good upstream conditions than a constriction is.

The instrument developed for use with the Pitot tube is termed the curved tube manometer. It consists of a reservoir containing oil which is connected to the upstream pressure hole, and a curved tube so shaped that equal increments in the velocity past the Pitot tip will cause equal movements of the oil meniscus along its length, which is connected to the downstream pressure hole. The manometer is so designed that it can be supplied to work at any maximum head between 15 and 120mm. of oil. Owing to the equal-spacing scale, accurate readings can be taken down to 1/9th or 1/10th of the maximum flow.

A larger type of the same instrument is now being developed in connection with high-pressure gas distribution, which will

enable accurate readings to be taken down to 1/20th of the maximum flow.

The Chairman (Dr. M. O. Forster) said there was plenty of scope for discussion on this paper, but in justice to the next author, Dr. Bone, he would ask that those who desired to discuss it would send in their contributions in writing.

A vote of thanks was accorded Mr. Hodgson for his paper.

A paper by Professor W. A. Bone and Mr. P. St. G. Kirke was communicated by the former.

"RECENT DEVELOPMENTS IN SURFACE COMBUSTION-BOILERS."

Professor Bone said he proposed to give a review of the development of a subject in which personally he was a good deal interested, but which had been mainly worked at during the last two or three years by Mr. Kirke. He proposed first to review the investigation as a whole, and then to mention some developments which had taken place since the Bonecourt system of surface combustion was first introduced.

He explained the characteristics of the Bonecourt system whereby an explosive gaseous mixture is forced on to an incandescent solid. As is now well known, the early experiments and practical application of the system used tubes 3ft. long and 3in. diameter packed with a loose granular material. The first experimental boiler was made up of ten such tubes fixed horizontally in a cylindrical steel shell, and it gave an efficiency of 94.3 per cent. In 1911 a much larger plant was erected at the Skinningrove Ironworks, the boiler being 4ft. long and 10ft. diameter, and containing 110 tubes. Two of these were ultimately put up, and they worked in conjunction with a feed-water heater. In July, 1912, these boilers, unlagged, gave an efficiency of 92.7 per cent. Certain difficulties were met with in this plant, but no trouble was experienced with the evaporating portion nor with the gas-feeding arrangements.

Dealing with the later modifications, Professor Bone pointed out that these had taken the form of lengthening the tubes, and first increasing and afterwards reducing again their size, and filling them by another form of refractory material. The latter had been adopted on account of objections which had been taken to the loose type of packing originally introduced, and which required renewal once a year, and, moreover, required to be very carefully packed. Consequently a rigid system of packing was introduced, consisting of moulded blocks placed at varying angles. The tubes were made 6in. in diameter instead of 3in. By the use of this form of packing they were able to use producer gas without any inconvenience, because with a closely packed tube such as that used originally it was impossible to pass a tar-laden gas through without clogging the packing. In this form the boilers could be used with producer gas or ammonia-recovery plants. The use of this rigid system of packing also had the effect of reducing the temperature of the packing in the front part of the boiler to about 850°. Two boilers fitted with these improvements had been put down in the Birmingham district in 1914 for generating steam from coke-oven producers, and had been working continuously ever since. These boilers were 10ft. diameter by 12ft. long, and contained each 38 tubes of 6in. diameter. With this rigid system of packing each tube was provided with its own gas supply, and although these two boilers had been running over five years none of the tubes had had to be renewed. The only criticism of the boiler was that they did not consider the separate supply of gas to each tube could be regarded as finality, and, further, that it would be an advantage if the tubes could be made of smaller diameter and of longer length, in order to increase the heating surface of the boiler. It was in one sense an advantage to have a separate gas supply to each tube, if the boiler was subject to variations in load. With a constant load, however, there was an advantage in dispensing altogether with the separate control, and a system had been devised for doing that. That consisted of a chamber through which the gas was supplied, which was controlled by a valve, and a perfect mixture for combustion could be maintained in the boiler tubes by adjusting the speed of the fan to the pressure so that the boiler could be fed at any desired load.

Another modification was that by the addition of a superheater the system could be made applicable to large power plants, which was impossible in the early stage of development. Experiments had been made, and results had been obtained which showed that with a boiler working at 100lb. pressure per square inch, the steam could be superheated to a tempera-

ture of 192° F., or a total temperature of 533° F., while at the same time the temperature of the products leaving the system were reduced to 442° F. Superheats of 340° were obtained on other experiments.

Further experiments had also been made with tubes of 3in. diameter and smaller, and of longer length, and a new form of iron spiral packing had been introduced with tubes of 2in. diameter. A Lancashire type of boiler had been constructed, 6ft. by 18ft., and containing 2in. tubes, fitted with superheater and feed-water heater, and using the spiral packing, the boiler being controlled by one valve for the gas supply to all the tubes. The efficiency of this was about the same as that of the original Skinningrove boiler.

The intention was, said Professor Bone, to build three types of boiler according to the circumstances in which they were to be used, the three types being the short boiler with loose packing and the other sizes of boiler and tubes with the two systems of solid packing referred to. The Skinningrove boiler, from the technical point of view, was quite good, but it was more costly to make for a given steam output than the later types, and, while he did not anticipate that users would wish to put in the more expensive type, if, for reasons of space, the short type of boiler was desired, they would be prepared to instal them and guarantee their successful operation and their high efficiency.

The paper was discussed in the afternoon, when Dr. Charles Carpenter presided.

Mr. H. J. Ping, of Hans Renold, Limited, said that he put down a Bonecourt boiler three years ago filled with solid spiral packing, and it had given great satisfaction, in addition to having many advantages in regard to coal supply, ash collection, space, and so on.

Dr. W. R. Ormandy asked what were the limits of the poor-ness of the gas which could be employed, and had it answered to use preheated air when using gas of a very low calorific value—say, 100B.Th.U.? He also asked whether the overall efficiency of a boiler run on producer gas would show any advantage over a direct-fired boiler run economically, unless the producer was able to use a low-grade fuel which could not be employed upon modern mechanical stokers. It was that aspect of affairs which was largely going to settle whether it would pay to instal this type of boiler.

Dr. Bone, in reply to Dr. Ormandy's question as to whether gases of low calorific value could be used, said he had already explained that he was working with ammonia-recovery plants, the gas being about 140B.Th.U. Possibly Dr. Ormandy referred to low-grade blast-furnace gas. Very soon after the earliest experiments he made some experiments at the Skinningrove works with boiler tubes on blast-furnace gas, and found that he could not get the surfaces to glow sufficiently by feeding in that gas with the proper proportion of air. He afterwards started the tubes with a little coke-oven gas in order to get the material in the tube to a sufficient state of glow, and then turned on the gas and air mixture. Then the tubes worked quite satisfactorily. As to the question of putting down a boiler for blast-furnace gas in preference to a steam-generating plant, he would be quite frank and say that the blast-furnace gas would have to be cleaned before it could be used in any form of this boiler, and if the gas had to be cleaned he thought they would get greater efficiency by putting it straight into an internal combustion engine than into any boiler system. There might, however, be cases where the employment of internal combustion engines and blast-furnace gas would not be desirable, and in that case he thought there would be no difficulty if the gas was cleaned—say, by the electrostatic method—of using it on the same lines as they used producer gas.

The Chairman, in proposing a vote of thanks to the authors, said they had proved that if they wanted to convert heat into steam it could be done economically by the method they proposed, always assuming that the source of heat—viz., gas—could be supplied under economical conditions. One of the advantages of the boiler was that it could be switched in or cut very much like a motor. It had been suggested that unless there was an independent supply of gas, and if the boiler had to be incorporated with the unit for generating gas, they were face to face with stand-by losses; but the most that could be said with regard to that was that the stand-by losses of a producer would not be anything like the stand-by losses in the case of an internally or Babcock fired boiler. In other words, they had a very much greater control over the production of gas in a producer than was possible in handling the dampers of the ordinary form of boiler.

The next paper was by Mr. P. Parrish on:—

"A MODERN CHEMICAL WORKS POWER PLANT."

The author of this paper is in charge of a chemical works operating in conjunction with a gasworks (the South Metropolitan), and consequently large quantities of coke are available, which, after grading and screening, leave a large supply of coke breeze. At one time the disposal of this latter was a matter of some difficulty, but the progressively increasing price of fuel of late years has compelled attention to its disposal. The major portion of the prime mover at the works under review is required in connection with plant for (1) disengaging ammonia from ammoniacal liquor, which is treated in continuous column stills, the gaseous ammonia being absorbed in such a way as to produce liquor ammonia, ammonium sulphate, sulphite, chloride, and polysulphide; (2) providing the formation of sulphuric acid in the chamber process. Approximately 1,000 tons of gas liquor are treated per day, and about 75 tons of chamber acid are made per day. Other chemical processes are conducted, but those named are the most important.

Whilst the production of steam, which offers the only choice for disengaging ammonia from ammoniacal liquor, from low-grade fuel is not a new one, it can hardly be said that finality in the matter of efficiency has been reached. Coke breeze is a very indefinite term, and according to a table in the paper the ash and moisture contents of that which the author has to deal with vary considerably. Crosthwaite furnaces are used for the combustion of this material, which, in common with most other furnaces of a like character, consist of a series of cast-iron air tubes, built up of sections. Each section is provided with serrations, or is so arranged that a section forms a series of perforations with abutting sections. A blank end section is provided with each furnace, so that the air for combustion of the fuel passes through the several serrations or perforations formed by the various sections when assembled. The air for combustion is delivered through the air tubes under pressure, and is induced by the passage of steam usually at boiler pressure through suitable jets or nozzles. In the case of the Crosthwaite furnace these nozzles have an orifice $\frac{3}{8}$ in. in diameter. Recent improvements in the design of the furnace appear to have been directed to the number and size of the holes for the admission of the primary air, with minimum dust percolation, to the blast pressure, as well as to the provision of a secondary supply of air, these factors tending to a greater uniformity in the distribution and utilisation of the air.

The paper discussed some practical points arising in the working of these furnaces, and among other details called attention to the fact that the grate as occasionally installed by the forced-draught specialists is too long to admit of maximum thermal efficiency. By reducing the length of the grate by about 20 per cent., the temperature of the waste gases was reduced by 310°C. to 240°C. , a lesser quantity of fuel was consumed, the capacity of the boilers was unimpaired, and the chimney draught was not prejudicially affected.

Attention is also called to the lack of any attempt in a chemical works with sulphuric acid and sulphate of ammonia plants to utilise the exhaust steam, and, further, the several pumps and small power units are usually scattered and situated in the midst of operations which are far from clean. The author strongly favours centralisation of power plant.

Mr. J. H. West said he had had experience six years ago of burning coke breeze under a battery of six Lancashire boilers in a chemical works, and he was able to make comparative tests with another plant of four Lancashire boilers burning bitumen slack through underfeed stokers. The two works were making the same products, and he could confirm all that the author had said as regards the figures of cost. The cost of the coke breeze delivered alongside was 6s. 3d., whilst the coal in the other works cost 13s. 3d. For the production of a ton of steam the fuel cost in the case of breeze was 13d., whilst in the case of coal it was 20.5d.; the respective labour costs being 8d. and 6d. The great difficulty in the use of breeze was the choking of the side flues, the dust very often being 2ft. thick. He adopted the system of cleaning out one fire at a time on each boiler, and that meant there was always a fire door open. He had tried to reduce the primary air, but that was apt to result not only in incomplete combustion, but it gave the risk of unburnt carbon monoxide passing into the main flue and causing explosions. The difficulty was got over by increasing the primary air to a proper figure. These explosions were particularly liable to happen if any of the fires were banked owing to a temporary decrease in the demand for steam, as carbon monoxide was then apt to be

formed. In such cases he left the fire doors a little bit open. It was, of course, in favour of coke breeze that it was cheap, and not so long ago was difficult to get rid of. Some of them had been on a good thing, but he had no doubt that if the gas companies found there was a new use for it they would put up the price. Finally, he mentioned that boilers burning breeze could not be forced to any extent if there was an emergency demand for steam; it was very difficult to get more out of them, and if they did it was at the expense of the efficiency.

The Chairman said he imagined that the speaker's last remarks referred to the use of breeze in a Lancashire boiler. If so, he agreed with what he had said, because he had always regarded it as a barbarous practice to raise steam in that way. It was one of the worst forms of furnace they could have. Using the Babcock or Stirling type of boiler, however, such as was commonly used in power stations, it had been found that a breeze containing a certain proportion of larger coke gave results as regards output from the boiler very nearly equal to those obtained when using coal.

Mr. H. M. Ridge said that if the author had been using excess of steam for blowing in the primary air—and he was not at all clear that that was the case,—it was a most undesirable thing, because not only did it give too much cooling, but with coke breeze a considerable proportion of water vapour which was not decomposed would pass through the incandescent coke, so that he would be losing heat at every stage. He was afraid that he was unable to agree with the author's limit to which it was essential to reduce the gas velocity in mechanical burners. That depended to a very great extent on the detailed design, and working with a much finer material than pyrites fines—90 per cent. to go through a 40 mesh—it was possible to use a higher gas velocity without having an appreciable quantity of dust carried forward.

Dr. W. R. Ormandy asked whether the experiments were carried out on a Lancashire boiler. He presumed they were, because the author spoke of the difficulty, in using coke, of the deadness with which it lay on the fire grates. That pointed to the requirement of some form of moving bar, and he believed a fire grate had been made—he had not seen a description of it published yet—of the moving-bar type as employed generally in the Babcock boiler, and working with forced draught. He would like to know whether with vertical gas retorts of the Glover-West type, in which steaming was employed, the water-gas manufacture which took place in the lower or hot portion of the layer of coke, led to the separation of ash, particularly on the outside of the coke particles; and did it result in the removal of a very considerable proportion of the ash. With regard to the utilisation of jets, it was essential to have a standard plug to test the size of the holes, because they very rapidly enlarged.

The Chairman, speaking with regard to the explosions in the flues, said that arose from the fact that as the fire was banked there was a thick body of fuel, and the small body of air coming through was converted into carbon monoxide, and if there was not an adequate supply of secondary air an explosion generally occurred when the fire was opened.

Mr. Parrish, replying to the discussion, said he was quite certain that if the primary air was reduced, the incombustible matter must of necessity increase, and there must obviously be an explosive mixture. With regard to the point raised by Mr. Ridge, he could only assume that he had had no experience of the combustion of breeze in Lancashire boilers with forced-draught furnaces, or he would not have suggested that too much steam was being used. They could not burn breeze unless steam was used. It was impossible to burn breeze without a primary supply of a certain pressure, and the only way to get that was by using a certain quantity of steam. Mr. Ridge also raised the question of gas velocity in relation to mechanical burners, and suggested that his experience would lead him to believe that there was no necessity to reduce the velocity of the gas. He himself had had an experience of some twenty years in connection with all types, and his figure of 4 lineal feet per second applied not only to Norwegian pyrites fines, but also to Spanish pyrites fines, and it was necessary to have such a velocity if they were going to eliminate the last traces of dust to get a perfectly satisfactory Glover tower acid. In reply to Dr. Ormandy, the experiments were made on a Lancashire boiler. As to the suggestion of a moving grate, he had had the opportunity of inspecting an installation in which a moving grate was adopted for the combustion of coke breeze, and where induced draught under a pressure of about $\frac{1}{2}$ in. was used. The manager of that installation was perfectly frank,

and put the whole of his figures on the table, and he himself did the same, and he found that he himself was doing the better of the two. He had had no experience of whether steaming fuel in Glover-West retorts led to the separation of ash on the coke particles, but he should imagine that it did. As to jets, also mentioned by Dr. Ormandy, he had found that after twelve months the enlargement was very small; it all depended upon the material they were made of. His personal view about the scientific combustion of this material was that it should be burned outside Lancashire boilers in a type of producer involving three conditions—a modified type of step grate was required; the producer must be arranged in such a way that there was preheating of the low-grade fuel, which was essential; and the step grate should be such that the clinker could be removed almost automatically. If they could get preheating of the low-grade fuel, and fairly regular removal of the clinker, he was certain that this material could be used to advantage, and even much more economically than the figures furnished in the paper.

The Chairman, in expressing the thanks of the conference to the author, said he would be the last to suggest that he had put forward a scientific process, but he had described an economical method of raising steam, arising from the fact that the fuel he had was very low in price. He had really summed up the whole question in his last words, when he said that the breeze really should not be burned under a Lancashire boiler at all. It should be gasified externally by a producer properly designed for the purpose, and then lead the gas into a boiler of some such type as that described by Professor Bone. That was a subject which might occupy the brains of some of our young designers. A great deal of this low-grade fuel was produced all over the country in increasing quantities, because the coke which it was now more or less the fashion to produce was much more friable than the harder coke produced in the old-fashioned retort setting. He had always thought there was scope for a producer which would burn breeze; there certainly was increasing use for one to-day. With regard to the question of ash raised by Dr. Ormandy, he would like to say that the lower part of the vertical retort was very low in temperature. It was made of cast iron, and he could not imagine that there would be any difference in the ash content of the coke at its edge or extremity than there was in the middle. He imagined that the coke had been fairly broken down by the time it got to the lower part of the retort, otherwise he did not think the results would have been achieved, at any rate as regards ammonia production, that had been returned from time to time in the Press.

A paper by Mr. H. Martin on "Electrical Supply in a Chemical Works" was taken as read, in the absence of the author, to whom a vote of thanks was accorded.

Professor J. W. Hinchley then gave his paper on:—

"THE OPERATION OF A CHEMICAL WORKS POWER PLANT."

It is easy to add accessories to boiler plant and make definite savings, and from a national point of view these are justified by a bare return, but in many cases it is possible, without any addition to the plant, to save the whole of the wages of the stokers by reasoning educational talk and by giving them a material benefit from their more efficient work.

The systematic chemical and physical examination of the fuel and the flue gases, the latter at different periods in the operation of the boilers, is not a difficult routine matter to establish even in a small chemical works; but unless the results are made intelligible and discussed between the stoker and the chemist no real improvement may be expected.

In all cases the stoker should be warned of the effect of leaky brickwork. The handling of the fire-door, the adjustment of the air supply above the fuel bed, and the closing of the door after firing, are matters upon which the chemist can guide the stoker with the authority of his analyses.

The problem is essentially one relating to "combustion" and "heat transmission." The former is best dealt with by the chemist in the manner mentioned, but the latter calls for careful measurement of coal, water, draught, temperature, etc., in more detail than the factory records usually give. The weighing of the coal used daily and the measurement of the feed water can usually be accomplished without difficulty.

The effect of heat transmission on the efficiency of boilers is of paramount importance, but the possible enormous variation of the rate of heat transmission is still hardly appreciated.

The outstanding importance of the heat transmission by radiation from the fuel bed should be insisted on. The stoker in firing should destroy as little as possible of the area of the

incandescent fuel bed. The length and shape of the firebrick bridge may be increased with advantage both to combustion and heat transmission.

The improvement of heat transmission on the fire side by increasing the velocity of the hot gases is usually not possible with the type of plant we are considering, although the reward is most attractive. The importance of the heat transmission on the water side of the boiler plate has not been adequately recognised in the past. The supply of fuel and water to the boiler should be made as continuous as possible to obtain the best conditions of heat transmission.

The formation of scale in the boiler during work has a most serious effect on heat transmission, and may reduce the capacity just before the cleaning period and occasion loss. The use of substances to prevent the formation of adhesive scale is generally advisable even with softened water. One of the latest of these materials, graphite, if used in the highest purity (85 per cent. carbon), is extremely effective. The general rule of the good stoker is to keep his fire in constant adjustment to the steam demand, maintaining it in such a condition at the lowest periods, so that by fully opening the damper he can obtain, in a few minutes, the maximum rate of combustion on the fire grate. At times of low demand the water level and steam pressure should be kept at their highest points, with the feed-pump working at its lowest rate. An increased demand for steam is shown by a drop in pressure and a fall in the water gauge. The opening of the damper and acceleration of combustion speedily equalise matters, and when the pressure ceases falling the feed-pump is accelerated to maintain the water level. A rise of pressure, on the other hand, would demand the closing of the damper somewhat, followed after a few minutes by a reduction of the speed of the feed-pump. Should the demand for steam over a period be such that, in spite of maximum combustion, the pressure falls too low for adequate service, some alteration or addition to the plant becomes essential. The grate may be increased in area (generally with reduction in efficiency), or a heat accumulator or a new boiler may be installed. On the other hand, the particular plant taking the sudden large supply of steam may be controlled to reduce its rate of working for the period of heavy steaming, without any loss.

A continuous feeding pump capable of continuous adjustment is essential to economy. As a rule, injectors should be removed. For boiler feeding they are inefficient through being intermittent.

The Chairman said that whatever might be the disadvantages of the present industrial conditions, we had got something on the other side—viz., much more intelligent workmen than we had 25 years ago. If a man who used to work twelve hours a day firing a boiler would now only work eight hours, there was a great possibility that a great deal of that extra expense might be recovered by getting him to do that eight-hour shift much more intelligently than was the case in days gone by.

A vote of thanks was accorded to Professor Hinchley.

The Chairman, in bringing the conference to a close, said he was sure that all those who were engaged in the chemical trade recognised the increasing importance of chemical engineering. He hoped the Group would be able to bring together those whose practice was mainly engineering and those whose practice was mainly chemical. That had been done very successfully in Germany, and there was no doubt that the position which the German chemical industry was in to-day, and was in before the war, was due very largely to the completeness of the collaboration between the chemist and the engineer. That was a work which the Chemical Engineering Group had set out to perform in this country, and he was glad that they had not fallen into the temptation to form a separate society from the mother society. In that they had shown foresight and statesmanship. The formation of the Group opened up great possibilities with regard to other branches of the chemical industry to form groups under the same flag. That would be of advantage in other ways, and in that respect the thanks of all those engaged in the chemical industry were due to the Chemical Engineering Group for the bold step they had taken, for the persistence with which they stuck to their point in face of a great deal of opposition, and, finally, for the success which had attained their first effort in the direction of the conference.

Professor Hinchley (Chairman of the Group), in proposing a hearty vote of thanks to Dr. Carpenter, said they all appreciated the encouragement which he had given to the movement from the beginning.

[A report of the further proceedings of the annual meeting will appear in our next issue. Ed., C.T.J.]

HIGH TEMPERATURE MEASUREMENTS IN THE PAINT AND VARNISH INDUSTRIES.

BEFORE the Oil and Colour Chemists' Association on July 10, Mr. R. S. Whipple read a paper on "High Temperature Measurement," in which he briefly reviewed various instruments which are in general use for the measurement of temperature, and gave the following summary of the practical conclusions.

In the laboratory, he said, nothing could exceed the convenience of the mercury-in-glass thermometer for temperatures up to 300 or even 400° C., but in the works it was an entirely different problem; the inconvenience of reading a thermometer, especially when in the hands of an unskilled workman, the risk of breakage, and the general inconvenience had to be considered. For temperatures up to 300° C., there was no more generally convenient thermometer than the mercury-in-steel, and he ventured to think there were great possibilities in front of this thermometer. It was impossible to place the unprotected steel tube in many of the pan mixtures, but if the stem was protected by means of lead covering—which could be done without difficulty,—then the instrument became an efficient and convenient tool. The dial part of the thermometer must naturally be made steam-tight in order that the moving parts might not be affected by moisture condensed in the interior of the instrument. As comparatively long capillaries might be used with these instruments, there was no difficulty in fixing the bulb into a vat, and the reading part of the instrument could be placed several feet away from it. The instrument could be placed in a position which was convenient for the man in charge of the operation.

In many processes, such as the manufacture of varnishes and in the preliminary preparation of linseed and other oils, it was necessary to measure temperatures up to 300° or 400° C. The conditions were frequently unsuitable for the employment of mercury thermometers, and either resistance or thermo-electric thermometers should be employed. If it was desired to take the temperature of a group of pans or vats it was generally advisable to instal a switchboard, so that any one of several thermometers could be read on the one galvanometer. If an open temperature scale was required, then a resistance thermometer should be employed, especially if the thermometer was to be kept untouched in the one position. If, however, the thermometer was to be taken in and out of the vessels continually it was preferable to use a thermo-couple. A couple was more robust than a resistance thermometer and was more easily renewed. If the thermometer was lead-protected and the connecting leads to the switchboard were carefully installed, then the thermometers would last without any attention for many years. Where a large number of thermometers were installed it was generally convenient to have arrangements made so that a recorder could be connected to any one thermometer through the switchboard. Thus, if it was desired to study the changes of temperature in one particular vat, the recorder was connected to the thermometer in that vat, whilst the temperatures of the other thermometers were read on the indicator without disturbing that one. If desired, the recorder or the indicator could be fitted with an electric alarm contact so that a bell would be rung when any given temperature was exceeded. Where higher temperatures were met with, such as from 800° to 1,000° C. in the manufacture of litharge and like products, thermo-couples should be employed. For temperatures not exceeding 900° C., some of the protected base metal thermo-couples, such as Hoskins nickel-chrome or the Titan couple, might be employed. For temperatures higher than 1,000° C., it was advisable to use platinum-rhodium couples. In the frict furnaces either radiation or optical pyrometers should be used.

The decision as to which type of pyrometer should be used depended very much on the class of labour working with the pyrometer. If the temperatures were to be read and not recorded, and if a fairly skilled observer was to use the instrument, then an optical pyrometer should be employed. If, on the other hand, an untrained observer was to take the temperatures, a Fery pyrometer, in which the readings were shown by a hand on a dial, should be used. The Fery instrument also had the advantage that a record of the temperatures could be taken without extreme difficulty.

In common with all other industries, paint and varnish manufacturers were now considering the advisability of reducing coal consumption. True economy could only be reached by seeing that every part of the steam plant was working to its full efficiency. One of the best guides for

knowing if a steam plant was working efficiently was knowledge of the temperatures throughout the plant. Electrical thermometers could be installed so that the engineer from his engine-room could know the temperature at the foot of his smoke-stack, at the inlet and outlet sides of his economiser, the temperature of his hot well, superheater, etc. From a knowledge of these temperatures he was able to form a very good idea of the efficiency of the plant.

The Chairman (Mr. A. Molteni) asked whether a thermo-couple containing aluminium would not be affected by the vapours in a lead furnace, or in a furnace where lead oxides were manufactured. It was the fact that whilst great progress had been made in temperature measurement in most industries, the paint and varnish trade still used the simple mercury-in-glass thermometer, perhaps because it was simple and also because of the cost of installing some of the more elaborate methods. Radiation pyrometers were not of much use to the trade, and it was unfortunate that there was not a simple mercury thermometer to measure up to 1,000°. He preferred the resistance thermometer to the thermo-couple, because it was possible for the records of the whole of a factory to be on a switchboard in the manager's office if it was desired. There was also the probability of working an electric alarm off such a system when a certain temperature had been reached, a useful device having regard to the various new oils that were being introduced into the varnish industry, which required much more careful temperature regulation than hitherto.

Mr. R. Britton said a system was wanted in the paint and varnish trade whereby the temperature measurements throughout the works could be read in the laboratory, because in some processes, at any rate, it was not felt that the operator could be trusted. It seemed that there were great possibilities of this with either the resistance thermometer or the thermo-couple. He did not altogether agree with the chairman that the industry had no use for the radiation pyrometer because it would be very useful in measuring the gloss of varnishes and comparing them.

Mr. E. S. Hanes said that on account of the unsatisfactory working of mercury thermometers his firm had adopted resistance thermometers with satisfactory results. He hoped shortly to have a switchboard by which he could get the temperature of the operations in any part of the works.

Mr. Whipple, in reply, said lead furnaces did have an effect as stated, but if the pyrometer was well protected it should last for some time. There was no difficulty in fitting an alarm, as suggested by Mr. Britton. He agreed with the suggestion that the radiation pyrometer could be used for comparing the gloss on varnish.

INSTITUTE OF PATENTEES.

A MEETING of the proposed Imperial Institute of Patentees, now in course of incorporation, was held at the Cannon Street Hotel, London, on Thursday of last week, under the auspices of the National Union of Manufacturers, for the purpose of considering and formulating a policy for the protection of the rights of patentees.

Sir Joseph Lawrence, who presided, said there had long been great need for a combination between inventors and patentees, and what was proposed now was, by means of this new Institute, to create an organisation which would enable patentees and patent owners to secure some amelioration of the conditions under which patents were worked. It would be an organisation which would represent hundreds of millions of capital and hundreds of thousands of people engaged in, or directly interested, in industries. Among other things, they proposed to ask the Government to give an extension of time to those patents which had been held up during the war, especially in the case of controlled firms. The period of extension which had been suggested was five years, that being the term of the war during which the patents had been held up. That was a definite object upon which the Institute might begin its work. The magnitude of the interests the Institute would represent might be inferred from the fact that during the three years preceding the war the number of patents sealed and of designs and trade marks registered were over 187,000.

The meeting agreed by resolution to the formation of an organisation "to safeguard and promote the interests of patentees," and pledged itself "to use all legitimate means to obtain from Parliament an extension of the life of patents which had been prevented from working and developing in consequence of the war," and further expressed the opinion

that "an alteration of the law was desirable in the interests of manufacturers and for the purposes of reconstruction." It was also decided that a deputation should present this resolution to the President of the Board of Trade.

THE ASSOCIATION OF BRITISH CHEMICAL MANUFACTURERS.

ANNUAL MEETING.

THE third annual meeting of the Association of British Chemical Manufacturers was held in the Council-room of the Chemical Society at Burlington House on Thursday (July 10), followed in the evening by a dinner at Prince's Hotel.

The Chairman, Mr. R. G. Perry, C.B.E., in his address at the annual meeting, reported a membership of 145 firms, representing a capital of about £70,000,000. In addition, seven kindred associations were affiliated to the Association. During the year much useful work had been accomplished in consolidating the industry and strengthening the position of its various branches. Much time had been devoted by the Council of the Association in impressing on the Government authorities not only the importance of an adequate supply of dyes, but the absolute necessity of new methods of stimulating dye production in this country, in order that it may be developed quickly and efficiently. It was not solely a question of obtaining dyes in large quantities, but much more a problem of variety and quality, as only a solution of these two factors would meet the wide requirements of our textile trade, and enable it to maintain its pre-eminent position in the world. We were only on the threshold of a great dye industry at home. The Association had been recognised by the Board of Trade, and Dr. A. Ree and the general manager, Mr. Woolcock, M.P., had acted as members of the Trade and Licensing Committee. In addition, Lord Moulton, the honorary president of the Association, had accepted the chairmanship of British Dyestuffs Corporation.

The importance of the manufacture of fine chemicals as a key industry had also been impressed on the Government, and the Association had been represented on an Imports and Exports Consultative Council, which was set up as a temporary measure. Close attention had been given by the Association to Parliamentary legislation in so far as it affected chemical industry, and particular mention might be made of patent law and traffic problems. A strong commission of the Association, representative of all branches of the industry, had recently returned from, and reported comprehensively upon, their visit, under Government auspices, to the chemical factories in the occupied area of Germany.

It was interesting to note that during the year an *entente cordiale* had been established between the British and French chemical industries, and collaboration between the two should be to their mutual advantage. After touching on many matters of domestic interest, the chairman stated that he was called upon to give evidence before the recent Coal Commission and to give his views on the control of the productive operations by public departments.

In the evening a distinguished and representative gathering dined at Prince's Hotel, and among the guests of the Association were: General Sir William Birdwood, Sir James J. Dobbie (president, Chemical Society), the Earl of Dunmore, V.C., D.S.O., Mr. T. G. Feasey, Lord Glenconner, General Hartley, Mr. J. Fitzallan Hope, M.P., Sir Herbert Jackson (president, Institute of Chemistry), Sir Evan Jones, Mr. F. G. Kellaway, M.P., Sir Arthur Steel Maitland, M.P., Rt. Hon. Sir Alfred Mond, Rt. Hon. Lord Moulton, and Mr. R. T. Nugent.

The toast to H.M. Ministers was proposed by Lord Moulton, and responded to by Sir Alfred Mond. Lord Moulton expressed his terror in the early days of the war at the lack of important chemical industries vitally necessary to save this country from defeat, and wondered to what extent the nation realised the importance of this industry.

In proposing the toast to the Association, Mr. Kellaway enlarged upon the remarkable achievements of British chemists and the wonderful part played by the industry as a whole. The toast was suitably responded to by Mr. Max Muspratt.

Dr. C. Carpenter, vice-president of the Association, proposed the toast to "Our Guests," which was responded to by the Earl of Dunmore and General Sir William Birdwood.

The toast to the Chairman was felicitously proposed by Sir William Pearce, M.P., and briefly responded to.

HELIUM.

REFERRING to recent developments in the production of helium in the course of a paper on "Science and Its Application to Marine Problems," read at the Victory Meeting of the North-East Coast Institution of Engineers and Shipbuilders at Newcastle-on-Tyne on July 10, Professor J. C. McLennan, O.B.E., F.R.S., Scientific Adviser to the Admiralty, said: Shortly after the commencement of the war it became evident that if helium were available in sufficient quantities to replace hydrogen in naval and military airships, the loss in life and equipment arising from the use of hydrogen would be enormously lessened. Helium is most suitable as a filling for airship envelopes, in that it is non-inflammable and non-explosive, and, if desired, the engines may be placed within the envelope. By its use it is possible to secure additional buoyancy by heating the gas (electrically or otherwise), and this fact might possibly lead to considerable modifications in the technique of airship manoeuvres and navigation. The loss of gas from diffusion through its envelope is less with helium than with hydrogen, but, on the other hand, the lifting power of helium is about 10 per cent. less than that of hydrogen.

Proposals have been frequently put forward by scientists in the British Empire and in enemy countries regarding the development of supplies of helium for airship purposes, but the first attempt to give practical effect to these proposals was initiated by Sir Richard Threlfall, who received strong support from the Admiralty through the Board of Invention and Research. It was known that supplies of natural gas containing helium, in varying amounts, existed in America, and it became evident from the preliminary investigations made by Sir Richard Threlfall and from calculations submitted by him as to the cost of production, transportation, etc., that there was substantial ground for believing that helium could be obtained in large quantities at a cost which would not be prohibitive.

The author was invited by the Board of Invention and Research in 1915 to determine the helium content of the supplies of natural gas within the Empire, to carry out a series of experiments on a semi-commercial scale with the helium supplies available, and also to work out all technical details in connection with the large scale production of helium and the large scale purification of such supplies as might be delivered, and become contaminated with air in service. In the course of these investigations, which were carried out with the co-operation of L'Air Liquide Company, it was found that large supplies of helium were available in Canada, which could be produced at a cost of about 1s. a cubic foot.

In the spring of 1917, when the United States had decided to enter the war on the side of the Allies, and after the investigations referred to above were well under way, proposals were made to the Navy and Air Board and to the National Research Council of the U.S.A. to co-operate by developing the supplies of helium available in the United States. The authorities cited agreed to co-operate with vigour in supporting these proposals, and large orders were at once placed by them with the Air Reduction Company and the Linde Company for plant, equipment, cylinders, etc. The Bureau of Mines also co-operated by taking steps to develop a new type of rectifying and purifying machine. By July, 1918, the production of helium in moderate quantities was accomplished, and from that time forward the possibility of securing large supplies of helium was assured. At the same time, under the direction of the author, plans were prepared and steps were taken to erect and equip a station for purifying the helium which might become contaminated in service.

Experimental investigations were also initiated with the object of developing all possible technical and scientific uses of helium. In particular, balance, spectroscopic and electrical methods of testing the purity of the gas were worked out, studies on the permeability of balloon fabrics to hydrogen and helium were commenced, and experiments were begun to exploit the use of helium in gas-filled incandescent lamps, gas-filled arc lamps, and in thermionic amplifying valves. The equipment provided for the purification of contaminated helium in large quantities supplied the major portion of the apparatus required to liquefy helium, and arrangements were therefore made to produce this gas in a liquid form for the purpose of carrying out low temperature researches.

The advances actually made at the time the armistice was signed warranted the opinion that by the present time, had the work projected been completed, supplies of helium at the rate of 2,000,000 cubic feet a month would have been produced within the Empire and the United States at a low cost.

SCIENTIFIC PRODUCTS EXHIBITION.

(Continued from page 35.)

EXHIBITS.

THE Mond Nickel Company, 39, Victoria Street, London, S.W., have an exhibit of nickel with a guaranteed purity of 99.8 per cent., prepared by the Mond process. Nickel sulphate in crystal powder is also shown, having particular catalytic properties in respect of the hydrogenation of oils. "Blighty" spraying mixture (Burgundy) should appeal just now that the season for spraying potatoes, etc., is on, inasmuch as it is arranged to eliminate the danger of scorching which so frequently occurs when inexperienced users make their own solution by dissolving copper sulphate and soda separately. It requires the addition of cold water only for its preparation.

The Hydronyl Syndicate, Ltd., 140, Leadenhall Street, London, E.C., have on view samples of fats hardened by hydrogenation according to Dr. R. Lessing's nickel carbonyl process. This is the only method of commercial hydrogenation in which the catalyst is not mixed with the oil in solid form, but is supplied as a vapour carried by the hydrogen gas employed. As fresh nickel is continuously added, the question of catalyst poisoning does not arise. Recovered nickel can be converted into nickel carbonyl directly without any intermediate conversion into a nickel salt. Samples of neutral sulphate of ammonia are exhibited obtained by the Linder-Lessing neutralising process, which has been adopted by a number of gas companies.

An exhibit which calls for mention is that of the British Optical Instrument Manufacturers' Association, the membership of which consists of some 14 well-known glass and lens makers. The Association, of course, has been called into existence as a result of the trouble we experienced in the shortage of optical lenses for gun-sights, pyrometers, microscopes, etc. It is curious that so many people—and we can hardly condemn them for it—are of the opinion that Germany, and not Great Britain, was the home of the optical industry. The optical instrument industry, however, originated in most of its branches in Great Britain, as did so many other branches of scientific work later developed by the Germans. To counteract the impression referred to, the British Optical Instrument Manufacturers' Association are about to publish an illustrated dictionary of scientific instruments, which includes, with a very brief description, the name of every known instrument, both current and obsolete, together with a key to the British makers of such as are now being used. If the size of the British optical factories has not equalled that of some of the Continental firms, the explanation—to a large extent, at any rate—may be found in the fact that Great Britain has not hitherto maintained an enormous standing army which required a vast optical equipment.

The Bellingham and Stanley refractometers, exhibited by Bellingham and Stanley, Ltd., 71, Hornsey Road, London, N. 19, are an echo of the recent meetings of the London Section of the Society of Chemical Industry, when the whole question of refractometry was discussed. We now have an improved type of Abbé refractometer made by this firm. This instrument possesses so many improvements that determinations of refractive indices (to an average accuracy of two units in the fourth decimal place) by day or artificial light can be made in one half the time required by the German type of instrument, which up to the present has been used throughout the world. The refractive index N_D of any transparent liquid, plastic or solid body, can readily be obtained by direct reading on the scale to the third; and by estimation to the fourth, decimal place, no calculation being necessary. The partial dispersion, C_F , of the material under examination can be obtained by referring the reading of the dispersion circle (situated below the telescope) to tables supplied with the instrument. A refractometer for testing butters, fats, and oils is similar in construction to the Abbé refractometer, and is designed to work between 1.42 and 1.49 N_D by day or artificial light. The Bellingham and Stanley immersion refractometer, with interchangeable prism, has been designed to measure refractive indices over a smaller range, but to a higher degree of accuracy than is possible with the Abbé type of instrument, so as to allow of the refractometers being applied to the accurate determination of the strengths of solutions.

In the metallurgy section there is much of interest to the chemical engineers. Cookson and Co., Ltd., Newcastle-on-Tyne, have samples of lead of exceptional purity (over 99.99 per cent.), the particular examples being super-refined sheet lead and lead pipe, having maximum acid-resisting properties.

Examples of litharge—a very large proportion of our requirements of which was supplied by Germany—and samples of orange lead also figure on this stand. Practically all the five orange lead also figure on this stand. Practically all the fine many and Austria, and no English makers could supply the requisite brilliant shades, fine textures, and chemical properties required. All that is now altered. Refined antimony can also be seen, the many uses of which are well known in the trade.

Johnson, Matthey and Co., Ltd., of 73-82, Hatton Garden, London, and also Manchester, have a case exhibiting specimens of the metals and various salts of gold, silver, platinum and metals of the platinum group, bismuth, selenium, tellurium, thorium, tungsten, niobium, thallium, etc., showing the connection of the firm with these metals in the past and some of their latest developments and applications.

A few exhibits are classified in the Fuel Section, and perhaps the most important, in view of recent events, is that of the Geographical Survey, which consists of mineral oil, oil shale, cannel coal, lignite, bitumen, etc., found in Great Britain. It is common knowledge that borings for oil were commenced in this country in October, 1918, a sum of £1,000,000, having been appropriated by the Government for the purpose, and Messrs. S. Pearson and Son, Ltd., were appointed to carry out the work under the title of Petroleum Development Managers. The first boring, at Hardstoft, near Chesterfield, was inaugurated on October 15, and since then six other borings have been commenced in the same county, two in Staffordshire and two in Scotland. The sites of all the borings are shown in the geographical map of the British Isles exhibited. The Survey also exhibits bauxitic clay from Salcoats, North Ayrshire, which, during the war, found a place as a high-grade refractory in the manufacture of small electric furnaces and crucibles, and also for glass-house use.

The Committee on the Production of Oil from Coal, Etc., shows raw materials, crude oils, and refined products to the extent of 50 samples of carbonaceous material from various deposits in Great Britain, including samples of lignite from Devonshire and shales from Scotland and Dorset.

LEAD-SODIUM ALLOYS.

IT has long been known that an addition of sodium to lead hardens the lead. As nearly the same effect can be obtained by the addition of other elements, however, which do not render the lead subject to corrosion as the sodium is apt to do, the lead-sodium alloys have little been studied. In the *Zeitschrift des Vereines Deutscher Ingenieure*, of May 10 last, Dr. J. Goebel describes some tests to which he submitted ternary alloys of lead-sodium-mercury and lead-sodium-tin. He started from the binary alloys Pb-Na, Pb-Hg, Pb, Sn, fusing the constituents in a hydrogen atmosphere, and cast test cylinders, 2cm. diameter, 1.75cm. high, which he submitted to hardness tests (Brinell), bending tests and impact tests. The specimens were tested immediately after quenching, or eight days or more later. Lead dissolves 0.8 per cent. of sodium, and the mixed crystals formed in the 4 per cent. alloy contain the compound Na_2Pb , the eutectic contains 2.5 per cent. of sodium. The addition of up to 7 per cent. of mercury to lead raises the hardness figure from 4 to 9. When sodium (up to 4 per cent.) is added to the lead, the hardness increases very much, reaching the value 8 when the Na percentage exceeds 0.8, keeping nearly at that value up to 2.5 per cent. and falling off with higher Na percentages. The hardness figure of zinc would, by the same test, be 27, that of electrolytic iron 47. The further addition of mercury to these binary alloys does not make much difference; the curves are in general more regular, however, and the maximum is shifted nearer 2.5 per cent. Na. Ternary alloys containing less than 1 per cent. of Na are softer than the corresponding Pb-Na alloys. The bending tests gave better values when mercury was added to the lead, and poorer values when sodium was added. The crushing tests showed that the reduction in height of the cylinder was much decreased by the addition of sodium, and the formation of cracks was also less noticeable; but hardness and crushing strength did not go together, and two specimens of equal hardness might give very different crushing values. The experiments with the binary and ternary tin alloys, Pb-Na-Sn, were not satisfactory; the sodium made the alloys (up to 7 per cent. of tin) harder, but not stronger, and the conclusion drawn is that only the lead sodium-mercury alloys might answer for certain technical purposes.—*Engineering*.

SCIENCE AND INDUSTRY.

LESSONS TO MANUFACTURERS FROM THE RHINE PROVINCES.

AT a largely attended and representative meeting of the National Union of Manufacturers, held on Monday, at the rooms of the Birmingham Chamber of Commerce—Mr. Randle L. Mathews presiding—Mr. Wilfrid Hill, chairman of the County Chemical Company, Limited, and the Calthorpe Motor Company, Limited, Birmingham, gave his "commercial reflections" on a recent visit to the Rhine provinces. His first reflection, he said, was one which naturally occurred, and inevitably, to a man like himself who was at once a chemist and a manufacturer—and it was that in the aniline dyeworks at Leverkusen he saw the world's greatest triumph in the application of chemical science to industry. In little more than a generation science had made Germany one of the most progressive industrial nations of the world.

Germany, Mr. Hill insisted, would in the future, as in the past, be one of our most formidable trade rivals, and, if we were to hold our own in the world's commerce, we must equip ourselves for the contest so as to meet our rivals on equal terms. That meant that we must yoke cosmopolitan science to British industry.

"I am convinced," he said, "that there are very few British factories of any considerable magnitude and importance in which the installation of a well-equipped laboratory and the employment of a competent chemist would not be a sound and profitable investment." The manufacturer's chemist would carefully inspect and analyse raw materials on their arrival, and so ensure that only ingredients of good quality entered into the composition of the finished article. This detective process would prevent three undesirable things: (a) Fraud on the part of those who supplied the materials; (b) disappointment and complaint on the part of the manufacturer's customers; and (c) loss of reputation and trade to the manufacturer himself. It would also be the duty of the chemist employed to revise the formulae used by the firm in the light of the latest scientific discoveries, thus from time to time improving the quality and lowering the cost of goods produced. Furthermore, it would be his province to test the finished products before despatch to make sure that neither accidental mistake nor deliberate neglect in the process of manufacture had led to the production of goods either above or below the standard of quality intended. Lastly, the chemist from his daily experience and as a result of his personal experiments would be able to suggest new lines, and so stimulate the firm's enterprise and expand its business.

His second reflection was that in the aniline dyeworks he had an illustration of Germany's genius for hard work. Those works were, while being a monument to Germany's commercial genius, the greatest reproach to Britain's short-sightedness. Science alone could not have made Germany a progressive and prosperous manufacturing people. Germany's prosperity was due to the fact that she was alike industrious and scientific. To-day commerce needed not only more science but more diligence—a greater enthusiasm for productive work.

One effect of the war, let us hope it was only temporary—seemed to be a sense of exhaustion and the creation of an almost universal disinclination for ordinary routine work. That spirit was very manifest in many British factories where there was a noticeable reluctance to put forth the best physical energy on the part of the workpeople. What was wanted in England to-day was a new basis of relationship between capital and labour; there must be a means whereby employer and employed may meet, reason, understand, and co-operate with one another. Modern industry must be democratised by the setting up of works committees and joint industrial councils. Real improvement in the standard of life could not be brought home by clamouring for shorter hours and higher pay; it could only be done by increased output; and, as a new basis of remuneration, something was necessary beyond the weekly wage and the piece-work rate—an attractive bonus on output.

Finally, the claims of science, of industrial chemistry, and engineering could scarcely be over-emphasised. Thirty years ago someone slumbered and blundered. Who was responsible for the loss of our nation's trade? Was it the British manufacturer of dyes or the British Government of that day? He was disposed to saddle both with the blame and the shame. Had the domestic dye industry been better organised, had there been closer co-operation between the makers and users of dyes in the textile and allied trades, and had those British producers and consumers been gifted with more foresight, the

trade necessity, for which there was bound to be a ready market in almost every market of the world, would never have been allowed to become the monopoly of an actual rival and a potential foe. (Applause.)

COAL CONSERVATION.

AT the British Scientific Products Exhibition on Friday, July 11, a lecture was given on this subject. Sir Robert Hadfield presided.

Professor H. E. Armstrong, F.R.S., in the course of his lecture, said the Sankey report mentioned not a word of the wasteful methods of burning coal which were now practised, nor as to the need of economics, but it had to be remembered that Socialism and not science was the governing factor in the situation with which Mr. Justice Sankey had to deal. It was impossible to over-rate the serious importance of the great rise in the cost of coal, but the position which had been brought about was largely due to the want of a national policy with regard to fuel and power. If attention was turned to improved methods of carbonising coal, our entire outlook would be changed. He believed the problem would be solved. During the past two years he had been a constant witness of experiments on a large scale—using several hundred tons of coal,—and the results had convinced him that it was merely a question of getting the engineering appliances which would make it economically possible to carbonise on a large scale. The coming struggle would be between smokeless solid fuel and gas as heating agents for domestic use. He did not believe that the proposed 16 electric-generating stations would serve the general needs of the country, although they might be made to serve the more important industrial centres. What was wanted was a scheme which would meet the general needs of the country, and that could only be obtained by the use of raw coal being disallowed and the coal carbonised and then distributed as a smokeless fuel. It would therefore be necessary to arrange for the fusion and consolidation of all interests concerned and to arrange power centres which would also be centres for the supply of smokeless fuel, as well as oil fuel and all the important by-products of carbonisation. In this way it would be possible to halve our coal bill at no very distant date.

Professor W. A. Bone said we were to-day reaping very largely what we had sown. Two generations of chemists at least, it might be said, had practically neglected the chemistry of coal. Before it would be possible to construct a sound and comprehensive policy with regard to coal it was necessary to investigate thoroughly the chemical characteristics of our coal seams, but although this had been advocated and set before the Government and the country, as yet he saw no signs of any attempt to carry out what he would call a chemical survey of the coalfields, and he was sure that the Department of Scientific and Industrial Research had not yet grasped what was meant by that.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

(SPECIALLY CONTRIBUTED.)

A rise of 6s. per ton in the price of coal, such as is contemplated by the Government, would hit the coking and chemical industries of West Cumberland almost immediately. The smelting of ordinary iron, for which the local coke (and not the harder East Coast coke) is used, would be quickly rendered unnecessary for the following reason: Workington to a very large extent keeps its steelworks going by the manufacture of steel rails, but it is already difficult to secure sufficient orders to maintain the plant in operation; and as every rise of 1s. in the price of coal means 8s. on the price of steel, American competition would oust West Coast railmakers out of the world's markets altogether. At present the demand for Cumberland coke no more than suffices to keep the ovens working at two-thirds of their capacity, and the export market is negligible.

The manufacture of by-products has diminished somewhat. Benzole continues to be in active demand, Ireland taking all the spirit that cannot be marketed locally. The entire make of sulphate of ammonia is being absorbed, though very little is going on export account. Pitch stocks have not all yet been cleared, but are moving away freely. Creosote is in fairly brisk request. Acids are weak, and some portion of the chemical works plant is idle.

ITEMS OF INTEREST.

RELAXATION OF SPANISH EXPORT EMBARGO ON OLIVE OIL.—The Spanish Government, it is said, will allow the exportation of 45,000,000 kilos. of olive oil during the second half of 1919.

MOTOR TRANSPORT.—The Chemical Employers' Federation has entered into an affiliation agreement with the Motor Transport Employers' Federation in respect of those of its members who employ commercial motor-vehicles.

BRUNNER, MOND AND CO. IN WESTERN AUSTRALIA.—Investigations of the resources of Western Australia have been recently carried out in that State on behalf of Messrs. Brunner, Mond and Co., with a view to establishing alkali works in Western Australia.

BRITISH DYESTUFFS CORPORATION.—We understand that the underwriting of 2,500,000 7 per cent preference and 2,500,000 preferred ordinary shares of the British Dyestuffs Corporation, Limited, was completed on Wednesday, and the prospectus will be issued on Monday next.

NOTIFICATION OF INDUSTRIAL ACCIDENTS.—At Halifax West Riding Police Court on Saturday last, Brookes Chemicals, Ltd., Lightcliffe, were fined £5. and costs for failing to notify the Inspector of Factories and Workshops of an accident which occurred at their works to one of their workmen.

INCREASED COST OF COAL TO THE CHEMICAL INDUSTRIES.—According to a statement issued by the Federation of British Industries, the proposed increase of 6s. per ton in the cost of coal will, in the aggregate, mean an increased expenditure by the chemical and allied industries of £1,363,500.

BUSINESS NOTICE.—Messrs. H. D. Hardie and Co., drysalters and merchants, 11-27, Bishop Street, Anderston, Glasgow, have concerted their business into a private limited company, with a capital of £100,000., under the title of H. D. Hardie and Co., Ltd. No change will take place in the management.

MANUFACTURE OF PHARMACEUTICAL CHEMICALS.—In a prefatory note to a memorandum just issued by the National Health Insurance Commissioners, Major Waldorf Astor, M.P., chairman, says: "It is not too much to say that the fine chemical industry has been greatly developed and extended, and that this country is now capable of manufacturing on a large scale all the important medicinal chemicals which before the war had been practically a German monopoly."

EXPORTS TO HOLLAND AND SWITZERLAND.—The Board of Trade (Export Licence Department) announce that in view of the raising of the blockade it is no longer necessary for goods exported to Holland and Switzerland to be consigned respectively to the Netherlands Oversea Trust and the Société Suisse de Surveillance Economique. Goods exported via Holland to the Occupied Rhineland Territory, Belgium, or Switzerland need not now be consigned to the Standard Bank of South Africa, Rotterdam.

ZINC AND ZINC DUST PRICES.—Australian high-grade zinc dust (88-92 per cent. metallic zinc purity) is quoted at £70. per ton, f.o.r. Consumers appear to be a little apprehensive of the quotation being raised in sympathy with the increase in the market price of spelter, but the Australian producers have made no move in this direction. The price of Australian electrolytic zinc (99.95 per cent. metallic zinc) has been advanced £2. to £42. per ton, f.o.b. Australia. Prompt business is on offer for shipment direct to New Zealand, India, South Africa, and elsewhere in the Far East.

TRADE WITH GERMANY AND GERMAN-AUSTRIA.—In view of the raising of the blockade, the Board of Trade have issued general licences under the trading with the enemy legislation authorising, with certain reservations, the resumption of trade with Germany and German-Austria. The licences do not remove the existing restrictions upon the payment of debts and the return of property due or deliverable to persons in Germany and German-Austria in respect of pre-war transactions. Moreover, any permission which may be necessary in respect of any transactions under Defence of the Realm Regulation 41D must be obtained from the Treasury. The licences do not permit the importation from Germany or German-Austria of any goods included in the Prohibition of Import Proclamations and not covered by a general licence issued under those Proclamations. Further, export licences must be obtained from the Export Licence Department, 1, Queen Anne's Gate, Westminster, S.W. 1, before goods included in Lists "A" and "B" of prohibited exports are shipped to those countries, but no licences are required in respect of goods included in List "C."

A CEMENT UNION.—The Associated Portland Cement Manufacturers and the British Portland Cement Manufacturers have resolved on joining forces by "a scheme of joint management, which will enable substantial reductions to be made in the number of directors and managing directors." The joint board will consist of a chairman, seven managing directors, and six representatives from each company, with the addition of Sir Guy Granet. An incidental reform will be the division of the £10. preference and ordinary shares of the Associated and the preference shares of the British into £1. shares.

PATRIOTIC STAND BY AUSTRALIAN CHEMISTS.—Some of the leading firms in Australia have taken a determined stand against the resumption of business relations with enemy trading concerns. The Australian firms of manufacturing chemists, Messrs. Felton, Grimwade and Co., of Melbourne, and Messrs. F. H. Faulding and Co., of Adelaide, recently received letters from Messrs. Schering and Glatz, of Maiden Lane, New York, a German firm, notifying that it had resumed the manufacture of certain chemicals, and suggesting the resumption of trade relations. The reply sent by each of the Australian firms took the form of a prompt and emphatic refusal. "We are thankful to say that we have not required any of the preparations of your manufacture which we used to sell," wrote Messrs. Faulding and Co., "and if you have had inquiries they are probably from Germans in this country, or from people who will sacrifice everything for the sake of cheapness." The letter sent by Messrs. Felton, Grimwade, and Co. concluded with the emphatic declaration: "None of us here want your products, your countrymen, or your communications."

PERSONAL.—Mr. E. Grant Hooper, Deputy Chief of the Government Laboratory, retired on superannuation last week after over 40 years' service. Mr. Grant Hooper has always taken great interest in the chemical industry. At the present time he is a member of Council of the Society of Chemical Industry and chairman of the Transactions Committee of the Society's *Journal*. From 1910-12 he was chairman of the London Section of the Society, and he has served on the Council of the Chemical Society and of the Institute of Chemistry. Before his appointment as Deputy Government Chemist he was for many years in charge of the Crown Contracts Branch of the Government Laboratory. Although the Civil Service regulations compel his retirement now from official duty, his energy is quite undiminished, and it is to be hoped that his knowledge and business acumen will for many years be utilised in commercial life.—Professor Alexander Findlay, Professor of Chemistry at the University College of Wales, Aberystwyth, has been appointed to the Chair of Chemistry at Aberdeen University. Professor Findlay graduated at Aberdeen and Leipzig. Before his appointment to Aberystwyth he was Special Lecturer on Physical Chemistry at Birmingham University.

A REMARKABLE CASE OF POISONING.—The extraordinary power and lasting effects of a type of poison gas or substance which was manufactured for military purposes at Chiswick Laboratory were revealed at an inquest into the death of Charles Orme, who was employed by the Ministry of Munitions, held at Acton on Tuesday before Mr. Komp and a jury. The evidence showed that deceased had been employed at the Chiswick Laboratory inspecting several of the rooms there, and he was taken mysteriously ill and died. Sir George Pollard, who had conducted the post mortem, was of opinion that the cause of death was blood poisoning due to inhalation of a poisonous substance. Mr. William Dunham, senior chemist at Chiswick Laboratory, said that what had been called a gas was not a gas but a solid. The premises had been properly cleaned, and all precautions taken to prevent anyone from suffering from the effects of this substance. He knew that people who visited the place suffered from irritation of the nose, which made them sneeze. Apart from the deceased, no one had been seriously affected. The still was thoroughly cleaned after it had come to an end in 1918. It had been treated once or twice, and used for the purification of methyl alcohol. All the witness himself had suffered from the effects of the substance was a slight irritation. So far as he knew, Mr. Orme was the only case in which death had ensued. The Coroner elicited the information that some people were much more easily affected by such a poison than others. He said this was a case in which, in the interests of the public, the nature of the substance should not be made known. The jury found that the deceased died from poisoning through the inhalation of a dust containing an irritant poison.

PARLIAMENTARY NEWS.

Sale of Calcium Nitrate Factory.

In the House of Commons, Mr. Rose asked the Parliamentary Secretary to the Ministry of Munitions if he will state the terms upon which the Government acquired the site and obsolete buildings utilised for the construction of the Royal Explosive Factory, Victoria Works, Wincham, Cheshire; what proportion of the £534,000. spent upon building and equipment was paid to the Salt Union and Messrs. Brunner, Mond and Co., Ltd.; and who advised his Department that this expenditure was useful only for war purposes?

Mr. Hope: The site and original buildings referred to were not acquired by the Government, but were rented from the Salt Union, Ltd., at £750. per annum, with an option to the Ministry to purchase at the fair value of the works as existing on January 1, 1916. The information asked for in the second part of the question cannot be supplied on such short notice; but I am having a statement prepared on the subject, which will be forwarded to the hon. member as soon as possible. The advice on which the Minister acted was that of the responsible officers of his Department.

Norfolk Petroleum.

Sir J. D. Rees asked the President of the Board of Trade whether he can give the House any information regarding the discovery of oil in Norfolk?

The Deputy-Minister of Munitions (Mr. Kellaway): I have been asked to answer this question. I have no information regarding the discovery in Norfolk of liquid petroleum. It has been known for a long time that the kimmeridge shales of Norfolk would yield considerable quantities of oil on distillation. The utility of this oil for commercial purposes depends, however, on the extent to which it might prove possible to eliminate the very high percentage of sulphur which it contains. We are doing everything possible to develop every possible source of oil in this country.

British Cellulose Company.

Lieut.-Colonel W. Thorne asked the Parliamentary Secretary to the Ministry of Munitions what was the total capital outlay of the British Cellulose Company on August 1, 1918; how much of this had been provided by the State, either in rebate of Excess Profits Duty or in any other form, and what were the total liabilities of the State in respect to this outlay; whether any further capital outlay has taken place since August 1, 1918; and, if so, does any liability rest upon the State to recoup the whole or part of any such outlay?

Mr. Kellaway: I would refer my hon. friend to the answer given on July 3 to his question on this subject. Until the Committee appointed by the Government have reported, I do not think it desirable to make any statement.

British Patents.

Lieut.-Colonel Sir J. Norton Griffiths asked the President of the Board of Trade what arrangements are being made to safeguard British patentees in respect of patents taken out before the war in countries which will be sub-divided in consequence of the terms of peace; and in what way will licences, granted by patentees to manufacture goods which could only be supplied in certain countries, be affected, having regard to the fact that such countries no longer exist in the form in which they did when the licence was granted?

Mr. Bridgeman: As regards the first part of the question, I would direct the hon. member's attention to Article 311 of the Treaty of Peace with Germany. The provisions of the Treaty with regard to licences granted before the war will be found in Article 310. Similar provisions will be embodied in the Treaties to be concluded with the other enemy Powers.

Storage of Explosives at Woolwich Arsenal.

Commander Bellairs asked the Prime Minister whether it is the custom to exempt State undertakings from the regulations made for public safety which are enforced with fines in the case of private undertakings; whether a Committee has reported that only 15 out of 172 buildings in Woolwich Arsenal comply with the Home Office regulations as to the distance between magazines and other danger buildings, and between these buildings and private dwellings; and what action is proposed in view of the warnings of the Committee?

The Deputy Minister of Munitions (Mr. Kellaway): The answer to the first and second parts of the question is "Yes,

sir." As regards the third part, immediately on receipt of the report the Minister appointed a Committee of Experts to consider the action to be taken on it, and the recommendations of that Committee are now being carried out. Very substantial reductions in the quantity of the explosives stored in the Arsenal have already been made, and are continuing. Most of the dangerous buildings have been or are being cleared.

Linseed Oil Deliveries to Germany.

Captain Brown asked the Food Controller what was the date when the agreement to supply Germany with 25,000 tons of linseed oil, at £78. per ton, was made; if this amount has now been delivered; and if any further agreements to supply linseed oil to Germany have been made?

Mr. Roberts: Approximately 12,000 tons of linseed oil have been delivered to Germany under the agreement of March 31, 1919. The answer to the last part of the question is in the negative.

Controlled Import of Plumbago.

Mr. Kellaway, in reply to Sir Harry Brittain, said: The importation of graphite into this country was not controlled by the Government, except that in the later stages of the war the Shipping Controller granted tonnage on the recommendations of the Ministry of Munitions based on the Ministry's knowledge of the quantities required to maintain the output of munitions.

GUTTA PERCHA.

THE material known by this somewhat curious appellation is the solidified gum of a tree, which is indigenous to the Malayan Islands. The name is Malayan—gutta, meaning gum, and percha, the tree from which it is obtained.

The most important use to which gutta percha is put is for the cores of submarine cables, and it was so employed in the construction of the first Channel cable in 1849. Since then it has come into general use for cable cores and insulation and for a number of other less well-known purposes. The India Rubber, Gutta Percha, and Telegraph Works Company, Ltd., one of the pioneer firms in the manufacture and laying of submarine cables (they made and laid a cable between Key West and Havana in 1867) have a special department at their works in Silvertown for the refinement of the raw gutta percha, and its reduction to various commercial forms.

There is an interesting and a pleasing variety about the Silvertown gutta-percha products. These include carboys, bottles, test tubes, tubes and valves for breweries, bosses for flax-spinning machinery, pump rings, buckets, seatings,



valves, hydrant balls, ram rings, driving belts, washers, and moulds for taking impressions of bores of guns. The Silvertown company also line tanks for acids and acid solutions.

Gutta percha, combined with resin and Stockholm tar, forms the famous Chaterton's compound, which is used for making joints in cables. The Silvertown company takes the greatest care in the preparation of the raw gutta percha, one of the later processes being to force the previously softened gum through a very fine sieve under a pressure of 100 tons, in order to remove all impurities, after which it is rolled out into sheets. In this form it is stored ready to be manufactured into any of the aforementioned articles.

Gutta percha, although it does not play such an important rôle in the commercial scheme as india rubber, to which it is similar in some respects, is absolutely irreplaceable by any other material in certain of its applications.

LEGAL INTELLIGENCE.

Chemical Company and Debenture Holders.

The case of *Louis Sanders v. The Abbey Chemical Company, Limited*, came before Mr. Justice P. O. Lawrence in the Chancery Division on Friday (July 11), on a motion by the plaintiff and other debenture holders for the appointment of a receiver and manager.

Counsel, on behalf of the plaintiff, said the debenture had matured, and had been presented for payment, but no payment had been made. He asked that Mr. James Fabian, of 27, Clement's Lane, London, chartered accountant, be appointed receiver and manager.

The application was opposed by counsel on behalf of the defendants and various debenture holders, and it was stated that at the present moment negotiations were going on for the reconstruction of the company and the provision of fresh working capital. It would be a great pity if these negotiations were to break down by appointing a receiver. There was no danger to the property, said counsel.

His Lordship said he thought the plaintiff was clearly entitled to a receiver, and he proposed to appoint Mr. Fabian, who was a chartered accountant.

Potash for Fire Extinguisher.

In the Patents Court on July 10 the *Citex Fire Extinguishing Company, Limited*, of Phipp Street, E.C. 2, applied for a licence to use the German patent 10,086, of 1908, in the name of Roemer, for the production of carbon dioxide for use in fire-extinguishing apparatus. The patent claimed in producing the carbon dioxide, which exerts pressure in fire-extinguishing apparatus, the application of a solution of substantially pure potassium carbonate of 96 to 98 per cent. strength.

Mr. A. J. P. Soar, secretary of the applicant company, explained that they had been manufacturing the chemical charge continuously for several years. They had originally an arrangement with the patentee, though the arrangement had not been registered, and they had had to pay the patent renewal fees and a royalty of a shilling on each cartridge, which sold at about 8s.

The Comptroller of Patents (Mr. Temple Franks): All the pre-war licences have gone, and if you want to be protected you must apply to this court. You should have applied before. There is the question whether the arrangement under which you work is a valid arrangement. If it was swept away what is to happen?

Mr. Soar: We have been very busy, and have had other things to think of, and, as a matter of fact, we could not get potash. Very little has been available during the war. The royalties are credited to the patentee in our office.

Sir Cornelius Dalton, who sat with the Comptroller: Do you mean to pay him?

Mr. Soar: We don't know. We don't want to pay anything we need not pay.

The Comptroller of Patents (who is just back from Paris): That may be a question under the Treaty of Peace. It will be raised afterwards. I think the licence should be granted. Other things will be arranged in time. The Board of Trade will be recommended to issue the licence.

A Soapmaker's Bankruptcy Examination.

At the London Bankruptcy Court last week, before Mr. Registrar Mellor, the public examination was held of Lloyd Dudley Stuart, trading as Dudley Stuart and Co., 14, America Square, E.C., and residing at 38, Genesta Road, Westcliff-on-Sea, soap manufacturer. The statement of affairs filed by the debtor showed gross liabilities amounting to £9,443. 19s. 5d., of which £6,162. 10s. 3d. was expected to rank against the estate for dividend. The assets were returned at £404., thus leaving a deficiency of £5,758.

In 1902 debtor, who was a commission agent, turned his attention to the manufacture of soap. He had not had any previous experience in the manufacture of soap, but opened a small factory in Canning Town, which he subsequently closed down. He did not have anything more to do with the soap business until 1916, when he advanced money to two Italians who carried on a soap business at Noxton, under the style of the Vebo Soap Company. In March, 1917, he made an agreement with them under which he was to receive 10 per cent. of the profits. Subsequently the business was transferred to Bowes Park, and he made himself responsible for the debts incurred. As a matter of fact, he entered into partnership with the two Italians, but there was no deed

of partnership. The names of his partners were Wilberforce Borg and Wagram Borg. On November 23, 1917, the name of the firm was changed to the British Soap Company, and he agreed to find all the moneys required for the business, including the wages and the cost of the materials. In April, 1918, the Borgs and himself got into trouble for infringing the bye-laws of the Wood Green Council, through not asking their consent before starting the soap factory. He sold part of the plant back to the people who supplied it, and removed the remainder to Kintore Street, Bermondsey, where he carried on the manufacture of soap for export at an average profit of £100. per month until the Government prohibited all exports, except under licence. He had never been able to obtain accounts from the Borgs as to the cost of manufacture, but he alleged that they owed him a considerable amount of money. He further alleged that the business was a failure owing to the incompetency of the Borgs and wasteful methods of manufacture. Of his deficiency of £5,000., upwards of £4,000. related to the Bowes Park business. He owed £2,000. to a Mr. Pierreboom under an arbitration award. Another large creditor was a Mr. Bourgeois in respect of oils supplied.

The examination was ordered to be closed.

Liquid Asphalte for Oil Engines.

Lord Sterndale in the Prize Court on Wednesday condemned as prize 12,809 barrels of "liquid asphalte" shipped by a Texas company at the beginning of 1916 on the steamship *Avra*, and consigned to the Isonteluis Handels Kompany, of Stockholm, and the question of the utility and nature of the "liquid asphalte" was raised by the problem of contraband.

Dr. Wyndham R. Dunstan, director of the Imperial Institute, made a report to the court of an analysis of the liquid asphalte. The samples, he said, were found to consist of crude petroleum from which the lower boiling fractions had been removed by distillation, leaving a product which was suitable for use as fuel, particularly in certain types of heavy oil engines. This so-called liquid asphalte came within the description "mineral oils," including benzine and motor spirits, included in the list of absolute contraband dated October 14-15.

OUR BOOK SHELF.

THE ANALYSIS OF MINERALS AND ORES OF THE RARER ELEMENTS. By W. R. Schoeller, Ph.D., and A. R. Powell. London: Charles Griffin and Co., Ltd., 16s. net.

In this book the complete analysis of rare-element minerals receives, probably for the first time, full and systematic treatment. Although various books and treatises have been consulted for data, some new separations have been specially devised. In this respect we might mention, as examples, the separation of molybdenum from antimony, and palladium from silver, etc. The keynote is complete analysis, the plan being generally in tabular form, whilst full details of operations will in every case be found in the book. The elements dealt with in the order of their groups are: Lithium, rubidium, caesium; beryllium, radium; scandium, gallium, indium, thallium; cerium, rare earth metals other than cerium; titanium, zirconium, thorium, germanium, vanadium, columbian, tantalum; selenium, tellurium, molybdenum, tungsten, uranium; ruthenium, rhodium, palladium, osmium, iridium, platinum. A table of melting points recently issued by the U.S. Bureau of Standards is included.

SALT. By A. F. Calvert. London: Sir Isaac Pitman and Sons, Ltd.; 2s. 6d. net.

An interesting and very readable booklet of the Pitman "Common Commodities and Industries" series. From technical and historical aspects, it serves a useful educational purpose. Illustrations are quite excellent.

DYERS' MATERIALS. By Paul Heermann, Ph.D. London: Scott Greenwood and Son. 7s. 6d. net.

This, the second edition, has been revised and enlarged by H. B. Stocks, F.I.C., F.C.S. We agree with the author's contention that there is ample scope for a book confined to substances used in dyeing and kindred processes, and there is no doubt this little book will make many friends. Both organic and inorganic essentials in these important processes are well presented to the reader, and in every case valuable hints are given dealing with their special application. Numerous plates are contained showing the microscopic appearance of textile fibres and various starches.

IMPORTS OF CHEMICALS AND ALLIED PRODUCTS.

THE following returns, which are taken from the import statistics of the United Kingdom, give the amount and value of chemicals and allied products imported during the month ending June 30, 1919, as compared with June, 1918.

ARTICLES.	QUANTITIES.		VALUE.		ARTICLES.	QUANTITIES.		VALUE.	
	Month ended June 30th.		Month ended June 30th.			Month ended June 30th.		Month ended June 30th.	
	1919.	1918.	1919.	1918.		1919.	1918.	1919.	1918.
CHEMICALS :			£	£	MANURES :			£	£
Acetic Acid other than for table use cwt.	3,584	—	10,588	—	Basic Slag..... tons	—	—	—	—
Bleach. Materials ..	—	—	—	—	Bones for Manure (whether burnt or not)	205	557	2,155	19,660
Boracite, Borate of Lime, Borate of Magnesium, and Borax ...	15,918	3,084	17,204	4,303	Guano	—	—	—	—
Brimstone	1,151	135,055	1,443	32,595	Nitrate of Soda (Cubic Nitre) ..	—	—	—	—
Carbide of Calcium ..	6,567	26,719	7,640	42,224	Phosphate of Lime and Rock Phosphate	5,587	20,917	18,251	82,486
Coal Products, not Dyes	4 801	98	894	8	OIL SEEDS :				
Cream of Tartar ..	645	3,873	7,528	67,369	Castor	860	193,821	1,291	301,765
Glycerine : Crude ..	—	3,180	—	12,379	Cotton				
Distilled	—	1,039	—	5,126	From Egypt .. tons	163	9,595	4,327	880,944
Potash Compounds - Saltpetre					„ British India ..	2,950	—	67,466	—
Nitrate of Potash ..	26,553	18,748	49,855	40,917	„ Oth'r C'tries ..	3,718	12	84,260	197
Other Sorts ...val. £	—	—	7,849	33,444	Total	6,831	47,608	156,053	881,141
Soda Compounds cwt.	2,563	2,319	7,522	10,813	Flax or Linseed :				
Tartaric Acid ..	832	1,889	12,322	28,739	From Russia .. Qrs	—	—	—	—
Unenumerated, including Acetate of Lime, Acetone, Muriate of Ammonia, and Sulphuric Acid ...val. £	—	—	268,244	1,422,577	„ U.S.A.	—	—	—	—
DRUGS & MEDICINES :					„ Argentine Republic ..	109,179	36,558	685,294	224,827
Bark, Peruvian .. cwt.	18,672	1,176	83,906	8,610	„ British East Indies	78,119	104,469	505,437	626,044
Quinine and Quinine Salts oz.	848,448	25,704	74,750	2,275	„ Canada	—	—	—	—
Unenumerated ..val. £	—	—	354,905	170,320	„ Oth'r C'tries ..	—	130	—	1,000
DYESTUFFS (other than DYE WOODS) and SUBSTANCES used in Tanning or Dyeing :					Total	187,298	141,157	1,190,731	851,871
Cutch	4,982	4,151	12,484	13,654	Rape :				
Dyes and Dyestuffs obtained from Coal Tar :					From Russia .. Qrs,	—	—	—	—
Alizarine and Anthracene... ..	490	602	560	678	„ British East Indies	88,507	16,299	562,592	93,476
Aniline and Naphthalene ..	3,300	3,281	109,976	106,962	„ Oth'r C'tries ..	—	20	—	200
Synthetic Indigo ..	400	380	3,572	4,000	Total	88,507	16,319	562,952	93,676
Other Coal Tar Dyestuffs	3	—	225	—	Sesame (or Sesamum, Benni, Gingelly, or Teel) :				
E'tcts for D'ing val. £	—	—	37,316	54,518	From China ... Qrs.	1,935	—	15,800	—
Indigo	264	289	10,660	13,734	„ Oth'r C'tries ..	135	—	872	—
Unenumerated ..	12,630	12,037	46,762	71,068	Total	2,070	—	16,672	—
Tannin Substances :					Soya Beans :				
B'k for Tanning cwt.	16,126	18,846	12,892	18,766	From Russia .. tons	—	—	—	—
Ex'ts for .. val. £	—	—	315,210	171,793	„ China	—	—	—	—
Gambier	325	2,713	1,045	11,281	„ Japan	—	—	—	—
Myrobalans ...	51,146	72,606	32,413	77,402	„ Oth'r C'tries ..	—	—	—	—
Sumach	6,868	4,831	6,557	5,661	Total	—	—	—	—
Valonia	3,860	38,951	5,475	90,573	Unenumerated .. Qrs.	2,121	497	17,177	5,151
Unenumerated ..	1,790	500	2,265	80	NUTS and KERNELS for expressing Oil therefrom :				
PAINTERS' COLOURS AND PIGMENTS :					Copra	3,331	51	147,458	2,212
Barytes	70,413	—	51,950	—	Ground Nuts (or Arachide Nuts, Monkey Nuts, or Pea Nuts) ..	12,373	22,463	481,170	705,545
Nickel Oxide ...	1,000	2,500	5,711	13,760	Palm Kernels ..	17,090	21,988	696,943	577,501
Red Lead	102	—	190	—	Other Sorts	2,844	651	110,097	30,948
White Lead	11,160	—	26,426	—	Total	35,668	45,163	1,435,668	1,316,206
Zinc Oxide	11,872	502	34,494	2,521					
Unenumerated ..	58,195	10,137	76,471	33,085					
Total	152,742	13,139	195,242	49,366					

(To be concluded.)

EXPORTS OF CHEMICALS AND ALLIED PRODUCTS.

THE following returns, which are taken from the export statistics of the United Kingdom, give the amount and value of chemicals and allied products exported during the month ending June 30th, 1919, as compared with June 1918.

ARTICLES.	QUANTITIES.		VALUE.		ARTICLES.	QUANTITIES.		VALUE.	
	Month ended June 30th.		Month ended June 30th.			Month ended June 30th.		Month ended June 30th.	
	1919.	1918.	1919.	1918.		1919.	1918.	1919.	1918.
			£	£				£	£
BLEACHING POWDER: To U.S.A. cwt.	—	—	—	—	MEDICINES, comprising DRUGS and MEDICINAL PREPARATIONS:				
" Other Countries ..	23,313	4,482	18,673	3,711	Opium, dried and powdered in the United Kingdom lbs.	351	9,298	1,348	34,005
Total	23,313	4,482	18,673	3,711	Quinine and Qui- nine Salts ozs.	61,352	36,447	11,754	6,632
COAL PRODUCTS, NOT DYES:					Other Sorts val. £	—	—	309,672	219,025
Aniline Oil and Toluidine lbs.	213,403	204,655	11,285	12,691	Total	—	—	322,774	259,662
Anthracene.....	313,842	—	1,263	—	MURIATE OF AMMONIA cwt.	9,015	3,556	27,096	10,419
Benzol and Toluol gals.	17,892	1,179,147	1,543	78,062	PAINTERS' COLOURS AND MATERIALS:				
Carbolic Acid .. cwt.	7,521	6,423	17,628	25,140	Barytes cwt.	6,434	1,472	4,631	902
Coal Tar, Crude ..	1,580	—	601	—	White Lead	16,406	7,271	49,259	20,856
Refined and Varnish gals.	422,732	122,960	17,519	3,271	Zinc Oxide	1,383	98	4,979	400
Naphtha	46,101	1,437	6,193	209	Unenumerated ..	95,540	36,088	355,136	91,063
Naphthalene ... cwt.	2,780	18,816	3,676	27,899	Total ..	119,763	44,929	414,005	113,221
Pitch	1,079,165	89,080	145,354	90,287	POTASH COMPOUNDS:				
Tar Oil, Creosote, &c. gals.	552,723	250,135	20,647	7,893	Saltpetre (Nitrate of Potash) British prepared cwt.	2,591	308	7,280	1,040
Other Sorts cwt.	21,077	12,766	20,305	22,229	Chromate and Bi- chromate of Pot- ash	454	93	4,317	1,054
Total Value £	—	—	246,014	267,681	Other Sorts val. £	—	—	2,689	6,717
COPPER, Sulphate of tons	548	4,325	29,170	272,253	Total	—	—	14,286	8,311
DYE STUFFS:					SODA COMPOUNDS:				
Products of Coal					Soda Ash cwt.	290,213	246,762	95,972	72,641
Tar cwt.	7,024	7,136	82,724	101,491	" Bicarbonate ..	39,692	44,614	19,759	22,893
Other Sorts	3,377	2,337	12,150	15,896	" Caustic	54,508	45,000	62,291	70,134
Total	10,401	9,473	94,874	117,387	" Chromate and Bichromate ..	6,279	8,239	18,111	28,083
GLYCERINE:					" Crystals	27,909	237	9,118	80
Crude cwt.	723	1,400	2,976	4,600	" Sulphate (Salt- cake)	40,364	103,567	7,927	17,308
Distilled	3,592	4,591	21,242	20,720	" Other Sorts ..	36,913	48,630	36,028	56,884
Total	4,315	5,991	24,218	25,320	Total	495,878	497,049	249,216	268,023
MANURES:					SULPHURIC ACID - cwt.	1,105	1,059	2,265	947
Sulphate of Ammonia:					TARTARIC ACID ..	720	164	11,882	3,046
To France..... tons	360	305	10,318	7,598	CHEMICALS, other sorts val. £	—	—	322,577	611,752
" Spain and Canaries	568	—	18,965	—	SALT, Rock and White (except Table Salt):				
" Italy	825	—	25,560	—	To Belgium tons	1,124	—	4,053	—
" Dutch, East Indies	1,200	—	31,602	—	" U.S.A.	853	1,380	2,790	3,979
" Japan	—	—	—	—	" British East Indies	5,100	7,327	15,310	15,519
" U.S.A.	—	—	—	—	" Australia	—	116	—	608
" British West India Islands (including Ba- hamas) and British Guiana ..	302	—	8,003	—	" New Zealand ..	—	—	—	—
" Other Countries ...	1,440	30	40,655	720	" Canada	2,178	3,038	7,139	7,361
Total	4,695	335	135,103	8,318	" Other Countries ...	13,319	22,924	54,273	71,744
Superphosphates ..	157	25	1,663	175	Total	22,574	34,785	83,565	99,211
Basic Slag.....	5	—	47	—	GREASE & UNREFINED TALLOW & ANIMAL FAT cwt.	198,184	6,217	60,354	2,837
Unenumerated ..	2,406	1,484	32,835	16,870					
Total of Manures ..	7,263	1,844	169,648	25,363					

(To be concluded.)

REPORTS OF COMPANIES.

Mond Nickel Company, Ltd.

The report to April 30 last states that the balance to credit of profit and loss account is £422,658. Directors propose interim half-yearly dividend on preference at 7 per cent. per annum, paid February 5, less tax; dividend now to be paid on preference at 7 per cent. per annum, less tax; interim dividend on ordinary of 1s. per share, paid February 5, free of tax; dividend now to be paid on ordinary of 2s. 6d. per share, free of tax; forward, £168,058. The operations of the company, both in Canada and England, have been carried on throughout the year without interruption. Owing to dislocation of trade after the conclusion of the armistice, finished stocks unsold at the end of the financial year have largely increased. This, together with the fact that large stocks of nickel have been accumulated by the British and Allied Governments during the war, has necessitated temporary reduction of output.

W. J. Bush and Co., Ltd.

Accounts for 1918 show a gross profit of £271,277. After providing for debenture interest, expenses, and directors' remuneration, and making allowances for depreciation, there is a net profit of £65,903., which, with amount brought in, makes £96,508. After deducting the amount required for dividends on preference shares, there remains £90,258. The directors recommend a final dividend of 15 per cent. on the ordinary shares, making 20 per cent. for the year, placing £20,000. to general reserve fund, £10,000. to writing down goodwill, and carrying forward £35,258. (out of which will be paid excess profits duty for 1918). In March last the company received a letter from the Foreign Office stating that the company's premises in Moscow had been sealed up by the Soviet Government. The buildings and plant at Ash Grove, Hackney, and elsewhere, have been fully maintained.

Kynoch, Ltd.

The report for the nine months ended December 28, 1918, states that the directors are not able to present the balance-sheet as at December 28 owing to the enormous amount of work which has had to be done in connection with the termination of the war and the change-over to peace conditions. They are, however, satisfied from figures put before them that the profit is sufficient for the dividend of 14 per cent., subject to tax, on ordinary. Dividend on preference shares at rate of 5 per cent. per annum, free of tax, for three months ended December 31, will be paid at the same time as ordinary.

Lever Brothers, Ltd.

At Port Sunlight on July 11, an extraordinary general meeting of shareholders was held to confirm the resolutions of the extraordinary general meeting three weeks ago. The resolutions relate to an increase of capital from £60,000,000. to £100,000,000., and to develop and purchase new businesses as required. This was agreed to without opposition.

Van Den Berghs, Ltd.

An extraordinary general meeting was held on Friday of last week for the purpose of passing resolutions for increasing the capital of the company to £3,075,000. by the creation of 1,000,000 new shares of £1. each, to be called "C" preference shares. Sir Herbert M. Praed, Bart., presided, and in the course of his remarks stated that the money would be required for a large area of land in Fulham with extensive buildings and warehouses, which had been purchased.

The resolutions were adopted.

Borax Consolidated, Ltd.

A meeting is called for July 22, at the Cannon Street Hotel, to consider an increase of capital from £2,300,000. to £2,900,000. by the creation of 600,000 new deferred ordinary shares to rank equally with the original deferred ordinary shares, and to be issued at such time and at such premium as the directors may think fit.

British South African Explosives Company, Ltd.

Dividend of 8½ per cent (1s. 0.06d. per share), less tax, for year. £24,533. for factory depreciation; £1,500. for depreciation of securities; £85,939. forward. Last year, 11 per cent.; £20,102. for factory depreciation; £63,565. forward.

British Dyestuffs Corporation, Ltd.

Lord Moulton presided at a special meeting of the shareholders of the British Dyestuffs Corporation, Limited, in Manchester, on Thursday, called for the purpose of sanctioning a proposal of the directors to issue further preference and ordinary shares. He announced that the Government had become shareholders in the company to the extent of £850,000, invested in preference shares, and a similar amount in preferred ordinary shares. The issue of extra shares was necessary in order to satisfy the full needs of the textile industry. The fact that the Government were shareholders would give enormous strength to the company, and the shares were issued on exactly the same terms as those in respect to other shareholders. There was no need to point out the great importance of obtaining more capital to enable the company to undertake great gigantic work facing it.

In reply to a shareholder, Lord Moulton said no preference at all had been shown to the Government in purchasing the shares.

The proposal was carried unanimously.

DIVIDENDS.

W. AND H. M. GOULDING, LTD.—Dividend at rate of 7 per cent. per annum, and bonus of 3s. per share.

BRITON FERRY CHEMICAL AND MANURE COMPANY, LTD.—Interim dividend of 7½ per cent., less tax, same as a year ago.

LINOLEUM MANUFACTURING COMPANY LTD.—Interim dividend of 5 per cent. actual (5s. per share).

BRITISH OIL AND CAKE MILLS, LTD.—Interim dividend on the ordinary of 10 per cent. (less tax) for current year.

EASTERN SMELTING COMPANY, LTD.—Interim dividend on preferred ordinary at the rate of 10 per cent. per annum.

NEW COMPANIES.

Headley, Birch and Co., Ltd.—Private company. Capital £40,000., £1. shares. Metal manufacturers, etc. Solicitors: Coley and Coley, 63, Temple Row, Birmingham.

Sheet Metal and Galvanising Company, Ltd.—Private company. Capital £10,000., £1. shares. Office: 2a, Tyrell Street, Bradford.

Standard Oil and Refining Company, Ltd.—Private company. Capital £300,000., £1. shares. Solicitors: Piesse and Sons, 15, Old Jewry Chambers, E.C.

Taylor and Evans, Ltd.—Private company. Capital £3,000., £1. shares. Chemical and colour merchants and manufacturers. Office: 8, Victoria Street, Liverpool.

H. Rollet and Co., Ltd.—Private company. Capital £15,000., £1. shares. Object: To acquire the business of a metal merchant and metal warehouseman carried on by S. T. Medlicott. Office: 34-6, Rosebery Avenue, E.C.

John Forster and Co., Ltd.—Private company. Capital £20,000., £1. shares. Object: To take over the business of oil, paint, and shipstore merchants carried on at Sunderland by John Forster and Co.

Landore Zinc Works, Ltd.—Private company. Capital £100,000., £1. shares. Object: To take over the business of zinc oxide manufacturers carried on at Landore, Glam., as "Jno. R. Down and Co." Solicitors: Stephenson, Harwood and Co., 31, Lombard Street, E.C.

Kappa Works, Ltd.—Private company. Capital £30,000., in 29,990 ordinary shares of £1. and 200 founders' shares of 1s. Manufacturers of and dealers in photographic sensitive papers, etc. Office: 2, Verulam Buildings, Grays Inn, W.C.

The Associated Lead Manufacturers, Ltd.—Capital £1,500,000., in 1,000,000 preference and 500,000 ordinary shares of £1. each. Objects: To acquire, hold, and deal in stocks, shares, and securities (particularly those of companies engaged in businesses below mentioned); to carry on, manage, or direct the management or operation of the businesses of (a) manufacturers of and dealers in refined pig-lead, dry white lead, white lead in oil, white-lead paint, red, orange, and antimonial lead, copper slags, litharge, flake litharge, lead sheets and pipes, tea lead, lead foil, block tin, tinfoil, zinc rods and sections, composition rods and pipes, tinned pipes, shrapnel bullets, lead shot, dry colours, coloured paints, bitumastic ships' anti-fouling composition paints, zinc oxide, zinc sheets, zinc sulphate, and other things made of lead or lead compounds, and (b) lead merchants and manufacturers, smelters, refiners, manufacturers of sanitary appliances and the like. Registered office: 70, Lombard Street, E.C.

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

The specifications of the following applications are not printed by the Patent Office until the complete specifications have been accepted.

July 7th to July 12th (inclusive).

- Drying China Clay. Adair, J. 16,953.
 Extraction of Tin from its Ores. Annable, H. W. C.; and Janson, E. W. 17,052.
 Anhydrous Magnesium Chloride or Anhydrous Double Chlorides of Magnesium. Ashcroft, A. E. 17,246.
 Electrolytic Decomposition of Anhydrous Magnesium Chloride and Production of Magnesium or Alloys Thereof and Chlorine. Ashcroft, E. A. 17,247.
 Production of Magnesium or Alloys of Magnesium and By-products. Ashcroft, E. A. 17,248.
 Regulating Operations in Rectifiers for Rectifying Mixtures of Liquefied Gases. Barbet et Fils et Cie, E. 17,221.
 Continuous Distillation of Glycerine from Weak Alcoholic Liquors of Fermented Liquids. Barbet et Fils et Cie, E. 17,222.
 Recovering Aniline and Toluidine from Aqueous Solutions Thereof. Barnett, E. de B. 17,460.
 Recovering Lecithine from Organic Compounds. Baumann, C.; and Grossfeld, J. 17,418.
 Paint. Bienenfeld, J. 17,508.
 Treatment of Heavy Oils. Dunstan, A. E.; and Thole, F. B. 17,114.
 Treatment of Ammoniacal Liquor. Fairweather, J. H. 17,186.
 Pyroxilin Solvent. Flaherty, E. M. 17,082.
 Borax, Boric Acid, and Lard Recovery. Fleming, E. L. 16,940.
 Treatment of Hydrocarbons. Forwood, G. F.; and Taplay, J. G. 16,961.
 Apparatus for Manufacture of Superphosphates, etc. Guillaume, F. 17,007.
 Anti-corrosive Paint or Composition. Ivinston, C. H.; and Roberts, G. S. 17,490.
 Separating Constituents of Gases or Vapours. Loring, F. H. 17,006.
 Colorimeters. Ormandy, W. R. 17,241.
 Indicating Level of Liquid in Closed Tank. Orok, W. M. 17,560.
 Separating and Reclaiming Oil from Waste Materials. Pritchard, E. R. 17,055.
 Acid-resisting Pipes, Cylinders for Scrubbers, Towers, etc. Rammage, A. 17,168.
 Electrolytically Depositing Copper, etc., on Aluminium and its Alloys. Rhodin, J. G. A. 17,443.
 Pyrometer. Schneiderman, L. 17,001.
 Precipitating Aluminium Hydrate. Sherwin, R. S. 17,084.
 Nitration of Phenols. Silberrad, O. 17,280.
 Mixing Gases with Liquids or Solids. Soc. Anon. l'Oxydrique Française. 17,428.
 Purifying Gases for Synthetic Production of Ammonia. Soc. l'Air Liquide, Soc. Anon. pour l'Etude et l'Exploitation des Procédés G. Claude. 16,986.
 Production of Acetylene, Acetaldehyde, etc. White, W. C. 17,434.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 6d. in stamps to the Comptroller, Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane, W.C.

1917.

- Apparatus for Expressing Liquid from Materials Containing the Same. Wallich, C. A. N. 5,591. 128,964
 Dopes or Varnishes for Aircraft Construction. British Aeroplane Varnish Co.; and Groves, S. E. 12,807. 128,974
 Manufacture of Gun-cotton. National Explosives Co.; and Bate, W. 12,845. 128,978
 Alkali Fusion of Aromatic Sulphonic Acids. South Metropolitan Gas Co.; and Evans, E. V. 13,514. 129,002
 Mercury Vapour Lamps. Cornu, M. J. 13,807. 129,022
 Recovery of Ether and Alcohol from Vapour-laden Air. Craig, R. A.; Robertson, Sir R.; Masson, J. I. O.; and Drummond, A. A. 13,874. 129,024
 Manufacture of Furfural. Recard, E. 13,880. 129,025
 Solutions of Cellulose Esters. British Aeroplane Varnish Co.; and Ward, J. G. 14,080. 129,033
 Explosives. Marin, A. J. 14,160. 129,036

1918.

- Decolourisation and Purification of Trinitrotoluol and Other Crystallisable Organic Compounds, and Apparatus Therefor. Morris and Co., H. N.; Morris, H. N.; and Sable, J. 9,258. 129,074
 Apparatus for the Destructive Distillation and Carbonising of Pitch. Perkin, F. M.; and Nitrogen Products and Carbide Co. 10,759. 129,091
 Concentration of Sulphuric Acid. Perrin, F. 11,021. 118,695
 Retorts for Use in the Destructive Distillation of Coal and the Like. West, J.; and Wild, W. 11,738. 129,139
 Production of Azides. Hodgkinson, W. R. 12,881. 129,152
 Process and Apparatus for Purifying Camphor. Du Pont de Nemours and Co., E. I. 13,076. 124,413
 Emulsifying Agent Especially Intended for Use in the Manufacture of Margarine. Rushen, P. C. (Naamloze Vennootschap Anton Jurgens Vereenigde Fabrieken). 14,329. 129,165
 Process for the Production of Blue Sulphur Dyes. Ellis, G. B. (Chemical Works formerly Sandoz) 16,761. 129,182
 Explosives. Marin, A. J. 20,180. 121,294

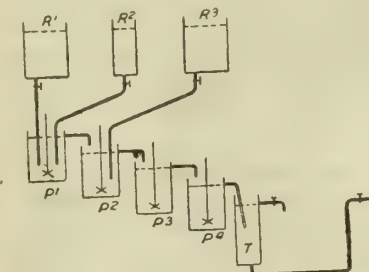
1919.

- Process for the Preparation of Anhydrous Sulphide of Zinc. Comment, P. 6,089. 126,274

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Nitro-compounds. Clayton Aniline Company, A. Schedler, and V. Vuilleumier, Clayton, Manchester. British Patent, 126,355, of 1917.

The continuous nitration of organic liquids is carried out in a plant consisting of (1) a series of open measuring tanks containing the nitric acid, sulphuric acid, liquid to be nitrated, and water for dilution if necessary, the base areas of the tanks being proportional to the requisite volumes of the several liquids; (2) reaction pans of uniform size and shape arranged in a stepped series and provided with agitators; (3) a separator into which the product of reaction flows and



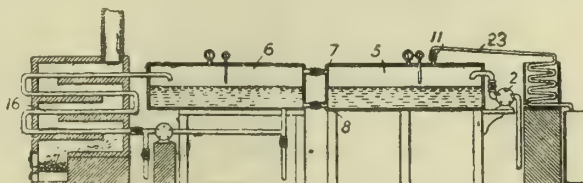
separates into nitro-body and waste acid, which flow off from the top and bottom respectively to suitable receptacles. The two acids are run continuously from their measuring tanks into the top reaction pan, and are mixed therein; the mixture flows down to the next pan, into which the liquid to be nitrated is also running from its measuring tank; the reacting mixture flows down through as many pans as are necessary to complete the reaction, and finally (after dilution with water if necessary) the product flows into the separator. The illustration shows an arrangement suitable for nitrating toluene to mononitrotoluene; the tanks R¹, R², R³ contain respectively sulphuric acid, nitric acid, and toluene; the two acids are run into the pan P¹, and after mixing run into pan P², which also receives toluene from tank R³; the mixture then flows through pans P³, P⁴, to the separator T; the temperatures in the several pans are suitably adjusted by heating or cooling coils. A similar arrangement, using four measuring tanks and seven reaction pans, is described for nitrating a mixture of mono-, di-, and tri-nitrotoluene to tri-nitrotoluene. Details of quantities of reagents, temperatures, etc., in these two processes are given. The process and plant may also be applied to the continuous nitration of benzene to mono- or di-nitrobenzene, xylene to mono- or di-nitroxylene, chlorbenzene to mono or di-nitrochlorbenzene, etc. Specification 16836/10 is referred to.

Phenols. D. Tyrer, Stockton-on-Tees. British Patent, 125,625, of 1916.

Phenol or a homologue thereof is separated from aqueous solutions by agitating with nitrobenzene, which may be mixed with a diluent such as benzene, solvent naphtha, paraffin, etc., which diminishes the specific gravity so that the mixture will float on water.

Cracking Oils. R. Cross, Kansas City, U.S.A. British Patent, 126,103, of 1918.

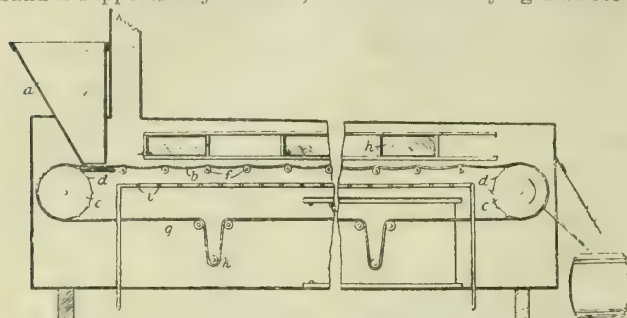
Heavy hydrocarbons are converted into light hydrocarbons by distilling them under a pressure of 400–1,000 lb. per sq. in., and passing the resulting vapours under the same pressure over and into contact with the cool heavy hydrocarbons on their way to the still. The apparatus comprises a still 6 in which the oil, heated by circulation through a heated coil 16, vaporises under pressure. The resulting



vapours pass through a pipe 7 into a container 5, which is continuously supplied with cool oil by a pump 2, and from which the oil after it has taken up the heavier constituents of the vapours flows by a pipe 8 to the still 6. The requisite pressure is maintained by a valve 11 on the vapour outlet pipe 23. The distillation is usually effected at 300–450° C., the pressure being 600 lb. per sq. in.

Drying Apparatus for Picric Acid. N. H. Graesser and E. Williams, Ruabon, Denbighshire. British Patent, 126,077, of 1916.

The drying of picric acid is effected by passing it through a heated chamber by means of a belt or band conveyer. The apparatus shown comprises a heated chamber *g*, through which the material is carried on a band *b* driven by rollers *c* with teeth *d* engaging perforations in the sides of the band. The band is supported by rollers *f*, which are of varying diameters



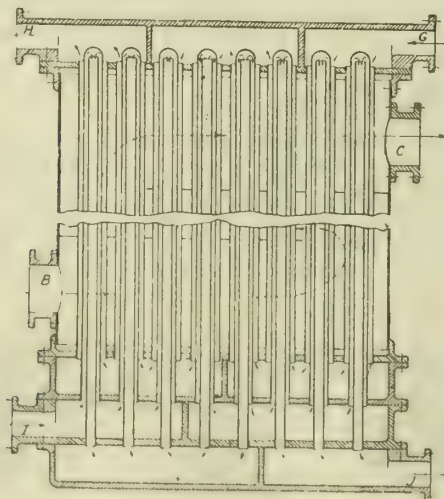
to agitate the material in its travel; weighted rollers *k* are provided for tensioning the band. The chamber is heated by steam pipes *i*; currents of hot air may also be used. A feed hopper *a*, outlet *l*, and inspection windows *h* are provided. Jets or sprinkler pipes are provided to drench the material in case of fire.

Hydrogen. R. and J. Dempster, Ltd., and J. M. Ballingall, Manchester. British Patent, 126,251, of 1918.

In the manufacture of hydrogen by passing steam over heated iron, the iron oxide produced is reduced in two stages; Firstly, by means of previously used water gas which has been dried and condensed, termed secondary gas; and, secondly, by means of fresh-water gas, termed primary gas, which may afterwards be reused as secondary gas. The second operation may be of longer duration than the first, and the primary gas used at the commencement of the second operation may be passed away without being utilised as secondary gas.

Catalytic Production of Sulphur Trioxide. W. J. Mellersh-Jackson, London. (A communication from Bombrini Parodi-Delfino, Rome.) British Patent, 126,396, of 1917.

In the production of sulphur trioxide, a single apparatus is employed through which the sulphur dioxide is passed on its way to the catalytic chamber, and in which it can receive heat either from an external source or from the sulphur trioxide leaving the catalytic chamber, or from both sources

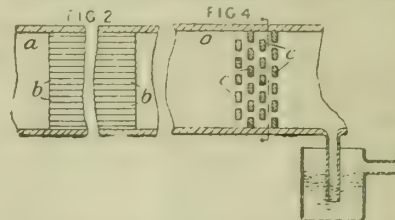


simultaneously. The apparatus described comprises a number of concentric tubes as shown. The hot gas acting as the external source of heat enters at B and leaves at C after passing around the tubes. The sulphur dioxide enters at G and leaves at H, and the sulphur trioxide enters at I and leaves at J.

Sulphuric Acid. Chance and Hunt, Ltd., Oldbury; W. A. S. Calder, Edgbaston; and C. A. O. Fox, Langley. British Patent, 126,320, of 1916.

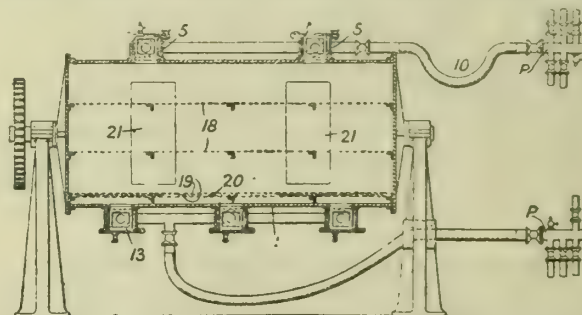
Sulphuric acid is separated from the fumes evolved in concentrating sulphuric acid by causing the gases at 95-135° C. to travel at high velocity through a constriction in the pipe conveying them.

velocities of 35-70 ft. per second being mentioned. If the gases are also caused to change their direction, the velocity may be as low as 20 ft. per second. The constriction may be formed by placing obstructions or packings in the tube *a* or in a constriction in the tube—for instance, pipes *b* may be used, Fig. 2; or, with change of direction, bars *c*, Fig. 4, may be arranged in staggered relation, or perforated plates with the perforations in staggered relation may be used. The condensed acid may be drawn off at a point following the constriction.



Extracting Fats, Sugar, Etc. J. de Raedt, Court St. Etienne, Brabant, Belgium. British Patent, 126,262, of 1919.

In apparatus for extracting fats, oils, sugar, and the like by means of solvents in an oscillated container, the inlets and outlets 5, 13 for the solvent or other fluid are arranged along the top and bottom of the drum 1, and are connected to the main supply pipes P by flexible tubes 10. Filters comprising mats 20 held between perforated plates 19 may be arranged a short distance from the inlets and outlets. Compartments



are formed in the drum by porous or perforated plates 18, and steam-heated coils may be arranged below each division. The drum is filled and emptied through doors 21. In the preferred method of working, hot solvent vapour is admitted to the exhausted charged drum before any liquid solvent, and the residual solvent is removed by hot steam generated from air-freed water.

Acetaldehyde. J. Crosfield and Sons, Warrington; and T. P. Hilditch, Grappenhall, Cheshire. British Patent, 125,926, of 1918.

In the production of acetaldehyde by passing acetylene into acid solutions of mercury salts, the mercury sludge formed in the process is revived by adding to the reaction liquid a small quantity of hydrogen peroxide, and agitating the mixture by passage of gas or by mechanical agitation; the revivification is repeated until the solution ceases to be an effective absorbent. The reaction liquid should contain 0.5 to 1.5 per cent. of mercuric oxide, and the apparatus should be free from metallic parts; the lower part of the apparatus should contain baffles to break up the gas current. A detailed example is given. Specification 105,064 is referred to.

Nitrogen. E. A. Ashcroft, London. British Patent, 125,714, of 1918.

An alloy containing from 5 to 50 per cent. of magnesium and from 95 to 50 per cent. of lead is used in presence of water vapour to absorb oxygen from gaseous mixtures containing it, and particularly for the preparation of nitrogen from atmospheric air. An alloy of 15 per cent. of magnesium and 85 per cent. of lead is suitable for use cold, for instance, in granular or powder form. The gas mixture may be passed over or through the alloy, or may be exposed to it while confined in a gas-holder over water.

FERTILISER NEWS.

(SPECIALLY CONTRIBUTED.)

Nitrate of Soda.—The official total of the June shipments from Chili is 36,190 tons, of which 4,090 to Europe, 19,640 to the United States, and 12,460 to "other parts"; the exact production was 128,730 tons, leaving stocks of manufactured nitrate on hand at July 1, 1,488,760 tons. There is nothing to report with regard to the position of the article on this side, the agricultural demand being "nil," as usual, at this time of the year, the few parcels changing hands for chemical purposes fetching rather more money than of late owing to the scarcity of supplies held by merchants. The Government still advertise "large surplus stocks of nitrate of soda, calcium nitrate, and ammonium nitrate," but particulars of prices have not transpired. Business in Chili is practically at a standstill as far as the Associated Producers are concerned, and their position is rapidly becoming unbearable, the only recent sale out of their enormous accumulation of stocks having been a small quantity of "refined" for August shipment at 9s. 8d. per quintal, f.o.b. It may readily be imagined that buyers are not disposed to operate in this direction when they can effect purchases on much more favourable terms through the Chilean Government. The latter, acting on behalf of the native and German producers standing out of the Association, seem not to have let the grass grow under their feet, it being circumstantially stated that they have sold 50,000 tons of nitrate to Holland and 20,000 tons to Spain, besides arranging with a French syndicate for the annual shipment of 300,000 tons for three years; negotiations are also said to be proceeding with Italy for 100,000 tons from the German oficinas—in every case at prices considerably below those "fixed" by the Association. No wonder there is a flutter in the nitrate dovecot!

Fertilisers on the Continent.—In reference to a decision recently announced on the part of the Unione Concimi to reduce the price of superphosphate by about 20 per cent., it is stated that the Societa Collae Concimi di Roma has unreservedly adhered to this basis of price, and that its intention is for the coming spring to make a new and serious reduction in sale prices. Merchants and consumers of fertilisers are therefore advised to limit their purchases to the quantity that will be required for the coming autumn season. The journal announcing this movement observes that the Government would be doing a praiseworthy thing if they would liberate the necessary ships for the transport of phosphorites. The result, it is thought, would be a further and a greater reduction in prices in the very near future.

At a recent fair held at Utrecht a large number of Dutch chemical manufacturers exhibited, thus proving that under the protection of the war the chemical industry in Holland has made important progress. Amongst the products exhibited were artificial manures, sulphuric acid, phosphoric acid, nitrate of ammonia, sulphate of ammonia, phosphate of ammonia, phosphate of calcium, sulphate of soda, and bisulphate of soda.

Important Algerian Fertiliser Combination.—The shareholders of the Algerian Chemicals and Fertiliser Company are convoked to a general and extraordinary meeting on July 30 to approve the report of the commissioner on the question of amalgamation with the Tunisian Chemical Fertiliser Company.

Sulphate of Ammonia.—The average export value of sulphate of ammonia at present is about £25. per ton, net cash, in double bags, f.o.b., British port; and the fixed price for home agriculture is £19. 10s. per ton, net cash, delivered destination required by buyer in Great Britain for July-September delivery. The market does not appear to be very active at the moment, but the under-current is good. People seem to be paying more attention now to the American production of sulphate of ammonia, especially with regard to its prospects of securing a hold upon foreign markets. In these columns the American market has been noted from time to time, and readers will know, therefore, that this is a section of the market to watch. Latest advices from the other side of the Atlantic announce that there has been no easing off in the demand for American sulphate for export. The domestic consumer is somewhat reluctant to bring full demands to the market, presumably waiting possible lower price levels. In the meantime, holders out there state that there is no necessity for making concessions to stimulate local trade, and therefore prices are firmly maintained. Some attention is also being directed to the possibility of develop-

ment of the German export trade in sulphate of ammonia, which may be reanimated earlier than expected. The price of sulphate of ammonia in France has been reduced slightly, and the material will be sold at this reduced figure until November 15 it is said.

Slag and Superphosphate.—The bookings continue to be good for deliveries of basic slag over the season, and quite a respectable quantity is on order for deliveries over this and next month. Representative prices appear to be £3. 2s. to £3. 12s. per ton for prime slag, 12-22 per cent. phosphate, in bags; with £3. 15s. to £5. 2s. for 24-42 per cent. It was held that there would be a larger output of basic slag during the season, but the demand even then threatens to outpace it. Superphosphate business remains pretty level, with prices as already given here.

Bone Meals.—The position of this market still remains unsatisfactory from the agricultural standpoint. Larger supplies, especially from India, are being asked for, but they do not mature. At the same time prices, whilst still being high, cannot be regarded as extravagantly so, and a fair level of trade is moving. From £12. to £13. 10s. is still being quoted for pure dissolved bones, 3-3 per cent. ammonia and 35 per cent. phosphate; with £11. to £11. 5s. for pure steamed bone meal, 1 per cent. ammonia and 60 per cent. phosphate, in both cases ex works.

SOUTH WALES NOTES.

(SPECIALLY CONTRIBUTED.)

Fuel prices are interfering with the extent of business in the tinplate trade, and manufacturers in their quotations are acting with great caution regarding the question of delivery. Forward bookings are only entertained on small limits, and it is feared that American competition will prove too great for Welsh makers to retain their former prestige in markets hitherto exclusively supplied by them. The advance of 6s. per ton on coal will have a serious effect on this staple industry, which is already in a critical state owing to the demands of labour and the high prices of steel and other raw materials.

Mr. G. Rudd Thompson has been appointed by the Society of Public Analysts to represent them on the Standards Committee of the Institute of Chemistry "to consider the advisability of making provision for the preparation and issue of authoritative samples of chemical substances, ores, metals, etc., of ascertained composition," which are to be officially recognised as standards of purity for national use. Mr. Thompson is the public analyst for the county of Monmouthshire.

The Council of the University of Wales has appointed Mr. H. Ll. Bassett, B.A., B.Sc., lecturer in organic chemistry. During the last three years Mr. Bassett was assistant demonstrator in the University laboratory, Cambridge.

It is too early to form any definite idea as to the effect of the advance in the price of coal upon the export trade in patent fuel, which of late has been steadily increasing.

The prospects of better trading in the spelter trade are brightening, and, given stability in labour matters, foreign competition will not cause much worry. Two thousand tons of zinc concentrates arrived this week from Australia and 200 tons from Port Pirie.

ACETYLENE AS MOTOR FUEL.—In Switzerland, where hydro-electric power for making calcium carbide is abundant, acetylene is the most promising substitute for petrol as a motor fuel. Its drawbacks include violent explosiveness when mixed with compressed air in the carburetter, and corrosion or clogging of the motor by soot and acids of combustion. Remedies are dilution of the acetylene and an extra air supply to ensure burning all carbon. H. Grossmann reports that the explosion of even the diluted freshly generated acetylene is too sudden, but that acetylene from a solution in acetone carried under pressure in steel cylinders is safer, and is ready for the instant starting of the motor until the cylinder is practically emptied. The cylinders, however, are not only heavy and expensive, but are not generally obtainable. A large one for a motor-car gave a run of 75 miles from one charging. Diluents included alcohol, petrol, light tar oils, naphthalene, water, etc., and the use of at least 20 to 25 per cent. was necessary. Good results were given by 20 per cent. of an equal mixture of light tar oil and alcohol.

GAZETTE NEWS.

LIMITED COMPANIES.—Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions, Orders, and Official and Other Notices.

Broughton Rubber Company, Ltd.—Resolved June 30: That the company be wound up. F. S. Burman, 29, Princess Street, Manchester, chartered accountant, liquidator. Meeting of creditors at liquidators, July 18.

Thompson (Jabez) and Sons, Ltd., Northwich.—Resolved June 11, confirmed June 26: (1) That the company be wound up. J. H. Worthington, 11, Spring Gardens, Manchester, chartered accountant, liquidator. (2) That an agreement, dated June 18 (now produced and read to the meeting), between this company and Brunner, Mond and Co., Ltd., providing for the sale to the latter company of the business of this company, including its machinery, plant, stocks, and other assets mentioned in said agreement, be and the same is hereby approved and ratified. (3) That the liquidator be and is hereby authorised to carry out the sale. Meeting of creditors, Halliday, Pearson and Co.'s, 11, Spring Gardens, Manchester, July 16.

Waste Conversions, Ltd., London, E.C.—Resolved June 30: That the company be wound up. G. D. Cahill, 4, Tokenhouse Buildings, E.C., liquidator. Meeting of creditors registered office, 4, Tokenhouse Buildings, E.C., July 17. Claims to liquidator by July 31.

DISSOLUTIONS OF PARTNERSHIP.

(Note.—When two dates are given in the following announcements, the first is the date of the dissolution. The date in parentheses is that of the official advertisement.)

Luke and Bailey (Anthony Jno. Luke and Jno. Gregory Bailey), 1 to 4, Great Tower Street, E.C., chemical merchants. June 24. Debts due and owing to or by the said late firm will be received or paid by Black, Geoghegan and Till, 21, Bucklersbury, E.C. (July 1.)

Martin and Lanning (Sidney Martin and Geo. Lanning), Westgate Buildings, Bath; oil and colour merchants. June 25. Debts by S. Martin. (June 27.)

CONTROL OF SEEDS, OILS, AND FATS.

THE Ministry of Food announce that the Seeds, Oils, and Fats Order was issued by the Food Controller with the intention of protecting the consumer by the elimination of speculation. It is felt that the effective operation of the Order can best be secured by the trades themselves. It has therefore been decided to invite the co-operation of the recognised Associations concerned with the different products. These associations issue contracts, arrange for arbitration, and settle commercial disputes, and are thus in touch with the operations of practically the whole body of traders. The Food Controller has therefore authorised the issue of licences on his behalf by the following associations:—

London, Bristol, and Scottish Areas. The Incorporated Oil Seed Association, Exchange Chambers, St. Mary Axe, E.C. 3; London Oil and Tallow Trade Association, Crosby Buildings, Gt. St. Helen's, E.C. 3; London Corporation Association, 165, Fenchurch Street, E.C. 3; United Kingdom Brokers' Association, 14-20, St. Mary Axe, E.C. 3.

Hull Area.—Hull Oil Seed and Cake Association. Exchange Buildings, Hull.

Liverpool Area.—Liverpool United General Produce Association, 13, Rumford Street, Liverpool.

Licences to consumers in the soap trade are issued by the Scapmakers' Federation; to consumers in the paint and varnish and allied trades by the National Federation of Paint and Varnish Makers. The latter Association also issue licences to deal in linseed oil to their own members under certain circumstances. All the necessary information with regard to licences can be obtained from the secretaries of the associations concerned.

MARKET REPORTS.

TAR AND AMMONIA PRODUCTS.

WEDNESDAY.

Benzole: London, 90%, 1s. 11d. to 2s.; North, 1s. 9d. to 1s. 10d.; 50%, 1s. 9d. to 1s. 10d.; North, 1s. 9d., naked. Carbolie acid, crude, 60%, East and West Coast, nominally 1s. 3d.; crystals, 30-40%, 5d. to 6d., f.o.b. Crude tar, London, 42s. to 43s.; Midlands, 37s. to 38s.; North, 36s. to 37s. per ton, ex works. Pitch, 72s. 6d. to 75s.; East Coast, 65s., f.o.b.; West Coast, 52s. to 54s., f.a.s. Solvent naphtha, naked, London, 90-100%, 2s. 5d.; North, 2s. 3d. to 2s. 4d.; 90-100%, naked, London, 2s. 1d.; North, 1s. 10d. to 1s. 11d. Crude naphtha, naked, 30%, 8d. to 8½d.; North, 7½d. to 7¾d. Refined naphthaline, £18. to £22; salts, £6. to £7. Toluol, naked, London, 2s. 1d.; North, 2s. Creosote, naked, London, 5½d. to 5¾d.; North, 5d. to 5½d.; heavy oil, 6¾d. to 7d. Anthracene, 40-45%, 6d. per unit. Cresylic acid, 95%, 2s. 7d. to 2s. 8d.; 97-99%, 2s. 9d. to 2s. 10d., ex works, London, and f.o.b. other ports. Sulphate of ammonia: Home trade, £19. 10s. per ton; basis 24½%. Nitrate of soda, £21. to £22.

FERTILISER MATERIALS.

LIVERPOOL. THURSDAY

Nitrate of soda continues firm, the quotation for 95-96% quality being £21. 2s. 6d. per ton, net cash, f.o.b., prompt delivery. East Indian bone meal is again firmer, and the nearest value of 14% ammonia and 32% phosphate of lime, August-September shipment, is now £11. per ton, net cash, ex ship Liverpool. On spot, holders are also firmer, and now ask £15. per ton, net cash, for 4½ and 45% quality. Mineral phosphates: No alteration is to be reported in this market, and values are at present only nominal. Dried blood: Supplies of this material are scarce, the value being about 25s. to 30s. per unit of ammonia per ton, net cash.

LONDON METAL MARKET.

THURSDAY

Copper: Standard brands, £105. to £105. 10s., cash; £105. 10s. to £106., three months; electrolytic, £106. to £115. Tin: Standard, £254. 10s. to £254. 15s., cash; £254. 5s. to £254. 10s., three months; Straits, £254. 10s.; English, £251. to £252., f.o.r. Lead: Soft, foreign, £23. 17s. 6d.; English, £24. 15s. Spelter, £43. 15s.; hard,

£34. to £35. Antimony, English regulus, 90%, £45. Aluminium, £150. Nickel, £205., delivered, packages extra. Quicksilver, £22. to £22. 10s. Bismuth, 12s. 6d. Platinum, 442s. per oz. Wolfram, 30s. per unit.

TURPENTINE MARKET REPORT.

Messrs. James Watt and Son, Ltd., of 101, Leadenhall Street, London, E.C. 3, report that the stocks of turpentine on July 12 were: American, 27,217 barrels, compared with 8,899 barrels at the corresponding date of 1918; French, 46 barrels (15 barrels); and Spanish, 370 barrels (1,124 barrels). Deliveries during the week ended July 12 were 1,721 barrels, against 368 barrels last year, and since January 1 34,718 barrels, compared with 13,420 barrels in 1918. The price on Saturday last was 90s. per cwt., compared with 116s. at the corresponding date of last year. September-December delivery was quoted at 91s. 3d., and January-April 92s. 9d.

MANCHESTER CHEMICAL MARKET.

THURSDAY.

There is a decided improvement in demand for heavy chemicals, both on export and home trade account, and values all round are well maintained. Caustic soda, 70%, is still quoted at £17. 10s. for resale lots, and refined bicarbonate of soda at £7. 10s. per ton; 58% alkali unchanged at £6. 10s., ex store. Bleaching powder continues steady for spot lots at £15., softwoods, rails. Hardwoods, about £14., f.o.b. Soda crystals, bags, 82s. 6d., on rails. Chlorate of potash is lower at 1s. 1d. per lb. Soda steady at 7½d. per lb. There is not much inquiry yet for copper sulphate, and export price remains nominally £45., f.o.b. Bichromates are steady at recent rates. Selrooke firm at 60s., in bulk, carriage paid. Recovered rock sulphur, £19. per ton. Phosphate of soda, £25. 19s. per ton. Concentrated hyposulphite of soda quiet at £16. 10s., on rails. Concentrated sodium sulphide easier at £20. per ton, in casks. Nitrite of soda, £55. per ton. White powdered arsenic continues scarce, and small spot lots of Cornish make are still realising £40. per ton. Yellow prussiate of potash quietly steady at 1s. 9d. per lb. Soda appears to have reached the bottom at 7d. per lb., and is moving off fairly well. Acetic acid in good request, and values well maintained. Acetate of soda is in only moderate demand at

£53. per ton. Lead salts are unaltered: White acetate at £85. and brown, £75. per ton. Nitrate lower at £57. per ton. English brown acetate of lime in short supply, and price steady at £10. per ton. American grey higher at £19. 10s. per ton. Green copperas is only selling slowly. For oxalic acid there is a fair inquiry, and price unchanged at 1s. 2½d. to 1s. 3d., delivered.

SWANSEA MARKET REPORT. THURSDAY.

Tinplate prices are rather unsettled owing to the coal situation. Quotations have stiffened, and may be given as between 33s. to 34s. basis for standard boxes. Copper is dearer at £97. 10s. cash and £98. three months. Tin easier at £245. 7s. 6d. cash and £245. 10s. three months. Lead steady: Spanish, £23. 15s.; English, £24. 15s. Spelter, £41. 10s. prompt and £41. 15s. three months. Silver, 53½d. per ounce. Zinc sheets, £65., f.o.b., New York. Aluminium, £150. Antimony nominal: English regulus, 90%, £45. Nickel quiet at £195, including delivery to London or equal. Quicksilver, £21. 5s. per bottle. Sulphate of copper dull: United Kingdom price, £45. per ton, with export at £47., f.o.b. Sulphate of ammonia steady at £19. 10s. per ton over quarter. Nitrate of soda, 22s. 6d. per cwt., in bags. Turpentine, £4. 10s. 6d. per cwt. net. Pitch firm and in poor supply at 51s. per ton. Bone meal, 13s. 6d. per cwt, in bags. Arsenic is rather dearer at £39. per ton for white powdered, in bags, f.o.b. Oxalic acid quiet at 1s. 3d. per lb., f.o.b.

LIVERPOOL CHEMICAL MARKET. THURSDAY.

The demand for chemicals for use in the United Kingdom has been quieter. Business men have been depressed by the increase in the price of coal, coming at a time when all available skill was required to steer business safely through the troubled waters of labour unrest and the uncertainties thrown up by them. Trade was difficult enough to manage, without the new and onerous burden of 6s. per ton on coal.

Bleaching powder has met with a fair inquiry, and is £14. 10s. to £15. per ton free on rail or conveyance, in buyers' packages, and £17. per ton for export. Chloride of calcium has been in quietly steady demand, and is £8. to £11. per ton in casks, f.o.r. Caustic soda has been more inquired for, and is £24. per ton for 76 per cent.; £22. per ton for 70 to 72 per cent., and £19. per ton for 60 to 62 per cent. Nitrate of soda has been in fair demand and is £20. 10s. to £21. per ton. Saltcake has been quieter and is £6. 10s. per ton in casks, f.o.b. Soda crystals have been in rather active inquiry and are £5. per ton, in 2cwt. bags, f.o.r. at works. Bicarbonate of soda has been steadily called for and is £7. 5s. to £10. per ton, according to terms of delivery. Borax has sold more freely and is £42. per ton for ordinary and £44. per ton for powdered in bags. Ammonia alkali has been in good request and is £6. 5s. per ton, f.o.r. at works.

Hyposulphite of soda continues to meet with a fair inquiry. Ordinary crystals are £19. to £20. per ton, in 2cwt. bags, pea crystals, £25. per ton in 1cwt. kegs. Sulphite also has been in fair demand, and is £11. per ton for ordinary and £18. to £19. per ton for pea crystals in 1cwt. kegs. Bichromate of soda has been quieter and is 9d. per lb. Phosphate of soda has been in moderate request and is £25. per ton. Sulphide of sodium has been more inquired for and is £20. per ton in casks, and £22. per ton, in drums. Chlorate of potash has had a moderate sale and is 1s. 1d. to 1s. 2d. per lb. Permanganate of potash has sold more readily and is 3s. 6d. per lb. Sulphate of potash has been very quiet, and is £40. per ton. Carbonate of potash has been in moderate request and is £85. to £90. per ton for 80 to 85 per cent. Caustic potash continues to meet with a rather active inquiry and is £90. to £100. per ton for 35° Bé. Nitrate of potash has been in somewhat freer request and is £58. to £60. per ton for refined and £40. per ton for ordinary. Canadian ashes have had a very limited sale and are £200. to £220. per ton for first quality, Montreal, and £190. to £210. per ton for second quality. Bichromate of potash has been in moderate demand and is 1s. 6d. to 1s. 7d. per lb. Yellow prussiate of potash has been quiet and is 1s. 9d. to 1s. 10d. per lb. Sal ammoniac has been rather more inquired for, and is £80. per ton for lump; £75. per ton for seconds, and £5. per ton extra for ground. Sulphate of ammonia has been in quietly steady demand, and is £19. 10s. per ton for farm uses or for fertiliser making, less trader's discount of 10s. per ton; free to nearest wharf or railway station; to September 30. Carbonate of ammonia has been but little in

request and is 6½d. per lb. Muriate has been very quiet and is £50. to £60. per ton, according to quality. Magnesia has been in fair demand. Carbonate is £3. 10s. per ton, and sulphate, £10. to £16. per ton, according to grade. Alum has been steadily called for, and is £18. 10s. per ton for the home trade and £18. 10s. to £19. 10s. per ton for export. Aluminoferric has again been but little in demand, and is £8. 10s. to £12. per ton, according to quality. Sulphate of alumina has been quiet, and is £12. to £18. per ton, according to grade. Sulphur has been in very fair request. English flowers are £32. per ton; roll is £28. per ton, and rock £22. per ton, in bags, f.o.r. Sicilian kinds are: Flowers £28. per ton; roll £22. 10s. per ton; and third quality £17. 15s. per ton. Cream of tartar has been more in request, and is £11. 5s. to £11. 10s. per cwt. Tartaric acid has met with a fair inquiry, and is 3s. 2d. per lb. Boracic acid has been in moderate demand, and is £72. per ton for crystals and £74. per ton for powdered. Oxalic acid has been in quietly steady request and is 1s. 3d. per lb. Citric acid has again been in fair demand, and is 4s. 4d. per lb. White acetate of lead has had a very limited sale and is £85. to £90. per ton. Arsenic has been in fair request; white powdered has been scarce, and the price has been very irregular. From £42. to £45. per ton is being asked for it. Sulphate of copper has been but little in request for home trade uses, but rather more called for on export account. For farm uses in the United Kingdom, it is £45. per ton, and for export, £47. to £48. per ton, less 5 per cent., in casks, f.o.b. at Liverpool.

TYNE CHEMICAL REPORT.

TUESDAY

Chemicals are unchanged, but the demand is very steady, and for home consumption improving. Bleaching powder and caustic soda in good request. Soda crystals locally are steady at £5. per ton, 2cwt. bags. Sulphur continues very scarce and firm at £22. and £23. per ton.

The following prices are per ton, net: Bleaching powders, softs and hards, £15; caustic soda, 74-77%, £23. 5s.; do., 70%, £22.; do., 60%, £20.; recovered sulphur, 2cwt. bags, £23.; hyposulphite of soda, 5-7cwt. casks, £19.; do., 1cwt. kegs, £25.; sulphite of soda, 5-7cwt. casks, £12.; do., 1cwt. kegs, £20.; silicate of soda, 75° Tw., £9. 12s. 6d.; do., 100° Tw., £10.; do., 140° Tw., £10. 10s.; soda crystals, 2cwt. bags, £5.; sulphate of soda (saltcake), in bulk, £3. 10s.; pure white sulphate of alumina, 14-15%, £19. 10s.; blanc fixe, £22.; chloride of barium, £27.; sulphide of sodium, crystals, £18.; do., refined concentrated solid, 60-62%, £25.; hydrate of barium, crystals, £56.

COALS. Market is very unsettled, and operators generally are hesitating to commit themselves until the position is more defined. For the moment Allied schedule quotations are as under: Best Northumberland steam coal, 75s. to 76s. per ton; do., second qualities, 67s. to 70s.; Northumberland small coals, 51s.; do., seconds, 48s. to 50s.; best Durham gas coals, 61s. to 63s.; do., seconds, 50s. to 55s.; Durham bunkers, 55s.; do., seconds, 50s. to 53s.; foundry coke, 70s.; gas coke, 70s.

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Wednesday.

There are no distinctive changes in prices as far as the heavy chemicals are concerned, and, generally speaking, business during the past week in the West of Scotland area has been of a somewhat restricted character—with the bigger deal still more or less in the background. The shadow of the approaching Glasgow trades holidays has also had a perceptible effect, and by the time this report appears in print all chemical and other works throughout Glasgow and district will be closed for a period of seven to ten days. Prices remain on the old levels as follows: Arsenic, £40. per ton, net, Glasgow; bicarbonate of soda, £8. 15s. and £10. per ton for 6-8 casks and 1cwt. kegs, Liverpool; boracic acid crystals, English refined, £72. for 2cwt. bags, and borax crystals, £39. for 2cwt. bags, carriage paid; caustic soda, white, 70-72%, £24. per ton, net, Glasgow; chlorate of potash, 1s. 3d. per lb., net, Glasgow; chlorate of soda, 10d. per lb., net, Glasgow; citric acid, 4s. 4d. per lb., 5%, Glasgow; cream of tartar, 88%, £11. 5s. per cwt., net, Glasgow; sal ammoniac, £80. and £75. per ton, net, any port, for first and second lump respectively; sal ammoniac crystals £85. per ton, net, Glasgow; saltpetre, £3. 5s. per cwt., net, Glasgow; tartaric acid, 3s. 1d. per lb., 5%, Glasgow.

Among the sea oils, business is also quiet, and, generally speaking, the supply is more or less equal to the demand. As far as the whale oils are concerned, neither the pale nor yellow varieties are on offer (a condition of affairs which has now reigned for the past three or four weeks), while the prices of brown and black have advanced to 80s. and 78s., as against the old quotations of 78s. and 76s. respectively. Newfoundland cod maintains its recent rise from 74s. to 75s., and all available quantities of this oil find ready purchasers. The market is still bare of pale seal and Menhaden.

Quiet conditions continue to prevail in the West of Scotland coal trade. The local works are now seemingly getting larger supplies than they can conveniently deal with, and, as a general rule, stocks are well replenished. The position in the home market is greatly assisted at the moment, however, by the better business which is now being done for export; but this is only possible owing to the Coal Controller being more generous in the granting of the necessary permits. Work at the collieries is proceeding satisfactorily, and outputs are being easily disposed of.

IMPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

GLASGOW.

Week ending July 12.

CARBON BLACK—
Boston, 30 cs.

GLUE—
Boston, 57 bgs.

IRON PYRITES—
Huelva, 2,950 t.

LACTIC ACID—
Boston, 292 brls.

SOAP—
New York, 100 brls.

WAX—
Boston, 25 bdls.

GOOLE.

Week ending July 12.

NIL.

GRANGEMOUTH.

Week ending July 12.

NIL.

GRIMSBY.

Week ending July 12.

DYESTUFFS—
Dieppe, 550 csks.

HULL.

Week ending July 12.

BARYTES—
Montreal, 105 brls.

FERRO-SILICON—
Gothenburg, 54 cs.

FUEL OIL—
Puerto, 341,127 galls.

LITHOPONE—
Rotterdam, 40 csks.

MAGNESITE—
Christiania, 204 bgs.

ZINC WHITE—
Amsterdam, 10 brls.

LEITH.

Week ending July 12.

NIL.

LIVERPOOL.

Week ending July 12.

ACETIC ACID—
Newport News, 51 brls.

ANTIMONIAL LEAD—
Halifax, 5,937 pes.

ANTIMONY ORE—
Sydney, 10,113 bgs.

COAL PRODUCTS—
Dyes
Philadelphia, 9 brls.

CREAM OF TARTAR—
Oporto, 10 csks.

DYESTUFFS—
Argols
Oporto, 30 csks.

Dyewood Extract
New York, 200 bxs.

Shumac
Palermo, 2,475 bgs.

Tanning Extract
Montreal, 119 csks.

PARAFFIN WAX—
New York, 969 cs., 792 brls.,
211 bgs.

PHOSPHATE—
Alexandria, 2,140 bgs.

RESIN—
Oporto, 43 csks.

SOAP—
Philadelphia, 62 bxs.

STEARINE—
St. Johns, 10 puns.; Sydney,
44 pkgs.

TALLOW—
La Plata, 604 tcs.; New York,
746 csks.; Sydney, 1,371 csks.,
112 pkgs.

TIN ORE—
British West Africa, 5,600 bgs.

WAX—
Philadelphia, 609 brls.

WHITE LEAD—
New York, 305 cs.

LONDON.

Week ending July 12.

ACETIC ACID—
U.S.A., 560 brls., 81 pkgs.

ALUMINA SULPHATE—
Victoria, 56 bgs.

AMMONIUM BROMIDE—
U.S.A., 5 cs.

BARIUM CARBONATE—
U.S.A., 20 bgs.

BARYTES
Spain, 2,500 bgs.; U.S.A., 470
brls.

BEES WAX—
Anglo-Egyptian Sudan, 750 brls.;
Egypt, 19 bgs.; Morocco, 35
bgs.; Portugal, 19 bgs.; Port
E. Africa, 71 blocks; Spain, 76
pkgs.

CAMPHOR—
Holland, 80 cs.

CARBON BLACK—
Japan, 131 cs.

CAUSTIC POTASH—
Cologne, 122 pkgs.

CAUSTIC SODA—
U.S.A., 42 t. 12 c.

CHEMICALS (otherwise undescribed)
France, 9 cs.; U.S.A., 12 cs.

DYESTUFFS (otherwise undescribed)
Switzerland, 2 t. 18 c., 330 pkgs.;
U.S.A., 100 cs.

DYESTUFFS
Dyewood Extract
Switzerland, £310.

Gambier
Straits, 135 pkgs.

Indigo
British India, 45 chts.

Myrobalans
British India, 1,550 pkgs.

Turmeric
British India, 75 pkgs.

Valonia
A. Turkey, 191 t.

Vegetable Dye
U.S.A., a qty.

FISH OIL—
British India, 1,175 c.; Japan,
1,600 c.

GELATINE—
France, £165.; Holland, £156.

GLUE—
France, £616.; U.S.A., £136.

LEAD ORE—
China, 100 t.

LITHARGE—
U.S.A., 15 csks.

LITHIUM CARBONATE—
U.S.A., £235.

LITHOPONE—
Holland, 165 csks.

PARAFFIN WAX—
U.S.A., 98 t. 5 c.

PLUMBAGO—
Italy, 400 bgs.; U.S.A., 1 cs.

POTASSIUM IODIDE—
Japan, 62 cs.

ROSIN—
Sweden, 274 csks.

SALTPETRE
British India, 4 t.

SOAP—
Canada, £2,410.; Spain, £1,065.;
U.S.A., £4,507.

SODA—
U.S.A., 12 c.

SPERMACEETI WAX—
U.S.A., 200 brls.

STEARINE—
N.S.W., 1,618 bgs.

TALLOW—
China, 323 t. 3 c.; Italy, 25 t.
5 c.; N.S.W., 766 t. 16 c.; N.Z.,
759 t. 9 c.; Queensland, 229 t.
10 c.; Victoria, 111 t. 6 c.

TARTARIC ACID—
Italy, 40 pkgs.

TURPENTINE—
U.S.A., 998 brls.

WHITE LEAD—
U.S.A., 259 brls.

ZINC OXIDE—
Belgium, 100 brls.; U.S.A.,
2,647 csks.

MANCHESTER.

Week ending July 12.

BARYTES—
Philadelphia, 285 brls.

DEXTRINE—
Boston, 1,760 pkgs.

FERRO-CHROME—
Rouen, 125 cs.

MAGNESITE—
Fredriksstad, 305 bgs.

PHOSPHATE OF LIME—
Boston, 95 brls.

SOAP—
Alexandria, 1 cs.; Boston, 2 cs.;
Philadelphia, 2, 100 bxs.

TANNIC ACID—
Montreal, 22 brls.

MIDDLESBROUGH.

Week ending July 12.

NIL.

NEWCASTLE-ON-TYNE.

Week ending July 12.

WHITE LEAD—
Antwerp, 1 cs.

N. & S. SHIELDS.

Week ending July 12.

NIL.

STOCKTON-ON-TEES.

Week ending July 12.

NIL.

SWANSEA.

Week ending July 12.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

GLASGOW.

Week ending July 12.

AMMONIUM CARBONATE
Calcutta, 1 t.

CHEMICALS (otherwise undescribed)
Auckland, 23 t.; Bombay, 9 t.

CHEMICALS (otherwise undescribed)
17 c.; Delagoa Bay, 50 t.;
Montreal, 1 t. 8 c.; Rouen, 3 t.
2 c.

COAL PRODUCTS (otherwise undescribed)
Antwerp, £2620.; Bombay, £692;
Calcutta, £311.; Colombo, £229.;

COAL PRODUCTS (otherwise undescribed)
Madras, £89.

FERRO-SILICON—
Bombay, 150 t.

FORMALDEHYDE—
Bombay, 4 c.

GELATINE—
Montreal, 1 t. 4 c.

GLUE—
Montreal, 3 c.

IRON SULPHATE—
Calcutta, 9 c.

LITHARGE—

Abadan, 9 t. 11 c.

PARAFFIN—

Rouen, 2 t. 9 c.

PARAFFIN WAX—

Antwerp, £71.; Rouen, 20 t.

POTASSIUM CHLORATE—

Delagoa Bay, 1 t.

RED LEAD—

Auckland, 2 t.; Bombay, 26 t.

SHEEP DIP—

Auckland, 24 t. 18 c.

SODIUM BICARBONATE—

Auckland, 1 t. 12 c.; Madras, 14 t. 1 c.; Montreal, 18 c.

TALLOW—

Colombo, 1 t.

WHITE LEAD—

Auckland, 7 t. 2 c.

GOOLE.

Week ending July 12.

NIL.

GRANGEMOUTH.

Week ending July 12.

ALUM—

Bergen, 11 t.

GRIMSBY.

Week ending July 12.

NIL.

HULL.

Week ending July 12.

BORAX—

Christiania, 1 crt.

CHEMICALS (otherwise undescribed)

Alexandria, 1,960 bgs., 2 cs.;
Bombay, 1,325 brls.; Christiania,
28 bgs., 2 cs.; Dunkirk, 611 brls.,
55 bgs.; Gothenburg, 5 csks.,
18 kgs.; Helsingfors, 100 csks.;
Karachi, 100 brls.; New York,
25 bgs., 72 cs.; Rotterdam,
1 drn., 1 bg., 10 cs.; Stockholm,
10 kgs., 86 bgs.; Wiburg, 100
bgs.

COAL PRODUCTS—

Tar
Dunkirk, 392 csks.

DISINFECTANTS (otherwise undes.)

Alexandria, 12 cs., 70 drms.;
Bombay, 6 cs., 500 drms.;
Dunkirk, 150 csks.

FATTY ACIDS—

Dunkirk, 110 brls.; Rouen, 46
brls.; Rotterdam, 105 brls.

GLUE—

Christiania, 11 cs.; New York,
180 bgs.

SOAP—

Alexandria, 18 kgs.; Gothenburg,
10 cs.; Rouen, 850 cs.

TALLOW—

Alexandria, 6 brls.

LEITH.

Week ending July 12.

AMMONIUM CARBONATE—

Bergen, 3 t., £209.; Gothenburg,
5 t. 18 c., £292.; Trondhjem,
10 c., £32.

BORAX—

Gothenburg, 30 c., £59.

BORIC ACID—

Gothenburg, 3 t. 12 c., £268.

COAL PRODUCTS—

Naphthalene
Dieppe, 24 t. 18 c., £1,051.

MAGNESIUM CARBONATE—

Spain, 5 t. 13 c., £250.

POTASSIUM BICHRIMATE—

Amsterdam, 1 t. 3 c., £183.;
Gothenburg, 1 t. 14 c., £273.;
Rotterdam, 7 c., £50.

SODA CRYSTALS—

Iceland, 5 t. 1 c., £40.

SODIUM BICARBONATE—

Iceland, 4 c., £3.

SODIUM BICHRIMATE—

Copenhagen, 15 c., £124.; Goth-
enburg, 6 c., £33.; Rotterdam,
6 c., £23.

LIVERPOOL.

Week ending July 10.

ACETIC ACID—

Alexandria, 1 c., £11; Algoa Bay,
2 c., £15; Rio de Janeiro, 2 t.
19 c., £207; Santos, 1 t. 17 c.,
£152.

ALUM—

Bahia, 1 t., £22; Quitta, 2 c.,
£3; Rio de Janeiro, 1 c., £7;
Santos, 4 t. 17 c., £85.

ALUMINA SULPHATE—

Christiania, 5 t., £42.

ALUMINA SULPHOCYANIDE—

Rio de Janeiro, 1 t. 1 c., £74.

AMMONIA—

Rio de Janeiro, 2 t., £80.

AMMONIUM CARBONATE—

Algiers, 5 c., £15; Gothenburg,
2 t., £134; Nantes, 2 t., £138;
Natal, 2 c., £7; Pto. Alegre,
19 c., £63; Rio de Janeiro, 3 t.
2 c., £230; Stockholm, 3 t.,
£50; Santos, 5 t. 19 c., £366.

AMMONIUM MURIATE—

Montreal, 5 t. 5 c., £256.

AMMONIUM NITRATE—

Montreal, 55 t. 2 c., £1,375.

AMMONIUM PHOSPHATE—

Christiania, 1 c., £20.

AMMONIUM SULPHATE—

Christiania, 1 c., £27.

ARSENIC—

Bahia, 1 t., £131.

BARIIUM CHLORIDE—

Bilbao, 2 t. 1 c., £57.

BARIIUM SULPHOCYANIDE—

New York, 9 c., £66; Rio de
Janeiro, 10 c., £114.

BLEACHING POWDER—

Alexandria, 8 c., £20; Algoa
Bay, 1 t. 10 c., £27; Bahia,
5 c., £16; Bombay, 8 t. 18 c.,
£144; Calcutta, 20 t., £360;
Durban, 2 t. 2 c., £34; Nantes,
25 t. 15 c., £333; Rouen, 11 t.
3 c., £126; Santos, 2 t. 18 c.,
£52.

BORAX—

Alexandria, 7 c., £17; Algiers,
10 c., £19; Auckland, 10 c., £22;
Brisbane, 16 c., £36; Calcutta,
2 t. 10 c., £98; Christiania, 5 t.,
£200; Christchurch, 1 t., £44;
Lyttleton, 5 t., £210; Rio de
Janeiro, 5 c., £17; Soerabaya,
6 c., £14; Santos, 1 t. 5 c., £55;
Samarang, 4 c., £8; Singapore,
16 c., 37.

BORIC ACID—

Alexandria, 3 c., £8; Brisbane,
4 c., £15; Christchurch, 1 t. 3 c.,
£89; Dunedin, 10 c., £39; Rio
de Janeiro, 15 c., £91.

CALCIUM CARBIDE—

Accra, 1 t., £36.

CALCIUM CHLORIDE—

Madras, 15 t., £125; St.
Nazaire, 30 t., £206.

CARBONATE OF LIME—

Kobe, 16 t. 7 c., £194.

CAUSTIC SODA—

Auckland, 141 drms; Bangkok,
6 drms; Barranquilla, 6 cs.;
Bombay, 728 drms.; Copen-
hagen, 45 drms.; Hokitika, 10
pkgs.; La Libertad, 2 pkgs.;
Madras, 20 drms.; Newcastle,
155 drms.; Perth, 10 drms.;
Singapore, 38 drms.; Wellin-
gton, 320 pkgs.

CHINA CLAY—

Shanghai, 6 t.

CHLORIDE OF LIME—

Rio de Janeiro, 5 t., £86.

COAL PRODUCTS—

Carbolic Acid
Alexandria, 4 c., £25; Hong
Kong, 1 t. 3 c., £50; Melbourne,
1 t. 7 c., £44; Rio de Janeiro,
3 c., £47; Sydney, 9 c., £15.

COAL PRODUCTS—**Dyes**

Antwerp, 7 t. 15 c., £867;
Boston, 9 t. 12 c., £4,470;
Genoa, 1 t. 19 c., £1,868; Mel-
bourne, 2 t. 13 c., £1,781;
Montreal, 4 t. 8 c., £1,824; New
York, 2 t. 18 c., £638; Sydney,
8 t. 7 c., £3,722.

Naphthalene

Rio de Janeiro, 6 c., £35;
Santos, 1 c., £8.

Tar

Abidjan, 10 c., £7; Danoe, 1 t.
3 c., £6; Lagos, 2 t. 1 c., £19;
Port Swettenham, 53 t., £292;
Port Harcourt, 5 c., £3; Rio de
Janeiro, 10 c., £9.

CREAM OF TARTAR—

Christiania, 4 c., £55.

DISINFECTANTS (otherwise undes.)

Alexandria, 10 c., £60; Algiers,
3 t. 16 c., £60; Auckland, 2 t.
15 c., £115; Algoa Bay, 2 t. 5 c.,
£94; Dunedin, 1 t. 6 c., £54;
La Guaira, 1 t., £65; Lyttleton,
1 t. 2 c., £46; Pto. Alegre, 12 c.,
£27; Wellington, 3 t. 6 c., £138.

DYESTUFFS—**Aniline Dye**

Adelaide, 1 c., £28; Alexandria,
10 t., £1,175; Barcelona, 1 c.,
£80; Bilbao, 9 c., £96; Boston,
13 c., £1,618; Havre, 8 c., £70;
New York, 12 c., £234; Rio de
Janeiro, 3 t. 12 c., £826; Valencia,
1 c., £35.

FERRO-MANGANESE—

Nantes, 6 t.; Vancouver, 1 t.

GLUE—

Montreal, 140 pkgs.

GLUE, SIZE, AND GELATINE—

Kobe, 370 pkgs.; Montreal, 170
pkgs.; Rio de Janeiro, 1 pkg.;
Yokohama, 200 pkgs.

HYDROFLUORIC ACID—

Bahia, 2 c., £11.

LEAD CARBONATE—

La Libertad, 3 c., £17.

MAGNESIUM CHLORIDE—

Bombay, 65 t. 19 c., £972;
Saigon, 1 t., £21.

NAPHTHONIC ACID—

Rio de Janeiro, 6 c., £83.

NITRIC ACID—

Bahia, 3 c., £8.

PHOSPHORIC ACID—

Algiers, 3 t. 18 c., £685.

PHOSPHORUS—

Joinville, 2 c., £31; Kobe, 20 t.
7 c., £2,876; Rio de Janeiro,
1 t. 7 c., £173; Santos, 19 c.,
£106.

PITCH—

Yokohama, 2 t., £18.

POTASSIUM BICHRIMATE—

Alexandria, 8 t. 6 c., £1,470;
Rio de Janeiro, 1 t., £291;
Rotterdam, 6 c., £51.

POTASSIUM CHLORATE—

Barranquilla, 9 c., £150; Bilbao,
4 c., £43; Pto. Alegre, 4 c.,
£33.

SALAMMONIAC—

Algoa Bay, 3 c., £12; La
Libertad, 1 c., £6; Montreal,
3 t., £231; Stockholm, 10 c.,
£38; Singapore, 10 c., £36.

SALT—

Abonema, 50 t.; Accra, 22 t.;
Bonny, 10 t.; Buenaventura,
26 t.; Calabar, 142 t.; Campana,
75 t.; Cape Town, 5 t.; Chem-
ulpo, 2 t.; Copenhagen, 10 t.;
Cotonou, 30 t.; Demerara, 150
t.; Duala, 200 t.; Gothenburg,
297 t.; Natal, 36 t.; Opobo, 120
t.; Port Harcourt, 6 t.; Saltpond,
36 pkgs.; Secondee, 26 t.;
Talcabano, 6 t.; Trinidad, 94 t.

SALT CAKE—

Lisbon, 250 pkgs.

SHEEP DIP—

Algoa Bay, 2 t. 5 c., £125;
East London, 27 t. 14 c., £1,754;
Kilindini, 9 t. 8 c., £488; Rio
de Janeiro, 3 t. 9 c., £577;
Santos, 16 t. 13 c., £1,015.

SOAP—

Abonema, 110 bxs.; Aden, 307
cs.; Amboina, 110 cs., 300 bxs.;
Alexandria, 42 cs.; Amsterdam,
5 pkgs.; Algiers, 2,174 cs.;
Assoy, 50 bxs.; Bangkok, 480
cs.; Barbados, 1,700 cs.; Bata-
via, 1,037 cs.; Beira, 230 bxs.;
Bombay, 1,991 bxs., 2,397 cs.;
Bordeaux, 11 pkgs.; Buena-
ventura, 40 cs.; Calcutta, 273
bxs.; Calabar, 1,175 bxs.; Cara-
cas, 6 pkgs.; Cartagena, 50 cs.;
Cheribon, 200 cs.; Colombo,
460 cs.; Colon, 200 cs.; Copen-
hagen, 400 cs.; Cristobal, 10 cs.;
Demerara, 523 cs.; Durban,
105 bxs.; Esmeraldas, 112 bxs.;
Gorontalo, 60 cs.; Helsingfors,
200 bxs.; Hong Kong, 16 bxs.;
Jeddah, 100 cs.; Karachi, 63 cs.;
1,350 bxs.; Kilindini, 20 bxs.;
Lagos, 48 bxs.; La Guaira,
2 bxs.; Lyttleton, 98 bxs.;
Malta, 26 cs.; Madras, 304 cs.;
750 pkgs.; Medellin, 4 bxs.;
Menado, 30 cs.; Oran, Algiers,
170 cs.; Palembang, 30 pkgs.;
Panama, 5,122 pkgs.; Penang,
100 bxs.; Port of Spain, 1,280
pkgs.; Port Limon, 106 pkgs.;
Port Said, 1,570 pkgs.; Rangoon,
676 bxs.; Rio de Janeiro, 3 bxs.;
Sabang, 110 cs.; St. Vincent,
50 cs.; Shanghai, 4,005 bxs.,
7 brls., 15 cs.; Sierra Leone,
12 cs.; Singapore, 15 csks., 670
cs.; Stanley, 56 bxs.; Swatow,
7 bxs.; Teneriffe 410 cs.; Tumaco,
60 pkgs.; Tjilatjap, 400 pkgs.

SODA ASH—

Copenhagen, 1,250 pkgs.; Han-
kow, 200 bxs.; Santos, 50 pkgs.

SODA CRYSTALS—

Mombasa, 15 pkgs.

SODIUM BICARBONATE—

Antwerp, 137 pkgs.; Bombay,
200 drms.; Copenhagen, 130
pkgs.; La Libertad, 32 pkgs.;
Lyttleton, 1,080 pkgs.; Wellin-
gton, 40 csks.; Zanzibar, 35 csks.

SODIUM CYANIDE—

Cristobal, 125 brls.; La Guaira,
25 cs.; Mauzanillo, 360 brls.;
Valencia, 40 brls.

SODIUM NITRATE—

Santa Cruz, 165 dbl. bgs.

SODIUM SILICATE—

Auckland, 23 pkgs.; Wellington,
25 csks.

SODIUM SULPHIDE—

Saigon, 30 pkgs.

SULPHANILIC ACID—

Rio de Janeiro, 4 c., £52.

SULPHUR—

Nantes, 2 t., £50.

SULPHURIC ACID—

Lagos, 4 c., £11.

SUPERPHOSPHATE (otherwiseOrotava, 10 t. *undescribed.*)**SUPERPHOSPHATE OF LIME—**

Teneriffe, 20 t.

TANNIC ACID—

Copenhagen, 2 c., £30; Rio de
Janeiro, 10 c., £187.

TARTARIC ACID—

Christiania, 1 c., £20; Rio de
Janeiro, 1 t. 10 c., £505.

WOOD PRESERVATIVE—

Hong Kong, 1 t. 5 c., £34;
Lagos, 9 c., £11; Winnebah, 5 c.
£4.

LONDON.

Week ending July 9.

ACETANILID—

Alexandria, 1 cs. (pt.), £5.

ACETIC ACID—

Calcutta, 18 cs. (pt.), £22;
Canterbury, 3 cs., £9; Canton,
1 cs., £8; Durban, 2 cs., £6;
Perth, 6 cs., £17; Wellington,
120 cs., £38.

ALUM—

Bombay, 6 c., £7.

ALUMINA ACETATE—

Alexandria, 1 cs., £5.

- AMMONIA**—
Alexandria, 7 cs., £14.; Bombay, 5 cs., £12.; Calcutta, 18 cs. (pt.), £27.; Cape Town, 10 cs., £20.; Delagoa Bay, 10 cs., £20.; Durban, 14 cs., £25.; East London, 8 cs., £16.; Paris, 92 drms., £84.5; Rangoon, 4 cs., £23.; Rio de Janeiro, 10 cs., £26.; Shanghai, 4 cs., £5.; Sierra Leone, 4 cs., £8.
- AMMONIA (ANHYDROUS)**—
Alexandria, 20 cylds., £150.; Lisbon, 11 cylds., £53.
- AMMONIUM ACETATE**—
Alexandria, 1 cs. (pt.), £6.; Calcutta, 12 cs. (pt.), £15.; Canton, 1 cs., £6.
- AMMONIUM BROMIDE**—
Port Elizabeth, 1 cs. (pt.), £15.
- AMMONIUM CARBONATE**—
Barcelona, 2 c., £12.; Calcutta, 10 c., £59.; Colombo, 6 c., £53.; Constantinople, 3 c., £11.; Cyprus, 3 c., £13.; Jaffa, 2 c., £6.; Madras, 3 c., £10.; Malmo, 2 t., £150.; Melbourne, 1 c., £6.; Rangoon, 1 t. 10 c., £119.; Rio de Janeiro, 3 t. 1 c., £362.; Santos, 4 c., £25.; Sydney, 1 c., £12.; Trinidad, 3 c., £15.; Valencia, 4 c., £12.
- AMMONIUM CHLORIDE**—
Alexandria, 5 csks., £23.; Antwerp, 100 kgs., £320.; Calcutta, 3 cs., £24.; Christchurch, 1 csk., £20.; Melbourne, 2 cs., £8.
- AMMONIUM CITRATE**—
Calcutta, 18 cs. (pt.), £11.
- AMMONIUM MURIATE**—
Batoum, 2 t. 8 c., £150.; Vancouver, 17 c., £60.
- AMMONIUM NITRATE**—
Antwerp, 5 t., £149.
- AMMONIUM PHOSPHATE**—
Algiers, 6 t. 14 c., £750.
- AMMONIUM SULPHATE**—
Dunkirk, 48 t. 13 c., £1425.
- AMMONIUM SULPHIDE**—
Bombay, 2 c., £6.
- AMYL ACETATE**—
Buenos Ayres, 1 c., £7.
- ANTIMONY SULPHIDE**—
Brussels, 2 pkgs., £19.; Durban, 1 kg., £6.
- ANTIMONY TARTRATE**—
Calcutta, 1 cs. (pt.), £6.; Rio de Janeiro, 10 cs., £37.
- ARSENIC**—
Rio de Janeiro, 3 t. 19 c., £150.; Valencia, 19 c., £35.
- BARIUM NITRATE**—
Bombay, 6 kgs., £32.; Rio de Janeiro, 15 cs., £32.
- BARIUM SULPHIDE**—
Alexandria, 1 kg., £9.
- BENZOIC ACID**—
Paris, 3 brls., £20.; Valencia, 1 cs., £15.
- BISMUTH CARBONATE**—
Christchurch, 1 cs., £34.; Dunedin, 3 cs. (pt.), £66.; Durban, 1 cs. (pt.), £6.
- BISMUTH SALTS**—
Melbourne, 3 cs., £238.
- BISMUTH SUBGALLATE**—
Calcutta, 1 cs. (pt.), £6.
- BISMUTH SUBNITRATE**—
Rangoon, 3 cs., £83.
- BISULPHIDE OF LIME**—
Durban, 4 hds., £13.
- BORAN**—
Antwerp, 10 t., £400.; Beyroul, 1 t. 10 c., £66.; Singapore, 2 c., £6.; Yokohama, 10 t. 1 c., £392.
- BORIC ACID**—
Amoy, 5 c., £25.; Antwerp, 19 t. 14 c., £1,522.; Auckland, 5 c., £46.; Beyroul, 1 t. 8 c., £118.; Brisbane, 1 c., £6.; Canton, 5 c., £20.; Cape Town, 2 c., £8.; Colombo, 1 t. 10 c., £176.; Las Palmas, 10 c., £40.; Penang, 1 c., £6.; Rio de Janeiro, 1 c., £22.; Santos, 8 c., £12.; Shanghai, 1 c., £6.; Singapore, 1 c., £6.
- BUTYRIC ACID**—
Copenhagen, 1 cs. (pt.), £40.
- CALCIUM CARBIDE**—
Delagoa Bay, 1 t., £25.; Durban, 2 t. 19 c., £73.; Penang, 1 t. 1 c., £36.; Piraeus, 1 t. 11 c., £48.
- CALCIUM CHLORIDE**—
Bombay, 1 t. 7 c., £17.
- CALCIUM GLYCEROPHOSPHATE**—
Antwerp, 1 cs. (pt.), £5.
- CALCIUM HYPOPHOSPHATE**—
Calcutta, 1 cs. (pt.), £9.
- CALCIUM LACTATE**—
Karachi, 1 cs. (pt.), £6.; Mauritius, 2 cs. (pt.), £7.
- CARBON BISULPHIDE**—
Durban, 4 cs., £17.; Pt. Elizabeth, 4 cs., £18.
- CARBONATE OF LIME**—
Paris, 15 bgs., £21.
- CARNAUBA WAX**—
Genoa, 1 t.
- CAUSTIC POTASH**—
Auckland, 1 cs., £12.; Bombay, 7 cs. (pt.), £24.; Napier, 1 cs. (pt.), £5.
- CAUSTIC SODA**—
Penang, 5 t. 11 c., £165.; Shanghai, 11 c., £20.
- CERESINE WAX**—
Antwerp, 10 c.; Genoa, 1 t. 10 c.
- CHEMICALS (otherwise undescribed)**—
Alexandria, 21 cs., £95.; Auckland, 2 cs., £5.; Bombay, 4 cs., £42.; Italy (*via* Boulogne), 3 cs. (pt.), £113.; Brisbane, 4 cs., £54.; Buenos Ayres, 1 cs. (pt.), £16.; Calcutta, 5 cs., £25.; Cape Town, 4 cs., £125.; Canton, 1 cs., £15.; Canterbury, 3 cs., £56.; Hong Kong, 3 cs., £30.; Kobe, 1 cs., £21.; Madras, 13 cs., £129.; Melbourne, 8 cs. (pt.), £57.; Montreal, 7 cs., £101.; New York, 2 cs., £47.; Paris, 2 cs., £40.; Port Elizabeth, 1 cs., £12.; Soerabaya, 3 cs., £34.; Sydney, 18 pkgs. (pt.), £553.
- CHLORAL HYDRATE**—
Auckland, 1 cs. (pt.), £5.
- CHRYSOGRAPHIC ACID**—
Calcutta, 1 cs., £62.
- CITRIC ACID**—
Aden, 1 c., £26.; Antwerp, 1 c., £23.; Beyroul, 1 c. (F.), £25.; Bombay, 4 c., £106.; Brussels, 7 c., £161.; Colon, 1 cs. (pt.), £13.; Jaffa, 1 csk., £10.; Montreal, 2 t. 15 c., £1,243.; New York, 5 t., £2,300.
- COAL PRODUCTS**—
Alizarene
New York, 8 csks., £280.; Paris, 77 csks., £1,944.
Aniline Colour
East London, 1 cs., £35.
Aniline Dye
Brussels, 5 pkgs., £181.; Calcutta, 2 kgs., £34.; Cape Town, 2 cs., £35.; Genoa, 11 pkgs., £510.; Melbourne, 72 pkgs., £2,902.; New York, 1 kg., £75.; Palermo, 1 cs., £32.; Port Elizabeth, 3 pkgs., £41.; Sydney, 2 kgs., £51.; Timaru, 2 csks., £113.
Benzonaphthol
Lisbon, 1 cs. (pt.), £11.
Betanaphthol
Calcutta, 1 cs., £6.
Carbolic Acid
Batavia, 10 cs., £18.; Helsingfors, 77 csks., £770.; Kobe, 197 csks., £1,143.; Madras, 2 cs., £15.; Melbourne, 2 cs., £10.; Padang, 5 cs., £8.; Port Swettenham, 1 cs. (pt.), £5.; Rotterdam, 1 cs., £7.; Singapore, 5 cs. (pt.), £34.; Wiborg, 4 cans, £10.
Croosote
Amoy, 25 pkgs., £40.; Montreal, 5 csks., £20.; New York, 117 csks., £1,035.; Oporto, 200 csks., £515.
Naphthalene
Cape Town, 2 cs., £5.; Port Elizabeth, 25 csks., £125.
Pitch
Antwerp, 240 t., £900.; Barcelona, 2 brls., £13.
- COAL PRODUCTS**—
Tar
Adelaide, 14 pkgs., £19.; Cape Town, 150 pkgs., £85.; Delagoa Bay, 60 drms., £13.
Tar Spirit
Paris, 6 brls., £45.
Terebine
Hong Kong, 2 pkgs., £32.
- COBALT ACETATE**—
Switzerland, 1 brl., £90.
- COBALT OXIDE**—
Christiania, 1 cs., £22.
- COPPER ACETATE**—
Oporto, 1 brl., £90.
- COPPER SUBOXIDE**—
Aalesund, 6 csks., £356.; Christiania, 2 kgs., £21.
- COPPER SULPHATE**—
Bombay, 2 c., £8.; East London, 8 c., £21.; Christiania, 2 t., £90.
- CREAM OF TARTAR**—
Antwerp, 2 c., £25.; Brussels, (F.), £6.; Brussels, 12 c., £156.; Bombay, 1 c., £10.; Calcutta, 1 c., £25.; Calcutta, 3 c. (F.), £48.; Copenhagen, 1 t. 19 c., £461.; Durban, 1 c., £13.; East London, 1 c. (F.), £12.; Rangoon, 2 c., £26.; Trinidad, 1 cs. (F.), £7.; Valparaiso, 1 c., £20.
- DEXTRINE**—
Alexandria, 4 c.; Antwerp, 10 c.
- DISINFECTANTS (otherwise undescribed)**—
Alexandria, 9 c., £25.; Athens, 2 t., £341.; Auckland, 1 t. 2 c., £80.; Bangkok, 2 t. 14 c., £94.; Batavia, 8 t. 13 c., £605.; Bombay, 1 c., £6.; Callao, 5 c., £12.; Canton, 1 c., £6.; Christchurch, 2 t. 16 c., £420.; Christiania, 1 t. (F.), £130.; Colombo, 2 t. 14 c., £266.; Copenhagen, 2 t., £85.; Cyprus, 11 c., £51.; Delagoa Bay, 9 t. 2 c., £198.; Durban, 5 c., £43.; Hong Kong, 11 t. 1 c., £325.; Madras, 1 t. 2 c., £51.; Malacca, 2 t. 14 c., £103.; Malta, 3 c., £15.; Mombasa, 1 t. 10 c., £105.; Mossel Bay, 11 c., £20.; Padang, 4 t. 18 c., £120.; Penang, 4 c., £10.; Piraeus, 1 c., £11.; Port Elizabeth, 5 c., £20.; Port Moresby, 4 c., £11.; Port Swettenham, 3 t. 6 c., £114.; Rangoon, 10 c., £15.; St. Vincent, B.W.I., 8 c., £23.; Singapore, 16 c., £22.; Sydney, 1 c., £13.; Toronto, 1 t. 1 c., £47.; Wellington, 1 t. 12 c., £54.
- ETHER**—
Alexandria, 2 cs., £12.; Copenhagen, 1 cs. (pt.), £33.; Madras, 5 cs., £95.
- ETHER (METHYLIC)**—
Alexandria, 2 cs., £23.
- ETHER (SULPHURIC)**—
Bombay, 1 cs., £9.
- ETHYL CHLORIDE**—
East London, 1 cs. (pt.), £9.; Oporto, 1 dr., £15.
- FATTY ACIDS**—
Dunkirk, 75 t.; Rouen, 20 t.
- FULLERS EARTH**—
New York, 327 t.; Paris, 10 t.; Santos, 10 t.
- GALLIC ACID**—
Buenos Ayres, 1 cs., £9.
- GELATINE**—
Ostend, 1 t., 4 c.
- GLUE**—
Tientsin, 5 t.; Tokyo, 15 t.; Yokohama, 20 t.
- GLUE, SIZE, AND GELATINE**—
Antwerp, 2 t.; Calcutta, 10 c.; Cape Town, 11 c.; Christiania, 1 t.; Copenhagen, 1 t. 5 c.; Dalny, 15 t.; Dunedin, 1 c.; Durban, 3 c.; East London, 3 c.; Karachi, 4 c.; Malmo, 6 c.; New York, 1 t.; Oporto, 1 c.; Ostend, 1 t. 19 c.; Rabat, 10 c.; Rangoon, 10 c.; Shanghai, 1 c.; Singapore, 7 c.; Sydney, 2 c.
- GLYCERINE**—
Alexandria, 6 c., £51.; Brisbane, 1 c., £8.; Calcutta, 5 c., £48.; East London, 1 c., £8.; Madras, 4 c., £26.; Piraeus, 1 c., £9.
- GLYCERINE**—
Rangoon, 2 c., £17.; Rio de Janeiro, 1 c., £12.; Tampico, 10 c., £56.; Yokohama, 3 c., £33.
- GLYCEROPHOSPHORIC ACID**—
Cape Town, 1 cs., £10.
- GOLD CHLORIDE**—
East London, 1 cs. (pt.), £15.; Melbourne, 4 cs. (pt.), £7.
- HYDROBROMIC ACID**—
Calcutta, 1 cs., £29.; Melbourne, 1 cs., £17.
- HYDROCHLORIC ACID**—
Alexandria, 1 c., £6.
- HYDROGEN PEROXIDE**—
Bangkok, 1 cs., £8.; Batavia, 10 cs., £63.; Cape Town, 4 cs., £31.; Christchurch, 6 cs., £10.; Durban, 3 cs., £18.
- IODINE**—
Antwerp, 1 cs. (pt.), £9.; Calcutta, 1 csk. (pt.), £23.
- IODIFORM**—
Karachi, 1 cs. (pt.), £7.; Port Elizabeth, 1 cs. (pt.), £6.
- IRON AND AMMONIUM CITRATE**—
Shanghai, 1 cs., £46.
- IRON PERCHLORIDE**—
Singapore, 4 cs., £12.
- IRON SESQUICHLORATE**—
Wiborg, 1 csk., £6.
- LACTIC ACID**—
Rangoon, 1 cs. (pt.), £13.
- LEAD ACETATE**—
Rio de Janeiro, 1 kg., £14.
- LEAD CARBONATE**—
Las Palmas, 1 cs. (pt.), £8.
- LITHIUM BENZOATE**—
Paris, 3 cs., £150.
- LITHIUM CITRATE**—
Calcutta, 6 cs. (pt.), £5.; East London, 7 cs. (pt.), £8.
- MAGNESIA (CALCINED)**—
Brussels, 2 csks., £18.; Marseilles, 4 cs., £37.
- MAGNESIUM CARBONATE**—
East London, 1 cs., £12.; Melbourne, 5 cs., £25.; New Plymouth, 1 cs., £6.; Paris, 20 bgs. (F.), £56.; Rio de Janeiro, 2 cs., £10.; Switzerland, 1 csk., £8.; Trinidad, 4 cs., £10.
- MAGNESIUM CITRATE**—
Cape Town, 1 cs., £11.; Calcutta, 6 cs. (pt.), £13.; East London, 1 cs. (pt.), £7.; Port Elizabeth, 1 csk., £9.
- MAGNESIUM SULPHATE**—
Alexandria, 3 c., £6.; Barbados, 5 c., £12.; Bombay, 1 t. 10 c., £53.; Brussels, 5 c., £10.; Karachi, 9 c., £9.; Port Elizabeth, 6 c., £13.; Port Moresby, 3 c., £7.; Rio de Janeiro, 10 c., £15.; Sydney, 5 c., £14.; Toronto, 10 t., £205.
- MANGANESE OXIDE**—
Sydney, 1 csk., £15.
- MERCURY AND AMMONIUM CHLORIDE**—
Durban, 1 cs. (pt.), £5.
- MERCURY ARSENIATE**—
Christiania, 1 cs., £30.
- MERCURY CHLORIDE**—
Paris, 1 cs., £75.
- MERCURY OXIDE**—
Barranquilla, 1 cs., £70.
- MERCURY PERCHLORIDE**—
Rangoon, 1 cs. (pt.), £8.
- MERCURY SUBCHLORIDE**—
Rangoon, 1 cs. (pt.), £8.
- METHYL SALICYLATE**—
Antwerp, 1 dr., £18.; Cape Town, 1 cs. (pt.), £8.; Durban, 1 dr., £7.
- MINERAL BLACK**—
Christchurch, 20 cs., £27.
- NICKEL OXIDE**—
Rotterdam, 42 csks. (F.), £1,500.
- NITRIC ACID**—
Antwerp, 2 t., £75.; Alexandria, 2 c., £5.; Ghent, 3 t. 15., £160.
- NUCLEIC ACID**—
Paris, 1 cs., £306.

OLEIC ACID—
Antwerp, 120 brls., £1,800.

OXALIC ACID—
Calcutta, 2 cs., £12.; Paris, 8 csks. (F.), £270.

PARAFFIN WAX—
Helsingfors, 20 t.; Rotterdam, 20 t.

PHOSPHORIC ACID—
Alexandria, 1 cs. (pt.), £6.; Bombay, 2 cs., £6.; Madras, 1 cs. (F.), £13.; Montreal, 2 cs., £20.; Paris, 60 cbys., £460.

PHOSPHORIC AND CITRIC ACID—
Dunedin, 2 cs., £10.

PHOSPHORUS (AMORPHOUS)—
Bombay, 1 cs., £14.; Durban, 16 cs., £193.

PLUMBAGO—
Piraeus, 1 t. 1 c.; Santiago, 9 c.

POTASSIUM ACETATE—
Calcutta, 1 cs. (pt.), £6.; Christiania, 4 cs., £40.; Karachi, 1 cs. (pt.), £5.; Mauritius, 2 cs. (pt.), £5.

POTASSIUM BICARBONATE—
Adelaide, 2 kgs., £15.; Alexandria, 2 cs., £9.; Melbourne, 5 kgs., £37.

POTASSIUM BICHROMATE—
Bombay, 2 cs., £22.

POTASSIUM BROMIDE—
Dunedin, 1 cs. (pt.), £5.; Valencia, 1 cs., £17.

POTASSIUM CARBONATE—
Cape Town, 1 cs., £6.; Surva, 1 cs., £8.

POTASSIUM CITRATE—
Adelaide, 1 cs., £17.; Alexandria, 1 cs. (pt.), £8.; Dunedin, 1 cs. (pt.), £8.

POTASSIUM CYANIDE—
Karachi, 1 cs., £7.; Madras, 2 cs., £4.; Paris, 5 c., £50.; Rangoon, 1 cs. (pt.), £7.

POTASSIUM FERROCYANIDE—
Bombay, 1 cs. (pt.), £6.

POTASSIUM HYDROXIDE—
Durban, 1 cs. (pt.), £5.; Melbourne, 1 cs. (pt.), £14;

POTASSIUM HYPO—
Paris, 1 cs. (pt.), £5.

POTASSIUM IODIDE—
Amsterdam, 1 cs., £75.; Antwerp, 1 cs. (pt.), £8.; Calcutta, 1 cs. (pt.), £78.; Christchurch, 1 cs. (pt.), £6.; Cape Town, 1 cs. (pt.), £6.; Dunedin, 3 cs. (pt.), £42.; Durban, 1 cs. (pt.), £19.; Melbourne, 1 cs., £20.; Mauritius, 2 cs. (pt.), £36.; Singapore, 4 cs. (pt.), £9.

POTASSIUM METABISULPHATE
Algiers, 8 csks., £405.

POTASSIUM PERMANGANATE—
Bombay, 7 cs. (pt.), £5.

POTASSIUM PRUSSATE—
Havre, 12 cs., £120.

POTASSIUM SULPHOGUAIACOLATE—
Calcutta, 2 cs., £60.; Lisbon, 1 cs. (pt.), £13.

POTASSIUM SUPEROXALATE—
Melbourne, 1 kg. (F.), £11.

POTASSIUM OXALATE—
Melbourne, 1 kg., £11.

PRUSSIAN BLUE—
Hong Kong, 3 pkgs., £50.

PYROGALLIC ACID—
Hankow, 4 cs., £75.

QUININE—
Calcutta, 10,556 ozs.; Durban, 300 ozs.

SALAMMONIAC—
Christchurch, 2 c., £8.

SALICYLIC ACID—
Paris, 20 csks., £303.; Sydney, 2 kgs., £20.

SALTPETRE—
Beira, 7 t., £77.; Bombay, 3 c., £10.; Delagoa Bay, 10 c., £28.; Durban, 10 c., £36.; East London, 13 c., £42.; Galatz, 16 c., £40.; Ghent, 11 c., £33.; Oporto, 9 t. 3 c., £532.

SALTPETRE—
Rio de Janeiro, 15 c., £45.

SHEEP DIP—
Buenos Ayres, 56 t. 5 c., £3,000.; Cape Town, 9 c., £12.; Durban, 7 t. 13 c., £296.; Napier, 22 t. 10 c., £788.; Port Elizabeth, 9 c., £12.

SILVER NITRATE—
Calcutta, 2 cs. (pt.), £16.; Durban, 4 cs. (pt.), £68.; Sydney, 1 cs. (pt.), £16.

SOAP—
Adelaide, 6 c.; Alexandria, 5 c.; Amsterdam, 2 t. 7 c.; Antwerp, 178 t. 12 c.; Auckland, 2 t. 4 c.; Bangkok, 10 c.; Batavia, 4 c.; Barcelona, 2 t. 10 c.; Batoum, 1 c.; Beira, 1 c.; Bermuda, 1 c.; Bergen, 4 t. 10 c.; Beyrout 2 c.; Bombay, 1 t. 2 c.; Boulogne, 8 t. 15 c.; Callao, 7 c.; Calcutta, 1 t. 11 c.; Cape Town, 1 c.; Canton, 1 c.; Colombo, 10 c.; Christchurch, 1 c.; Copenhagen, 15 c.; Cyprus, 2 c.; Demerara, 1 c.; Dunedin, 7 c.; Dunkirk, 16 c.; Durban, 2 t. 10 c.; East London, 2 c.; Gibraltar, 11 c.; Hankow, 1 c.; Havre, 12 t. 10 c.; Helsingfors, 5 t.; Hong Kong, 3 c.; Karachi, 2 c.; Lyttleton, 2 c.; Madras, 16 c.; Melbourne, 4 c.; Monte Video, 3 c.; Napier, 1 c.; New York, 7 c.; Newcastle, 1 c.; Ostend, 11 c.; Paris, 11 c.; Port Swettenham, 3 t. 4 c.; Paramaribo, 1 c.; Penang, 3 c.; Rangoon, 1 t. 15 c.; Rotterdam, 7 c.; St. Kitts, 1 c.; Salonika, 3 t. 6 c.; Shanghai, 1 c.; Singapore, 6 c.; Stockholm, 8 c.; Tientsin, 7 c.; Valencia, 2 t. 2 c.; Valparaiso, 6 c.; Yokohama, 2 c.

SODA ASH—
Athens, 10 t., £74.

SODIUM ARSENATE—
Port Elizabeth, 10 c., £25.

SODIUM BENZOATE—
Calcutta, 1 cs. (pt.), 1 cs., £33.

SODIUM BICARBONATE—
Beyrout, 10 c., £7.; Brussels, 10 c., £6.; Calcutta, 1 t. 10 c., £90.; Canton, 10 c., £15.; Constantinople, 2 c., £11.; Cyprus, 6 c., £6.; Durban, 7 c., £7.; Rio de Janeiro, 3 t. 11 c., £91.; Santander, 7 c., £17.; Shanghai, 14 c., £9.; Trinidad, 5 c., £5.

SODIUM BISULPHITE—
Nantes, 4 c., £10.

SODIUM BROMIDE—
Calcutta, 1 cs. (pt.), £8.

SODIUM CARBONATE—
Hankow, 10 c., £8.; Rio de Janeiro, 10 c., £16.; Shanghai, 16 c., £9.

SODIUM GLYCEROPHOSPHATE
Stockholm, 2 pkgs., £166.

SODIUM HYDROSULPHATE—
Sydney, 1 t., £350.

SODIUM HYPOSULPHATE—
Paris, 15 t., £230.

SODIUM HYPOSULPHITE—
Cyprus, 5 c., £9.

SODIUM IODIDE—
Calcutta, 1 cs. (pt.), £21.

SODIUM NITRATE—
Bombay, 4 cs., £24.

SODIUM PHOSPHATE—
Dunedin, 1 cs. (pt.), £31.

SODIUM SALICYLATE—
Antwerp, 1 cs., £10.; Calcutta, 4 cs., £53.; Cape Town, 1 cs., £7.; Dunedin, 1 cs., £11.; Melbourne, 1 cs., £13.; Montreal, 1 cs. (pt.), £20.; Rosario, 1 cs., £16.; Singapore, 4 cs. (pt.), £5.; Switzerland, 6 cs., £66.; Sydney, 1 cs. (pt.), £49.

SODIUM SILICATE—
Cyprus, 2 c., £5.

SODIUM SULPHITE—
Bombay, 1 t., £40.; Hankow, 10 c., £11.; Sydney, 6 c., £6.; Toronto, 6 t., £300.

SODIUM TARTRATE—
Calcutta, 1 cs., £8.; Rangoon, 1 cs. (pt.), £9.

SULPHUR—
Brussels, 2 t. 5 c., £75.; Helsingfors, 2 t., £60.; Rio de Janeiro, 2 c. (F.), £7.

SULPHUR (FLOWERS)—
Alexandria, 10 c., £14.; Paris, 6 t., £200.

SULPHURIC ACID—
Port Sudan, 3 t., £75.

SULPHUROUS ACID—
Colombo, 4 c., £28.; Madras, 2 t. 4 c., £60.; Port Sudan, 3 t., £15.; Rotterdam, 100 csks., £256.

TANNIC ACID—
Paris, 5 brls. (F.), £57.

TARTARIC ACID—
Brussels, 1 c., £16.; Calcutta, 2 c. (F.), £38.; Cape Town, 3 c., £54.; Christiania, 10 c., £201.; Dunedin, 2 c., £39.; Durban, 1 c., £20.; East London, 1 c., £18.; Jaffa, (F.), £15.; Karachi, 10 c. (F.), £106.; Montreal, 4 t., £1241.; Port Chalmers, 2 c., £39.; Rio de Janeiro, 11 c., £243.; Stockholm, 1 t., £336.; Toronto, 3 t., £958.; Valparaiso, 1 c., £27.

WAX—
Copenhagen, 6 c.; Osaka, 9 c.; Paris, 1 t.; Wiborg, 2 c.

WHITE LEAD—
Antwerp, £3,251.; Calcutta, £366.; Channel Islands, £150.; Christchurch, £17.; Hong Kong, £129.; Paris, £705.; Ponta Delgada, £16.; Shanghai, £463.; Tangiers, £65.

ZINC OXIDE—
Canton, 1 cs., £7.

ZINC SULPHOCARBONATE—
Melbourne, 1 cs. (pt.), £5.

MANCHESTER.

Week ending July 12

ACID—
Antwerp, 5 kgs.

ALUM (CHROME)—
Antwerp, 5 csks.; Stockholm, 5 csks.

AMMONIUM CARBONATE—
Antwerp, 20 kgs.; Gothenburg, 170 kgs.

AMMONIUM SULPHATE—
Antwerp, 200 bgs.

ANILINE OIL—
Rotterdam, 1 drin.

ANTIMONY—
Rotterdam, 1 kg.

CAUSTIC SODA—
Alexandria, 113 drms.; Stockholm, 12 drms.

CARBOLIC ACID—
Antwerp, 20 pkgs.

COAL PRODUCTS—
Carbolic Acid
Antwerp, 20 pkgs.
Tar
Antwerp, £1833.; Melbourne, £17.

DEXTRENE—
Antwerp, 8 csks.

DYESTUFF (otherwise undescribed)
Copenhagen, 1 cs.; Rotterdam, 2 csks.

DYESTUFFS—
Chestnut Extract
Copenhagen, 170 bgs.
Logwood Extract
Rotterdam, 3 csks.

GLUE—
Antwerp, 20 bgs.

HYDROQUINONE PASTE—
Montreal, 1 cs.

MAGNESIA (CALCINED)—
Alexandria, 13 csks.

MAGNESIUM BISULPHITE—
Montreal, 11 csks.

MAGNESIUM CHLORIDE—
Alexandria, 8 drms.

SALAMMONIAC—
Alexandria, 60 cs.

SALT—
Ghent, 4,000 sks.

SHEEP DIP—
Melbourne, 775 drms.

SOAP—
Alexandria, 2 drms.; Antwerp, 636 pkgs., 50 cs.; Sydney, 10 drms.

SODA ASH—
Gothenburg, 815 bgs.

SODIUM BICARBONATE—
Gothenburg, 176 bgs.

SODIUM HYDROSULPHITE—
Melbourne, 5 kgs.

TALLOW—
Gothenburg, 1 c.

TANNIC ACID—
Rotterdam, 3 brls.

WAX—
Alexandria, 1 cs.

ZINC CHLORIDE—
Alexandria, 3 drms.

MIDDLESBROUGH.

Week ending July 12.

CAUSTIC SODA—
Calcutta, 60 t., £1,200.

COAL PRODUCTS—
Disinfectant
Calcutta, 9 t. 1 c., £296.

Naphthalene
Calcutta, 5 t., £90.
Pitch
Antwerp, 1,116 t. 5 c., £3,120.

SALT—
Helsingfors, 92 t., £671.; Karis-
hamn, 156 t., £527.; Faroe
Islands, 347 t., £867.

NEWCASTLE-ON-TYNE

Week ending July 12.

ANTIMONY—
Antwerp, 3 t. 10 c.

BLEACHING POWDER—
Antwerp, 24 t. 18 c.

BORACIC ACID—
Copenhagen, 5 t.

CAUSTIC SODA—
Copenhagen, 4 t. 18 c.; Rotter-
dam, 10 t. 3 c.

GELATINE—
Copenhagen, 11 c.

GLUE—
Archangel, 10 t.

EPHARGE—
Gothenburg, 9 c.

PITCH—
Rotterdam, 2 t.

RED LEAD—
Antwerp, 4 t. 7 c.; Bergen,
10 csks.; Copenhagen, 7 t. 13 c.;
Gothenburg, 3 t. 15 c.; Stavanger,
10 c.

SOAP—
Antwerp, 11 t. 1 c.

SODIUM HYPOPHOSPHITE—
Antwerp, 5 t.

SULPHUR—
Antwerp, 5 t.

WHITE LEAD—
Antwerp, 9 t. 6 c.; Copenhagen,
4 t. 1 c.

N. & S. SHIELDS.

Week ending July 12.

NIL.

STOCKTON-ON-TEES.

Week ending July 12.

NIL.

SWANSEA.

Week ending July 12.

CAUSTIC SODA—
Basreh, 1 c., £2.

COPPER SULPHATE—
Bordeaux, 1,587 t. 6 c., £80,000.

SULPHUR—
Bordeaux, 5 t., £90.

PRICES CURRENT.

THURSDAY, July 17, 1919.

PREPARED BY MESSRS. HIGGINBOTTOM AND CO., 21, SPRING GARDENS, MANCHESTER.

The values stated are F.O.R. at makers' works, or at usual ports of shipment in U.K., unless otherwise specified
The prices in different localities may vary

Acids:—				£ s. d.		£ s. d.			
*Acetic	40% and 60%	per cwt.	32/- & 48/-	Lead Carbonate (White lead), pure	per ton	51	0	0	
"	Glacial	per ton	82 0 0	" Nitrate	"	57	0	0	
Arsenic, S.G. 2,000°		per ton	50 0 0	Lime, Acetate (brown)	"	10	0	0	
Boric, Crystals		"	72 0 0	" (grey), 80% (ex ship)	"	19	10	0	
*Fluoric		per lb.	0 0 7	Magnesium Chloride	"	15	10	0	
*Muriatic (Tower Salts), 28° Tw.		per carboy	0 6 6	" Carbonate (light)	per cwt.	3	7	6	
*Nitric, 80° Tw.		per ton	31 10 0	" Calcined Magnesite	per ton	25	0	0	
Oxalic		per lb.	0 1 2½	" Sulphate (Epsom Salts) (coml.)	"	10	10	0	
Phosphoric, 1,700°		"	0 1 9	" (druggists)	"	16	0	0	
*Sulphuric (tower, 70° Tw.)		per ton	—	Manganese, Sulphate	"	80	0	0	
" (Pyrites, 168°)		"	7 18 9	" Borate	"	100	0	0	
" (" 140°)		"	4 10 0	*Methylated Spirit, 64° (industrial)	per gal.	0	5	7	
" (free from arsenic, 144°)		"	5 7 4	*Naphtha (Wood), Solvent	"	0	10	6	
Tannic (commercial)		per lb.	0 2 9	" " Miscible, 60° p.	"	0	10	6	
Tartaric (crystals)		"	0 3 2	Oils:—					
*Acetone		per ton	8 0 0	*Cottonseed	per ton	135	0	0	
*Alum, loose lump (delivered)		"	17 0 0	*Linseed	"	135	0	0	
Alumina Sulphate (pure)		"	17 0 0	Stearine, 115-120° M.P.	"	95	0	0	
Aluminoferrous (in slabs)		"	8 10 0	Potassium, Bichromate	per lb.	0	1	5	
Aluminium (Ingot Metal, 98/99%)		per ton	150 0 0	" Carbonate, 80/82%	per to	85	0	0	
Ammonia, Anhydrous		per lb.	0 1 10	" Chlorate	per lb.	0	1	1	
" 880		per ton	33 0 0	" Cyanide, 98%	"	—	—	—	
" 920		"	20 0 0	" Hydrate (Caustic Potash) 90%	per ton	150	0	0	
" Carbonate		per lb.	0 0 6½	" " 75/80%	"	135	0	0	
" Muriate (grey)		per ton	50 0 0	" Potash Hydrate Liquid, 38° Bé	"	70	0	0	
" (sal ammoniac) 1st & 2nd, per cwt.		80/- & 75/-		" Nitrate (refined)	"	60	0	0	
" Nitrate		per ton	60 0 0	" Permanganate (B.P. crystals)	per lb.	0	3	6	
" Phosphate		"	114 0 0	" Prussiate (yellow)	"	0	1	9	
" Sulphate (grey), London, net		"	—	" (red)	"	0	5	5	
" " Hull		"	—	" Sulphate, 90% (ex ship)	per ton	40	0	0	
" " Manchester		"	—	" Muriate, 80%	"	30	0	0	
*Aniline Oil (pure)		per lb.	0 1 2	Silver (metal)	per oz.	0	4	6½	
Aniline Salt		"	0 1 2	Sodium (metal)	per lb.	0	1	3	
Antimony		per ton	45 0 0	" Acetate	per ton	52	10	0	
" (tartar emetic), 43/44%		per lb.	0 3 4	" Arseniate, 45%	"	48	0	0	
" (golden sulphide)		"	0 1 3	" Borate (Borax), Crystals	"	39	0	0	
Arsenic, white powdered		per ton	40 0 0	" Bicarbonate (1 cwt. kegs)	"	9	10	0	
Barium Chloride (in casks)		"	24 10 0	" Bichromate	per lb.	0	0	11	
" Carbonate (native), 92/94%		"	11 10 0	" Carb. (Caustic Soda-ash), 48%	per ton	10	0	0	
" Sulphate (native levigated)		"	£7 to £14	" (Alkali), 58% (bags)	" f.o.r.	6	0	0	
Baryta Chlorate		per lb.	0 1 3	" (Soda Crystals), (bags)	" wks.	4	2	6	
*Bisulphide of Carbon		per ton	55 0 0	" Chlorate	per lb.	0	0	7½	
Bleaching Powder, 35%		"	15 0 0	" Cyanide (100% basis)	"	0	0	10	
" " Liquor, 7%		"	6 0 0	" Hydrate (76% C. Soda) (f.o.r.)	per ton	23	10	0	
Casein (commercial)		"	82 0 0	" " (74% C. Soda)	"	23	0	0	
Chromium Acetate (crystals)		per lb.	0 1 6	" " (70% C. Soda)	"	22	0	0	
Calcium Chloride		per ton	8 0 0	" " (60% C. Soda)	"	21	0	0	
China Clay (at Runcorn), in bulk		"	40/- to 70/-	" (pure liquid, 90° Tw.)	"	9	0	0	
Coal-tar Products and Dyes:—				" 77/78% Powdered (99%) Hydrate	"	25	10	0	
Alizarine (artificial), 20%		per lb.	0 2 0	Hyposulphite (commercial)	"	16	10	0	
Magenta		"	18/- to 35/-	" Manganate, 25%	"	65	0	0	
Anthracene, 40/50% A, f.o.b., L'don, per unit,		6 to 7		" Nitrate, 96%, retd., f.o.r., L'pool	"	21	0	0	
Benzol, 90's (naked)		per gal.	0 1 11½	" Nitrite, 100%	"	55	0	0	
" 50/100's		"	0 1 9½	" Phosphate	"	25	10	0	
Carbolic Acid (crude, 60°)		"	—	" Prussiate	per lb.	0	0	7½	
" (crystallised, 40°)		per lb.	0 0 5½	" Silicate (glass) Alkaline	per ton	12	5	0	
" Acid (pale liquid, 97/98%)		per gal.	0 2 9	" (liquid, 100° Tw.)	"	9	10	0	
*Cresote (ordinary), naked		"	0 0 5½	" Sulphate (Saltcake), delivered	"	3	0	0	
*Crude Naphtha, 30% at 120°C.		"	0 0 8½	" (Glauber's Salt)	"	3	0	0	
*Grease Oils, 18° Tw. (naked)		per ton	6 10 0	" Sulphide (conc.), 60/65% casks	"	10	0	0	
Pitch, f.o.b., Liverpool or Garston		"	2 11 0	" Sulphite	"	10	0	0	
*Solvent Naphtha, 90% at 160°		per gal.	0 2 1	Sulphocyanide, Ammonium, 95%	per lb.	0	2	1	
Copper		per ton	105 0 0	" Barium, 95%	"	0	1	4	
" Sulphate		"	45 0 0	" Potassium	"	0	2	4	
" Oxide (copper scales)		"	85 0 0	" Calcium, 70%	per lb.	0	1	4	
Dross Salts		"	39 0 0	Sulphur, (Flowers)	Sicilian per ton	21	0	0	
*Glycerine (crude), 80%		"	72 0 0	" (Roll Brimstone)	"	20	0	0	
" (industrial, S.G. 1,260)		"	110 0 0	" Brimstone (best thirds)	"	—	—	—	
*Hydrochloric		per oz.	0 0 10½	" (ex ship)	"	13	0	0	
*Ice Nitrate, 80° Tw.		per ton	12 0 0	Tallow	"	100	0	0	
" Sulphate (copperas), delivered		"	4 10 0	Tin Crystals	per lb.	0	1	3	
" Sulphate		"	7 15 0	" English Ingots	per ton	252	0	0	
Lead (Foreign P.L.)		"	23 17 6	Titanium, Potass. Oxalate	per lb.	0	1	6	
" Anthracene Flake		"	4 0 0	Titanous Chloride	per cwt.	1	10	0	
" Acetate (white), (ex ship)		"	85 0 0	Zinc (Spelter)	per ton	43	15	0	
" " (brown)		"	75 0 0	" Powder, 88/92%	"	70	0	0	
				" Chloride (solution, 102° Tw.)	"	23	0	0	
				" Sulphate, Crystal	"	23	0	0	

* Packages extra or returnable, otherwise prices usually include packages.

THE CHEMICAL TRADE JOURNAL AND CHEMICAL ENGINEER.

No. 1679.

LONDON, SATURDAY, JULY 26, 1919.

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NOTICES.

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NEW ARRANGEMENTS.

The "Chemical Trade Journal" will be published in future a day earlier.

SUBSCRIBERS to whom the Journal is posted direct will therefore receive it each week on Friday.

THE TRADE will in future be able to secure their supplies from our London office, 265, Strand, at 10 a.m. on Fridays.

EDITORIAL NOTICES.

INDEX.

Copies of the Index to Volume LXIV. (January-June, 1919) of the "Chemical Trade Journal and Chemical Engineer," which is now available, will be forwarded to those readers who make early application to the Publishers.

Readers are invited to forward items of intelligence, company reports and balance-sheets, or cuttings from local newspapers of interest to the trades concerned.

Articles, reports, and correspondence on all matters of interest to the chemical and allied industries, home and foreign, are solicited. Correspondents should condense their matter as much as possible, write on one side only of the paper, and in all cases give their names and addresses, not necessarily for publication. Sketches should be sent on separate sheets.

CURRENT TOPICS.

THE COAL CRISIS.

THE term crisis is no exaggeration when used to describe the present position of the coal industry, and indeed it may be applied more generally to the whole trade of the country. The state of affairs now existing is one that must shake the confidence of the most optimistic among us, and what makes the situation more serious is the fact that no break in the clouds anywhere is visible.

Britain's commercial supremacy in the past has been due in large measure to the cheap and abundant supplies of coal that have always been available, and if production increases, as we are told it must if we are to maintain that position, more coal will be needed. Yet, what do we find? In 1913 the total production in the United Kingdom exceeded 280,000,000 tons, whereas in the last year for which statistics are available only 220,000,000 tons were produced. Worse than that, the output is falling rapidly, and no great stretch of imagination is required to picture the state of affairs that must ensue. Granted that the use of coal has been most wasteful in the past, no possible economies can make up for the falling output, and all industries requiring a large proportion of fuel in relation to their production, such as the chemical and the iron and steel trades, will be placed in a parlous position.

Now, it seems to us that there has been no adequate attempt to keep prominently before us the fundamental causes of the present unrest. It is not due to differences as to the application of the Sankey Award, nor the retention of conscription; neither is it the six-shilling increase in the price of coal. The real cause lies much deeper than this, and has its roots in the Syndicalist propaganda preached in South Wales in particular long before the war. As our readers are aware, the doctrines of M. Sorel have for their object the rendering unprofitable of all private enterprises so that the "workers" may

eventually seize them for their own exclusive benefit. These doctrines remained more or less dormant during the war, but the revolutionary faction are now taking advantage of the declaration of Peace to proceed with their carefully concerted plan to bring the Government to their knees and to overturn the existing order of things. Concessions to the miners are useless at the present juncture, and the only alternatives we can see are capitulation or a stand-up fight, and the latter is the only one that will in the end bring industrial peace.

EMPIRE SUGAR PRODUCTION.

THE preliminary report of the Empire Sugar Supply (Technical) Committee, presented at the annual meeting of the Society of Chemical Industry, and the ensuing discussion, have thrown a good deal of light on a subject of more than passing interest, and we hope will have useful practical results. The consumption of sugar within the British Empire has been put at approximately $6\frac{1}{4}$ million tons, and the production at $3\frac{3}{4}$ million tons, leaving a deficit of $2\frac{1}{2}$ million tons. In order, therefore, to make the Empire self-supporting, so far as sugar supplies are concerned, an increase of nearly 70 per cent. in the production is essential. To effect this will obviously not be easy; but during the past few years there have been far more difficult problems to be solved—rendered doubly difficult because time was a factor to be reckoned with,—and we are optimistic enough to believe that with adequate assistance from the Imperial Government and the Government of India—for India certainly presents the greatest possibilities for rapid development—success would be met with if a carefully co-ordinated scheme were proceeded with. Even with the almost primitive methods largely in vogue, India produced in 1915 about 3,000,000 tons of sugar. With improved cultivation, more efficient machinery, and large centralised factories, it is authoritatively estimated that the output could be more than doubled. India alone, therefore, is potentially capable of supplying the needs of the Empire. There are many other sources, however, also capable of development, including the cultivation of sugar-beet in our own country. In composition and purity roots grown here have been proved to be superior to Continental varieties; the obstacle at the present time lies in the failure, owing to the methods of cultivation, to produce roots of the desired shape. That should not prove difficult to overcome. In all these schemes for development, however, the question of capital is paramount, and to render the sugar industry attractive to capital adequate preferential treatment to British Empire producers must be accorded.

COMPRESSED ACETYLENE.

AN Order of the Secretary of State, dated June 23, sets forth the conditions under which compressed acetylene contained in a porous substance may be exempt from the operations of the Explosives Act, 1875. Details of the Order, which comes into force on August 1 next, cancelling a previous Order of August 6, 1912, are as follows:—

Acetylene when contained in a homogeneous porous substance, with or without acetone or other solvent, shall not be deemed to be an explosive within the meaning of the said Act subject to the following conditions, and so long only as such conditions are observed, viz:—

(1) The porous substance shall be similar in every respect to a sample deposited with His Majesty's Inspectors at the Home Office.

(2) The porous substance shall fill as completely as possible the cylinder into which the acetylene is compressed.

(3) The porosity of the substance shall not exceed 80 per cent.

(4) Any acetone or other solvent used shall not be capable of chemical reaction with the acetylene gas or with the porous substance or with the metal of the cylinder, and the quantity of acetone or other solvent used shall be such that when fully charged with acetylene it shall not completely fill the porosity of the porous substance at any temperature likely to be met with in ordinary practice or use.

(5) A drawing showing the method of construction of every type of cylinder it is proposed to use for the storage of compressed acetylene gas shall be deposited with H.M. Inspectors of Explosives at the Home Office, and no cylinder shall be so used unless it is of a design approved in writing by one of the said inspectors, provided that this shall not be deemed to prohibit the use of existing cylinders for a period of five years from the date of this Order.

(6) The pressure in the cylinder shall not exceed 225lb. to the square inch at a temperature of 60° F., provided that no cylinder capable when empty of containing one cubic foot of water or more, which has the ends secured to the body by welding only, and no cylinder in which a porous substance is used without acetone or other solvent, shall be charged to a pressure exceeding 150lb. to the square inch at a temperature of 60° F. This condition shall not apply to cylinders used exclusively for marine lighting by a general or local lighthouse authority within the meaning of the Merchant Shipping Act, 1894.

(7) Every cylinder capable when empty of containing one cubic foot of water or more, in which under this Order the pressure allowed may be 225lb. to the square inch, shall be annealed and every cylinder shall be tested by hydraulic pressure to a pressure of not less than four times the pressure to which the cylinder is to be subjected in use, such hydraulic pressure to be maintained for a period of not less than fifteen minutes, and no cylinder shall be used which on the first occasion of its being subjected to this test shall show any permanent stretch.

(8) The compression of the acetylene shall be carried out only on such premises as shall have been approved in writing by one of His Majesty's Inspectors of Explosives. Such approval may be withdrawn at any time by one of His Majesty's Inspectors of Explosives.

(9) No firm shall charge with acetylene any cylinder manufactured by any other firm unless it is in possession of the full particulars and previous history of such cylinder, or has otherwise assured itself that the cylinder complies with the requirements of this Order.

(10) Whenever a cylinder is charged with acetylene it shall be subjected to a thorough visual examination if the history of the cylinder shows that it has not been subjected to such an examination within the previous twelve months, and at the same time the valve shall be removed and the condition of the porous substance at the neck of the cylinder ascertained.

(11) Every cylinder shall have permanently and conspicuously marked upon it or upon a brass plate soldered to it the name of the manufacturer and the words "Acetylene compressed into porous substance exempted by Order of Secretary of State." And every cylinder shall bear a label giving the date when it was last charged, together with the name of the firm by whom it was charged, the address of the last charging station and the maximum pressure allowed in the cylinder. Every cylinder capable when empty of containing one cubic foot of water or more manufactured after the date of this Order shall have stamped upon it the name or trade mark of the manufacturer and the serial number of the cylinder.

(12) Each charging firm shall keep a record of every cylinder charged by it. This record shall give the following information:—In the case of cylinders first issued by the firm: (a) the tare weight of the cylinder, including porous substance and acetone or other solvent, the nature of the solvent, and the maximum pressure allowed in the cylinder. In the case of all cylinders charged: (b) The date of each charging of the cylinder. (c) The dates upon which the solvent has been added. (d) The dates upon which the cylinder has been thoroughly examined as provided in Regulation 10, the results of each such examination, and the name of the person carrying out such examination. The record shall be open to the inspection of His Majesty's Inspectors of Explosives.

(13) Every facility shall be given to His Majesty's Inspectors of Explosives to inspect the apparatus and methods by which the cylinders are charged.

SOCIETY OF CHEMICAL INDUSTRY.

ANNUAL GENERAL MEETING.

(Continued from page 62.)

SUGAR PRODUCTION.

ON Wednesday, July 16, a conference was held at the Clothworkers' Hall, Mincing Lane, on the "Production and Consumption of Sugar Within the British Empire," when the preliminary report of the Empire Sugar Supply (Technical) Committee was presented. Lord Denbigh, C.V.O., presided.

The report was presented by Mr. Arthur R. Ling, chairman, and Mr. J. W. Macdonald. We give an abstract below:—

The sugar cane as now cultivated under the most favourable conditions gives a crop of 30-40 tons per acre, and sometimes more, and has a sugar content of 11-16 per cent. Taking a yield of cane of 35 tons per acre, and an extraction of sugar of 12 per cent., this, says the report, would mean a production of sugar of 4.2 tons per acre. In 1909 the world's production of beetroot sugar was 6,588,000 tons, or 44.3 per cent. of the total sugar production from cane and beet together. Of this Germany produced 2,080,000 tons. The remarkable success met with in Germany in improving the sugar content of the roots by selection and manuring may be judged by the fact that at the commencement of the industry the roots probably contained not more than 6-8 per cent. of sugar, whilst the sugar content had steadily improved until the roots of the 1909 harvest contained an average of 17.63 per cent. of sugar. Of this over 90 per cent. would be secured by modern methods.

It will be seen that the sugar content of beets is higher than that of cane, but the crop is a lighter one. On an average, under the best conditions, about 12 tons of beets can be grown to the acre, so that the yield of sugar seldom reaches 2 tons per acre, and is generally a little below it.

The British Empire, according to the last returns, had about 3,500,000 acres under sugar, mostly cane, yet the total production from this was less than that of Germany and Austria-Hungary combined, which countries could not have had as much as half that number of acres under beet. Obviously, there must be something wrong with our methods.

Let us bear in mind that the British Empire exceeds all other States in the production of sugar, yet the United Kingdom occupies the second place, coming next to the United States, as an importer of sugar. It is of particular significance in connection with this last-named fact that prior to the war more than 90 per cent. of the sugar imported into the United Kingdom came from foreign countries, and by far the greater portion of this (quite 90 per cent.) was European beet sugar.

Since the outbreak of hostilities the production of sugar from beet has dropped from 46 per cent. to 29 per cent. of the world's total supply. On the other hand, the production of the British Empire has increased from 3,275,500 tons in 1913-14 to 4,394,100 tons in 1917-18, whilst the total production of sugar throughout the world, which was 18,653,100 tons in 1913-14, was in 1917-18 17,556,400 tons. The country showing the largest increase of any is Cuba.

One of us (A. R. Ling) has a record of the investigation of 375 samples of sugar beets, grown in different parts of the United Kingdom. In these the average weights of the roots and of the leaves have been taken, the percentage of sugar in the roots and juice, and the coefficient of purity of the juice, i.e., the percentage of sugar in the other soluble constituents. The results show that the roots are in composition and purity superior to the average grown on the Continent. There is, however, another most important factor from the sugar producer's point of view, and in this respect the majority of our home-grown roots are defective. Some of them are globose in form, some are bifurcated, whilst many of them contain huge fangs and tails. The shape is, in the majority of instances, so faulty that it would be difficult, if not impossible, to deal with many of them in the sugar factory. Until greater attention is bestowed on the culture of sugar beets to meet the needs of the sugar producer we cannot assert that sugar beets can be grown in the United Kingdom equal to those furnished on the Continent. Deep ploughing is, of course, possible in this country, but as this has not been

carried out hitherto the sub-soil may for some considerable time exercise a deleterious effect on the roots.

The report goes on to review at some length the position of the various parts of the Empire in regard to sugar production. Regarding the Indian Empire, which in 1915 produced 2,600,000 tons of sugar from cane, and about 500,000 tons from palm, the report says:

The most feasible means of extending the sugar industry in India is by the establishment of central factories in which all interested in the manufacture co-operate, and are bound by legal contract to assist one another. The factories must be fitted with up-to-date power mills, vacuum evaporating plant, and other modern machinery. This would naturally necessitate considerable organisation and research, and the outlay of much capital. The Indian sugar industry greatly needs capital to extend it. Mr. Wynne Sayer is of opinion that the capital necessary for the development should be forthcoming, in view of the assistance available from Government sugar experts, which has made it possible to overcome many obstacles which formerly obstructed progress.

Mr. J. W. Macdonald said that the report disclosed the fact that the Empire was consuming about 6½ million tons of sugar annually, whilst at the present time the Empire production was about 3½ million tons. Where was that to be produced in order that we might be self-supporting in the future? No doubt some of them had seen a pamphlet issued by the West Indian Committee saying that the West Indian group could produce all that the Empire wanted; because Demerara could produce 2½ million tons, which was exactly the amount the Empire was short of to-day. It might be true that Demerara could and would produce it if the settlement were there; but what a long time it would take to wait for that! If we waited for that we should be flooded with foreign sugar. What we wanted to do was to get sugar where it could be got best and cheapest—where labour was to be had, and other natural conditions were favourable. India was a very important factor in this question. The difficulties there were very great; the land was held by small people, each of whom worked his own little plot, and produced his own sugar for his own consumption. In one way or another, the Indian peasantry wasted two-thirds or three-quarters of the sugar that the land might produce; but they were satisfied, and it was difficult to shift them. If the Government of India educated their people into more efficient methods of making sugar, he believed there were great possibilities, although it would take time. It seemed to him that India was the place to get sugar quickly. The sugar could be grown there, the labour was there, the cane made its own fuel, and there was any amount of land. The thing which frightened him was the enormous cost of the factories, which was about three times what it was pre-war, and unless there were to be big profits, guarded by protection or preference until these big costs were paid off, he did not think people would care to put money into the industry. At present in India most of the sugar was grown in the North, where they planted a thin cane, and got only one ton of sugar to the acre. In the South, where they planted a thicker cane, they got, with their primitive methods, 2½ tons of sugar to the acre, but with better cane and better methods, instead of 2½ they would get 5 or 6. He did not think we in this country could compete with Indian cane sugar by growing beet. Although we might make a small amount of sugar, he did not see how we could spare the land to produce the two million tons of sugar we were actually importing.

Sir Francis Watts, Director of Agriculture for the West Indies, speaking of the needs of the United Kingdom, asked how the two million tons required were to be found. India might be left out, as for the moment she was an importing country. Australia, Fiji, and New Zealand might be left out; they were not exporting countries. Canada was an importing country. What remained? There were but few British tropical countries left that still produced sugar. Why? Because the condition of the sugar industry had been such that no people would venture to put money and machinery into the parts of the British Empire where sugar could be produced. Whether we could by a vigorous effort, well thought out in this country, produce Empire sugar, rested with the

politician. From the very beginning sugar had been the sport of politics, and those countries which had built up their sugar industries into a powerful position had done so on a political basis, while this country had destroyed its sugar industry on a political basis. He might be told that it was under discussion now, and probably would be acceptable to this country, to give a preferential treatment to British-grown sugar to the extent of £3 or £4 a ton remission of duties. That meant that British-grown sugar coming in to-day or next year would receive preferential treatment to the extent of £3. or £4. Therefore, it was estimated that the British producer would get that much advantage in the price of sugar. But it was not quite sure that he would. The working out of preferential treatment in other things was often obscure, and it appeared that the preference which was supposed to go to the producer often stuck midway, and did not reach him. Even with the present stress and need he (the speaker) did not look for more than three-quarters of the preference to find its way to the producer. If it did, to what extent would it stimulate the investment of new capital? To a very moderate extent. He believed the intention of granting that preference was to stimulate investment; but for a preference to stimulate investment in a business whose unit of time was three years, there must be some assurance that the benefit would extend over ten or fifteen years. No man could invest in a sugar factory, because for the next two or three years he might make large profits, and for the next ten or fifteen years a bare margin. If this preference was capable of being assured for a considerable period of time, people would invest, and there would be British sugar. If it were not assured, this market would get most of its nearly two million tons from benevolently disposed but none the less foreign competitors.

Dr. Voelcker said he hoped the Committee, before finally adopting its report, would see its way to modify the opinion expressed in it that there was very little value in carrying out experiments to test the respective yields of mangolds, swedes, and beets. Though these might not be of much value to the manufacturer of sugar, they were all important to the agriculturist, because they resolved themselves into a question of which crop paid best, having regard to the residue from the beet factories for cattle feeding, the employment of labour, and so on. At the same time, important though they were, all these questions were subservient to the main question, which was a political one. What was going to be the agricultural policy of our Government in the future? Were we going to aim more and more at being a self-supporting country, or were we to be dependent on other countries—our Colonies and elsewhere,—and look to the Navy to protect our shores?

The Chairman thought the question which had to be solved was whether it would not be more profitable to have less grass land and more land under cultivation. Then the growing of sugar beet would not mean the growing of less wheat.

The conference adjourned for lunch.

Mr. J. W. Macdonald presided at the afternoon sitting.

Mr. A. R. Ling, chairman of the Sugar Committee, referring to Mr. Macdonald's remarks during the morning, said that that gentleman had rather pinned his faith to India.

The Chairman said that was not entirely the case. His point was that India was a large producer already, and as she had the labour and the land under cultivation, an attempt should be made to improve methods, so that a larger output could be obtained.

Mr. Hamel Smith said that 25 per cent. of the juice never came out of the cane in India, and another 25 per cent. was lost in manufacturing, so that as India produced three million tons of sugar last year, she could apparently produce another 1½ millions by not wasting.

Mr. Sandbach Parkes said he was mainly interested in British Guiana, where the possibilities were immense, but the difficulties were very great, mainly for the reason that there was no labour. Sugar was indigenous almost throughout the tropical belt of the British Empire, and it was a question of obtaining security for the industry. Then capital would be attracted, and the necessary labour obtained. The point to be considered was where we should get the best value for the capital invested in the industry. This might be in Africa, where land was cheap and labour plentiful. Although India manufactured sugar in a very uneconomical way, and the yield could be considerably increased, it would take some years to double the yield and to export in any considerable quantity, because India at present imported 800,000 tons of sugar for her own consumption.

Sir Alfred Chatterton gave a brief account of the primitive methods adopted in India and urged the need for the intro-

duction of mechanical appliances, whilst difficulties of transport were also very great.

Professor Carmody, who has been connected with Trinidad for many years, said the fact that the British sugar industry remained firmly established in spite of the severest, most unfair, and most strangling competition that any industry ever had to face, was remarkable, and at the same time encouraging. It was immaterial whether the 2½ million tons which were required were produced from cane or beet, but having an established cane-sugar industry within the Empire, it seemed to him that expenditure would be most profitably incurred upon that. He agreed that India was a country which was likely to produce results much earlier than any other part of the Empire. The great needs were capital, machinery, and, to a certain extent, scientific assistance; whilst transport was a very serious question.

Mr. Ling, speaking on the question of the relative merits of cane and beet sugar, said that he held no brief for beet. If the sucrose could be got from cane, he was quite agreeable to it being done. But no compound had been submitted to such numerous and far-reaching physical tests as sucrose, whether derived from cane or from beet, and when refined to the extent that it was by Tate or other refiners, there was no doubt that cane and beet sugar were practically identical. There was no recognisable impurity in the beet sugar. He preferred the sugar made from cane, but there was no doubt that from many points of view there was much to be said for beet sugar, and when refined as it was to the extent of 99.9 per cent. or more, it was the pure sucrose.

Dr. Thorne, who said he had never been connected with sugar producing, but had had a great deal to do with refining and using of sugars produced in various countries, believed we might look forward to producing within the Empire all the sugar that was wanted, within a comparatively short time, if we put our backs into the matter. After India, we should consider British Guiana, because although India might be capable of producing another two million tons, she would soon be wanting that for her own consumption. If, therefore, attention was paid also to British Guiana, supplies from there should be available by the time India was consuming her own additional production.

Mr. Martineau, as a refiner, confirmed Mr. Ling in saying that refined beet was as good as thoroughly refined cane; in fact, he would rather refine beet than cane. At the same time, he did not want to see Austrian or German beet here again, and he hoped his work in future would be to refine sugar cane only, and he preferred any of our Colonial raw sugars to that from either Cuba or Java. Speaking on the question of research, as honorary secretary to the British Empire Sugar Research Association, he said that body, which had been given encouragement by a Government Department and promises of help, was now a live association, and was backed by thirteen powerful sugar trade associations. Thus the new Research Association represented millions of capital and thousands of firms. The Department of Scientific and Industrial Research had approved of the memorandum and articles of association, the council had been elected, and a start would be made at once. The aim of the Association was "to establish in co-operation with the Government Department of Scientific and Industrial Research, an Empire scheme for the scientific investigation, either by its own officers or by universities, technical schools, and other institutions, of the problems arising in the sugar industry, and to encourage and improve the technical education of persons who are or may be engaged in the industry."

Dr. Bywaters said he would like to know what would be the prospects of dealing with beet sugar in the Colonies. One gentleman had said that he hoped he would never be called upon to refine beet sugar again. That did not sound very promising for the beet-sugar industry of our own country. When one compared the wages now demanded by labour in this country with what were paid to an Indian, he wondered whether there was any hope at all of establishing a beet-sugar industry in our own country.

Mr. Martineau said that when he said he hoped he would never have to refine beet sugar again, he was referring to the flood of beet sugar that we used to get from Germany and Austria. If an English beet-sugar industry was going to be started, he would be glad to encourage it in every way he could. On the other hand, he felt he would rather invest money in growing cane sugar in the Colonies than in growing beet sugar here.

Mr. Sandbach Parkes said that, although a West Indian sugar grower, he was not opposed to the introduction of a beet-sugar industry in England; but he was very doubtful if it could compete with cane sugar grown under proper aus-

pices in the Colonies. It should, however, be given a chance to show whether it could be developed into a paying crop in this country. It would be a sound transaction for the Government to introduce it on a small scale, and see whether it would be a valuable agricultural addition to the crops of the country.

The Chairman, replying to some of the questions raised in the discussion, said that in all the returns the committee had got, only two countries referred to beetroot; these were Victoria and Canada, and neither gave a rosy account of their work. He supposed the industry paid because there was Protection there; but, apart from that, the report was not very good. For instance, in Victoria in 1912 they only got 5.3 tons of root per acre—that was about one-third of a ton of sugar per acre. At another time they got twelve tons of roots, or 1½ tons of sugar to the acre. From Canada the report was that they were cultivating from 14,000 to 18,000 acres in Ontario. There was a large amount of land available suitable for beet, but the conditions were not economically favourable for the extension of factories without assistance from the Government. It was stated that one factory had actually closed because some fiscal facilities that had been given by the Government had been withdrawn. He was afraid the report would not help them much as regards beet, which he believed would always be beaten by the cane sugar. With regard to India, if she produced sufficient only for her own consumption it would liberate large quantities for elsewhere. For instance, Mauritius made between 200,000 and 300,000 tons and practically all of it went to India. It would help very much to get that here. Another point was that fuel was very important in beet-sugar making, but cane supplied most of its fuel. Not only did the bagasse provide fuel for power, but also for heat to evaporate the juice. Nearly all the reports the committee had received complained of the lack of labour, and high freights. Those were the reasons why the industry did not develop.

A conference on "Dyestuffs, Synthetic Drugs, and Associated Products" was held at Salters' Hall on Thursday.

Dr. Rée, who was in the chair, said the first paper was by Dr. H. Levinstein, who, it should be conceded, knew more about the subject of dyestuffs than anybody in the country.

THE BRITISH DYESTUFF INDUSTRY.

Dr. Levinstein said he did not propose to give a panegyric on the war work of the British industry, though that was quite remarkable. Such reviews had a tendency to make one complacent and to encourage the fatal notion that we could for the moment relax our efforts. Nor did he propose to say anything about our present position and future intentions except this: The industry now operated on a large scale, for the British Dyestuffs Corporation, the principal manufacturers, already employed close on 7,000 persons, and some 300 academically trained chemists, exclusively in the manufacture of dyes and auxiliary products, and their works comprised about 1,050 acres. Further large extensions were in preparation to both research laboratories and plant, and he anticipated that before the end of this year the number engaged would be substantially increased, with a corresponding increase of output. The range of products manufactured was being enlarged as quickly as new construction permitted, and our immediate object was to manufacture, in the shortest space of time, a range of dyes sufficient to render the country substantially independent of German dyes.

As the Government, who have a substantial holding in the British Dyestuffs Corporation, had in many ways shown their determination to secure a dye industry here, it was important that everybody should thoroughly understand the facts which make a successful dye industry of paramount importance to the State. He proposed, therefore, to deal with those aspects of the dye industry which explained why any British Government might well feel uneasy until we possessed a dyestuff industry equivalent to that of Germany. There were four reasons why the success of the dye industry was vital to the State. First, the dye industry was a key industry—an over-worked word which now conveyed nothing to a good many people. It might be said that our textile trades did exceedingly well up to the time of the war, though dependent upon Germany for a supply of dyestuffs; and that now the war was over there was not the same necessity for rendering ourselves entirely independent of Germany for the supply of these products. That view would be, however, entirely erroneous. It was held by no one who was at all familiar with the methods and history of the big German aniline dye trust,

which was created in 1915. The negotiations for the gigantic combine were well advanced in August, 1914, and their conclusion was not, as was generally supposed, due to the war, but the carrying out of a policy long decided upon. Had the war come but a little later the ring would have been closed, and our textile industry would have appreciated an acute difference in the conditions under which they would have received their supplies. To-day this trust, familiarly known as the I.G., was the most powerful weapon possessed by the Germans, for in peace, as in war, it was and is a tool of the German Government.

It was inconceivable that we should voluntarily permit the I.G. to dictate to essential industries the terms on which they should obtain their dyes, that we should leave to the I.G. the power to withhold supplies of useful or even essential commodities, or to charge British consumers a higher price than they charged their own textile trades. The real danger of being dependent upon Germany for dyestuffs, however, did not lie in the risk that we might be cut off from supplies in the case of a war with Germany, but that the world-monopoly possessed by Germany in dyestuffs was imperceptibly becoming a desperate menace to the freedom of our textile trades.

Secondly, the dye industry was required for national defence as a guarantee of peace. During the war the I.G. produced not only all the synthetic ammonia and nitric acid needed for the production of explosives, and also vast quantities of explosives, but also, with an unimportant exception, the whole of the chemical warfare products used by Germany in the course of the war. It was entirely due to the I.G. that Germany was able, in spite of the blockade, to carry on the war after the end of 1915. But for the possession of her dye industry, the German resistance would have broken down in little more than a year for lack of nitric acid. Could anything more clearly prove the military value of the German dye industry and the loss and destruction which it had caused us?

The Germans also were, of course, fully conscious of the value of their war factories for the purposes of peace, and far the greater part of their war expenditure on chemical plant was of a permanent character, and erected with a view to the after-war commercial struggle. The plant erected in Germany for the increased production of mustard gas was now available for the increased production of dyes. Attached to one of their plants erected during the war, ostensibly solely for the purpose of war, were laboratories which contained a large luxuriously equipped lecture-room, and cost £200,000.

Thirdly, very few people realised to what a small extent new industries arising out of new inventions had been created in England in recent years in comparison with those created abroad, particularly in Germany. On the whole, that country would produce the most chemical inventions which had the greatest number of trained research chemists. There was no industry except the dye industry which could support a large number of organised research chemists. The dye industry was thus a key industry in a new sense. It was the key to invention.

Fourthly, there was the political importance of the dyestuff industry. The German dye industry was the most potent weapon possessed by Germany for peaceful penetration. In America Mr. Mitchell Palmer showed that the dyestuff sales organisation of the I.G. firms was used by the German Government for espionage both before and during the war. The peaceful penetration of Russia and other foreign countries by Germany was one of the causes which led to the war. It was not safe for us to permit the Germans to monopolise the up-country business with tins of dyestuffs among the natives of India and of the East in general for political reasons. It was our duty to afford an alternative supply of dyestuffs, besides German dyestuffs, to those of our Allies who did not possess an adequate home industry. To secure commercial freedom for our textile trade and that of our Allies was as important as to secure political freedom.

It followed from what he had said that enormous responsibility rested upon the chemists of this country. During the war they rendered good service and made sacrifices and ran risks, but let them be quite clear on this: The real burden of the war was not borne by chemists, and the victory was not won by chemists or by engineers, but by the indomitable courage and tenacity of our soldiers. The real war work of our chemists lay before them, for it rested with chemists to secure in the next few years the opportunities the soldiers won for us, the fruition of which German chemists might yet deny us.

The discussion on Dr. Levinstein's paper was taken in conjunction with the following papers:—

"CERTAIN COLOUR PRODUCING INTERMEDIATES."

By PROFESSOR G. T. MORGAN.

This paper contained a summary of work carried out at the Finsbury Technical College during the past three years, and illustrates a well-worn theme which should not be forgotten, even in the midst of international peace—viz., the close relationship between synthetic dyes and military explosives. In connection with the methylation of aromatic amines, it was previously known that polymerised methylene aniline, a condensation product of aniline and formaldehyde, yielded on alkaline reduction a certain proportion of methylaniline, but the process presented certain practical difficulties. An improvement was effected by causing formaldehyde and aniline to interact in the presence of excess of reducing agent, so that the nascent methylene aniline was reduced immediately to methylaniline. The success of this chemical change depends very largely on the thoroughness with which the reagents are mixed together. A machine devised for this purpose is on view at the British Scientific Products Exhibition by permission of the Chemical Warfare Committee. The reaction was found to be a general one, and was applied to the homologues and derivatives of aniline. Details are given of experiments with the acyl derivatives of methylarylamines, which indicate that experiments initiated to produce improvements in the manufacture of explosives have led to suggestive results in the production of colour intermediates. Acyl derivatives can be initiated and reduced successively to yield colour producing intermediates. Tetryl can, moreover, be prepared by an entirely different process starting from the well-known colour intermediate, chloro 2 : 4 dinitrobenzene. This compound, heated with methylamine hydrochloride in the presence of an alkali such as sodium or calcium hydroxide, is converted into 2 : 4 dinitro-methylaniline, the nitration of which yielded tetryl. The practical difficulty of manufacturing the methylamine hydrochloride required has been overcome, and this salt can now be produced on a commercial scale. With the acid of this reagent (kindly supplied by Messrs. Claus and Co., Manchester) Mr. F. P. Evans and the author have obtained methyl *p*-naphthol by an alternative method by *p*-naphthol, so that this hitherto imperfectly studied secondary aniline can now be prepared by the alternative methods based on formaldehyde. The acyl and other derivatives of this base are now under examination. Chlorodinitrobenzene also interacts readily with aqueous or alcoholic ammonia, giving rise to 2 : 4 dinitroaniline—a primary base not hitherto largely used in colour making.

Para-nitrated diazophenols were also dealt with in the paper, and various effects are referred to in producing dyes by reactions not hitherto employed. The author concludes by saying that this passing reference to work of theoretical interest might serve as a reminder that continued success in the exploitation of synthetic dyes and other fine chemicals is dependent on an enlightened appreciation of investigations and speculations which are not capable primarily of industrial application.

"DYES AND BRITISH TEXTILES."

By JAMES MORTON.

In spite of all our early-war resolutions to use no more colour from Germany no matter almost what should befall us, the peace has somehow brought a tempered attitude. Users are inclined to risk the future of dye-making in this country, to the extent at least of allowing in their own particular requirements. The Government also have to take a wide view of the situation, and, in spite of their desire to foster the making of dyes, cannot afford to ignore the urgency of maintaining our export trade in textiles, both as to quantity and quality. The textile trade is, as it were, up in new alarm, and is looking with more than longing eye at these German colours over the wall. For we might as well admit at once the fact that the war-fervour attitude of having no dealings with Germany after the war is already broken down. The Allies are even now tumbling over each other in Cologne and elsewhere to effect sales of their wares—French, American, and British alike,—and it is only folly to think the trading can be on one side only.

We are therefore met with three separate interests to satisfy, all necessary for the national well-being, and our problem is whether we can find a solution that will meet all the conditions. The first interest is the maintaining of our

supremacy in the textile trade. The second is that of dye-making in this country, and its development on lines that will justify the effort and capital already expended, and enable it to stand on its own legs as a sound commercial industry. The third interest to satisfy, and one that embraces both the above, and without which neither would be of much value, is national security.

Now how are all these partially conflicting interests to be met? Is it possible to devise a plan that will not fall foul of any of them? There are three obvious policies. There is first the opening of the gates free and wide with the fullest opportunity given for Germany to sell and users here to buy at their discretion. Secondly, there is the raising of tariff walls and the indiscriminate boycotting as far as possible of the import of German dyes. Thirdly, there is the method of control of imports—the temporary control of imports—with a temporary subsidy that would give time for the British effort to have a fair run for its life.

To open the gates at this juncture would have the obvious effect of arresting dye-making at its present stage, and administering such a blow that it would probably never be able to stagger on to its legs again. On the other hand, it would be equally disastrous to the other interest—that of the textiles—to raise indiscriminate tariffs, and put our manufacturers at so great a disadvantage as compared with our competitors abroad, and the incidence of any tariff that would be effective from the dye-maker's point of view would be almost impossible to frame. There remains the third method—that of a temporary control over the imports of dyes into this country and the method of a special kind of subsidy by the Government to meet the probationary period.

There has been much discussion as to what should be considered the probationary period, and the period necessary for this country to develop a dye industry that would make us practically independent. I should think the term of 10 years given by the Board of Trade is a reasonable calculation. The problem is therefore how to bridge over this interval.

Here I am making use of a contribution which I made to the *Times* of January 14 of the present year. My suggestion was that there should be formed a temporary Dyes Control Board, which should bring under review the whole of the requirements in dyes of the manufacturers of this country. This Board would form a sort of exchange through which, to begin with, all the dyes, whether home or imported, would pass, and this Board would fix the prices to be charged to the users. But it would be the constant objective of the Board to reduce its activities stage by stage till at the end of the period of, say, 10 years, it would cease to exist, at least in its capacity of an exchange.

Let us assume such a Board now formed, and that it had ascertained the requirements in the various dyestuffs for the first year. Let us suppose that, after eliminating many items which are only needless varieties of others, the number of colours it had to supply was, say, 1,000 in all. The first duty of the Board would be to ascertain which of those colours can be procured in this country, in what quantities, and at what prices. They would at the same time learn what prices ruled abroad for corresponding colours. This comparison, let us say, revealed the fact that there are being produced in this country at the present day, say, 100 colours equal in quality and price to the corresponding colours produced abroad. As regards this group of 100 colours, the first duty of the Board would be to announce to manufacturers and dye-makers that these colours are to be given a free market, and that the Board will take no control over them whatever.

As to the remaining 900 colours, the review would reveal very varied conditions. Some would show home productions to be only slightly dearer than foreign, though equal in quality; some would show much higher in price, yet inferior in quality, while some would not be procurable at all in this country. All these grades would have to be treated separately and in the manner best suited to bringing every one sooner or later, but as soon as possible, on the free list. Meantime, however, the problem is to be faced of giving the manufacturers these colours at the same prices as they can be purchased by competitors abroad. This is how they would act.

The Board would buy the production of the home dye-makers at such prices as its members had satisfied themselves showed only a reasonable working profit. Suppose the requirements for a certain colour to be 100 tons a year, the home production to be only 50 tons, and the price 6s. per lb. The same colour, it may be found, can be purchased abroad at, say, 4s. per lb. In order that the home manufacturer may be enabled to procure this colour at the same price as his foreign rival, the policy of the Board would involve its

supplying users in this country at 4s. per lb. for the whole 100 tons, otherwise they could not compete. The exchange would, therefore, purchase 50 tons from the home producers at 6s. per lb. and another 50 tons from abroad at 4s. per lb., and hand over the whole 100 tons to users in this country at 4s. per lb.

This method spread over a number of colours would of course show a large loss to the Board for the year, but that is the form in which I suggest the Government should give its main help and contribution towards the combined interests of the dye and textile trades.

Having accepted the situation regarding such a colour as is exemplified above, or such a group of colours, for the first year, investigation would be set on foot as to the causes for the higher price, or it might be the defective quality, of the home product as compared with the foreign article. This would be intimated to the dye-makers, and a certain time allowed them to make good in these particular colours—say, one, two, or more years—according to the nature of the problems involved; and by the expiry of the period stipulated this colour, or group of colours, would be put on the free list and outside the control of the Board.

In this way it might be expected that each year would see a further 100 colours put on the uncontrolled list, and by the end of 10 years the dye-making industry would be expected to be able to stand on its own legs and welcome competition. At any rate, the Board of Trade by this arrangement would have given the industry an opportunity to establish itself.

In the meantime I should like to suggest to the Government in these days of controlling and organising that a good deal might be done to further the progress of dye-making in this country by some judicious co-ordination of production.

Discussion.

Dr. M. O. Forster said that the most ridiculous statements were being made as regards the comparative efficiency of British chemists and German chemists, and some remarks were also being made with regard to German chemists. He read a short time ago a statement by a properly recognised chemist in America to the effect that the American chemists in four years had accomplished what German chemists did in 20 years. That, to his mind, was bunkum of the most dangerous character because it was so misleading. What American chemists did in four years was successfully to repeat in the laboratory and in the factory experiments on a small and a large scale which it took German chemists 20 years to elaborate *de novo*, and that was an absolutely different thing. The four points which had been given as essential to the permanent establishment of the dye industry were, in his judgment, all equal in importance, and Dr. Levinstein had been very careful to say that he did not differentiate between them in quality or quantity. The thing that impressed him most was that Dr. Levinstein had not been carried away, in spite of his own extraordinary personal achievements during the war, by this absurd optimism which had affected so many people. That was a great comfort to him, because it must not be overlooked that Dr. Levinstein was going to be responsible in the future for an enormous national undertaking. In fact, in a certain sense, he shared with the professors of the universities and colleges the responsibility for the future of the coming generation of chemists.

Professor W. H. Perkin said there had been a tendency lately in certain quarters to make the situation appear much more favourably than actually was the case. Whilst they could congratulate themselves on certain things that they had done, they must also look at the other side of the question and see what an enormous amount of work there was to do, and that was one of the reasons why the absolutely clear statement in Dr. Levinstein's paper should be so valuable. He personally was particularly interested in the co-operation of the universities and the industries, and had long looked at the matter from the point of view that what was required in the dye industry was the best chemists that could possibly be got. These men had to be trained in the universities and technical schools, and it was very important that the best scientific ability should be concentrated in the universities. He had been pleading for many years that the industries should make use of the scientific brains which were concentrated in the universities, and that was being done now. For instance, in connection with the dye industry there were at some of the universities, such as Oxford, Leeds, and Liverpool, little colonies of men working at problems connected with the dye industry. That aspect of the matter was in its infancy, but what had been done was sufficiently encouraging to lead to the hope that all manufacturers would see to it that the universities were largely used in this connection.

Mr. F. H. Carr said it was of paramount, fundamental, and essential importance that, as Sir William Pope had said on the previous evening, England should be the home of chemistry. England could not be the home of chemistry unless it was the home of industrial chemistry. The universities ought to be able, as Professor Perkin had pleaded, to maintain a large number of professors and chemists to carry out that research work which was necessary if England was to be the home of chemistry, but that could not be done unless the industry was flourishing and making large profits which would enable it to treat the universities generously. Makers of dyes ought to see to it that the profits which had passed into their hands and which had not passed out again were utilised as capital for immediate development.

Mr. James Morton said one point which had impressed him very much in listening to Dr. Levinstein's paper was that having such an army of chemists in this country for the dye trade would also be a stimulus for general invention. It was not only the dye industry that was going to benefit; it was going to quicken the intellect of the whole country, and it would affect industries quite different from the dye industry.

Dr. Levinstein, replying to the discussion, said he did not propose to criticise the detailed proposals made in Mr. Morton's paper for the Government support of the industry, because the Government policy had been formulated, and we should have to see how that policy worked out in practice before discussing in detail other alternative schemes. With regard to Professor Perkin's remarks, it was perfectly clear that no one man was going to revolutionise the industry, and they must recognise the fact that all the best chemists of the country, who, for the most part, were associated with the chemical schools and universities, supported them and were willing to help them. During the war there had been a great change in the outlook of the universities. They now held themselves far less aloof from industry, and they had accomplished extraordinarily fine work during the war, and he looked forward to having great support from them in the future primarily in supplying the industry with raw material in the shape of well-taught chemists who had learned how to work rapidly and cleanly and to think.

The Chairman said that he had very great admiration for the scheme Mr. Morton had put forward as to how the problems that were going to arise in connection with the dyestuffs should be dealt with. Whilst it was quite conceivable that something of the kind which Mr. Morton had suggested might ultimately be adopted, he wished to call attention to the fact that there were several respects in which it would be rather difficult to adopt the whole of his proposals. We should have to face, of course, the competition that would undoubtedly come from abroad, and he wanted to call attention to the fact that the Germans would undoubtedly come here in the future and make proposals to dye users. They would say to the user that there were certain dyes which were not being made in England, but which the Germans could make, and that they would let the British user have these dyes at a relatively low price if there were included in the contract other dyes and colours that were being made in this country. That was one of the ways in which the Germans would probably try to defeat such a proposal as Mr. Morton had made. Then Mr. Morton had stated that very little had been done during the war to avoid unnecessary duplication of production and unnecessary duplication of research. Whilst he agreed entirely that there had been a great deal of that sort of thing, he was afraid that during war-time it was inevitable, because Mr. Morton would admit himself that there was a great shortage of a number of these products, and that if people who wanted them and could not get them from one firm they went to another, and the result was that different people started to make intermediates in order to supply the absolute need for these dyestuffs. Some people also had actually to start making intermediates, because the quality of those they were able to obtain was not good enough for their requirements, and that again led to duplication. It was perhaps for the Government to deal with a situation of that kind, but he was very doubtful now whether the Government could really do very much in preventing what Mr. Morton had called attention to. When the Association of British Chemical Manufacturers was formed about three years ago, one of the principal objects was to get chemical manufacturers together in one body, so that they might discuss the problems interesting them with a view to preventing that duplication of plant and research. He knew that the Association had not accomplished anything like what it was hoped it would do in the time that it had been working, but he did know that something had been

done in that direction, and he had great confidence that a great deal more would be done in the future. With regard to the work that had to be done by the Board of Trade Licencing Committee, he thought that before long—perhaps it would take some months—ways and means would be found to overcome some of the serious difficulties that Mr. Morton had called attention to. He was quite certain that there would be a great deal of adverse criticism, but he hoped there would be a certain degree of patience exercised, and that it would be possible in that way to avoid a very difficult situation.

The conference then adjourned until the afternoon.

"THE MANUFACTURE OF INTERMEDIATES."

By E. V. EVANS, F.I.C.

Intermediates are not only manufactured by the British Dyes Corporation, but also by a number of other chemical undertakings. They constitute a special group of the Association of British Chemical Manufacturers, and may be said to represent all British makers of coal-tar intermediates and dyes outside the British Dyes Corporation. They have, however, until recently been mainly engaged in the production of munitions, poison gas, and other war necessities, and have thus, except in a few instances, been prevented from taking a really important part in the production of dyes. When considered individually most of these undertakings are small compared with the British Dyes Corporation, but in the aggregate they represent an invested capital of some twenty-five million pounds, and, if their efforts are co-ordinated, form a body admirably suited to deal with the problems of the future.

Whatever means may eventually be adopted to develop the whole of the country's resources consideration might advantageously be given to a few of the underlying principles practised by Germany to protect its chemical industry. It is acknowledged that that great octopus of the German chemical industry, the *Interessen Gemeinschaft* and the *Erweiterte Interessen Gemeinschaft*, possesses many disabilities. This scheme of selective protection for certain chemical manufacturers would have led to the destruction of the industry had it not been judiciously controlled by a directorate prepared to forego immediate financial returns in order to ensure the establishment of a permanent chemical industry. As an example of the latest developments of this scheme, it is found that one large works obtains a certain product from a distant works of an apparent competitor, although it is itself fully equipped to manufacture this same product. This is brought about by the fact that the distant works, owing to its superior geographical position, is able to manufacture the product more efficiently. It is remarkable also to find that a plant at the works of Bayer and Co. is closed down because the market requirement for the product is satisfied by the output of the *Badische Anilin und Soda-Fabrik*, which is able to manufacture more economically. Here and in many other instances may be seen the effect of co-ordination in the German chemical industry, and it should be emphasised that the industry is self-controlled by a highly technical directorate of chemical manufacturers.

In the manufacture of the intermediates still required in this country processes of a certain degree of complexity are entailed. Moreover, of these many are required in small quantity. It is therefore impossible to imagine that the manufacture of these new intermediates when conducted in a number of small units distributed throughout the kingdom will lead to success. In such cases, in order to pay due regard to the importance of mass production, manufacture must be undertaken only by one or two makers possessing special facilities, for it is no simple matter to displace imported manufactures at the present moment, even with installations of large output, owing to the existing cost of plant and apparatus and the high prices of labour and fuel. Whilst on the one hand great attention must be paid to mass production, it is in the natural order of things that the manufacture of intermediates should not be concentrated in one or two centres, but should be distributed in order to take full advantage of the present resources of the chemical industry. This distribution should be decided by such factors as geographical position, the cost of fuel, of transport, and of labour, and the present fitness of the manufacturer to undertake the work in question, but when the decision is made, plant of considerable output should be installed.

Professor A. G. Green said that if the author advocated a complete separation, or anything like a complete separation, of intermediates manufacture from dyestuffs manufacture, he

could not agree with him. Such an argument left out of account many factors, such as the factor of the close inter-relationship of by-products. For instance, in the manufacture of beta-naphthol, sulphite might be required for another manufacture. People making only beta-naphthol might not be able to do anything with the sulphite, and would have to sell it, but in the big works where a large number of products were being made it was possible to use the by-products of one manufacture as the principal products of another manufacture, and he therefore did not think they could divorce dyestuff manufacture from the manufacture of intermediates.

Mr. F. H. Carr said that anyone coming home from that wonderful centre of distribution, the Rhine, could not help seeing the enormous advantages to their chemical industries that the Rhine had, because it brought each unit of the concern into immediate proximity with the other, even although they might be 20 or 30 miles apart; there were wharves running right up against a deep navigation, and they could lift the goods from the river straight into any part of the factory required. In England it was desirable, if we possibly could, that we should develop the idea of consolidation of industries in the same way, making use of the best equivalent we had—viz., the Mersey or the Manchester Ship Canal.

Mr. Arthur Green did not think, from what he knew of Mr. Evans's position with regard to this matter, that he would claim that in all cases intermediate manufacture should be separate from dye manufacture. At the same time he could not go quite so far as Mr. Evans seemed to indicate—viz., that the secret of the success of the chemical works in Germany was their geographical position; it was more due to the fact that they manufactured everything for themselves. The raw material was taken into these great factories on one side—say, for the manufacture of a heavy chemical. That was passed to the next section, where it was used in the manufacture of intermediates, and from there it was merely passed across the road to the section which dealt with the conversion of these intermediates into dyestuffs, and finally it passed into the section where the dyestuffs were packed and despatched to the consumer.

Dr. J. C. Cain thought Mr. Evans was not disposed to make all intermediates in an intermediates works. He would make certain intermediates in the dye-manufacturing works and certain others in separate works. It had rather been conveyed that the German dyeworks made all their own intermediate products, whereas it was a fact that one works alone concentrated on salicylic acid. Von Heyden's before the war was the only firm making salicylic acid, and there were other similar cases to that. On the other hand, there were intermediates, such as metaphenylenediamine, which could be made in the dyeworks to better advantage than in an intermediate works.

Professor H. E. Armstrong said the development of the chemical industry in Germany commercialised and ruined the majority of the German laboratories by making it clear to them that it was desirable to make money out of chemistry. It spoiled them as educational centres, and his view was that, although Germany had gone up in the technical commercial scale during these years, she had been steadily retrograding in the scientific scale, and what he was most anxious to see avoided in this country was any socialisation of our scientific industry through Government grants. The Government had instituted a system which was bound to commercialise our science, if we were not careful, by putting a money bait before academic students. In his day in Leipzig no two of them—and there were 20 or 30 of them at work—were engaged on a similar theme. Each one of them knew what the other was doing, there was free intercourse among them, and the training they were getting was the training that the whole lot were getting. They communicated one to the other what they learned, and taught one another. A few years afterwards the staff was subsidised by the manufacturers, and instead of the students being free to talk about their work, they were put under a pledge of secrecy not so say a word about it, and that had a most serious influence. He did not want to see that condition introduced here. He happened to know practically all the men who had led in the German chemical industry during the last 30 years. They were an extraordinarily strong crew, prepared to row together, and who had been rowing together for years. We never had a crew which rowed together in this country of any size in these matters, and until we learned that first lesson of rowing together we would make no progress. We had not got the men for a crew. We had a certain number of chemists who could do things in the laboratory when they were told, but we had not got men of any imagination, of any commercial

grasp, men with any *savoir faire*. A great deal had been said about the advance of the industry, but what would be the opinion if they went among the different dyestuff users? He would have liked to have them at the meeting to know if they were satisfied not merely with the range but with the quality of the goods they were getting. He was not sure that they were. It was points of that kind that we had to pay attention to, and it was no good our bothering ourselves about Germany. We had got much more serious competition coming from America, where the chemical industry was far ahead of us from the point of view of organisation.

Mr. Evans, in reply to the discussion, said his instructions from those who sent him to Germany were to write a paper in which matters could be read between the lines, and nothing more was given. It appeared that he had been successful in doing that. His paper was really a plea for leadership.

The Chairman said he would like to know how far the ideals which Professor Armstrong had expressed with regard to universities undertaking work for business or industrial undertakings agreed with the views of Professor Perkin as expressed during the morning. It seemed to him that there was a certain disagreement between the two because he rather gathered from Professor Perkin that he thought it was desirable for us to follow the example set by Germany in making use of the exceptionally brilliant men at the universities and getting them to work in conjunction with the large industrial undertakings.

Professor Perkin said that no chemical laboratory nowadays could exist or flourish unless it was in connection with the industry. Chemical laboratories were enormously expensive in regard to the appliances and buildings which were required, as well as the staff that had to be paid more highly than it used to be, and unless it was in contact with the industry and got much of its material and apparatus free, and unless it got a Government grant, which Professor Armstrong did not seem to agree with, the laboratory simply could not exist. It was perfectly well known—it had been calculated out in Manchester—that the University lost about £70 a year on every advanced student. Where was the money coming from without grants or private benefactions. Another thing was that they must hold out to the man who was studying chemistry some hope that he would get some kind of remuneration later on—i.e., money must enter into the calculations of every student; there must essentially be a certain amount of commercialism about every university. With regard to contact between the university and the works, the type of research that was required by a works was practically the same as the kind of research that was carried out in the university laboratory. There were many problems which presented themselves to the chemical manufacturer which could perfectly well be solved, and best solved, in the University chemical laboratory.

The Chairman then called on Professor Green to read a paper on

"PATENT LAWS IN THE CHEMICAL INDUSTRY."

Professor Green said he wanted to raise a point in connection with our patent law policy. As they all knew, a new patent law was being considered by the Government. Everybody who had worked on war work knew the enormous assistance which the industry had received from German patents. The Germans, of course, were especially aware of the fact that they had by means of their own patents assisted us tremendously in our war work. He was credibly informed that they intended to change it, and, indeed, we might feel that to a certain extent they were bound to change the policy which they had had up to the present in regard to patenting. In future, in his opinion, they would take no patents with the exception of such processes in which the process was indicated by an examination of the end product. They would not take any patents for intermediates where it could not be told from an examination of the end product how the thing was done, and they would not take any patents for improved processes. That must influence our policy because if we continued to patent things in the same way as we had before we should be in the position that the Germans would know what we were doing, but we should not know what they were doing. Moreover, we should have no possible means of bringing home infringement. A product might be sold on the English market which was made by a process patented here, but it would be impossible to tell necessarily by examination as to what method was adopted. There then came the difficult question that if we did not protect our inventions how could we establish prior use. It would seem that one of two

courses were open—either some amendment of the patent law, by which possibly a process for an intermediate, where it could not be told from the final product what it was, or for an improved process, might at the discretion of the Board of Trade be kept secret for a certain number of years. The other thing was to keep the process secret, and that, of course, was a very great disadvantage in many ways. To keep a process secret indefinitely tended to prevent further progress, and, also, how were they to establish prior use?

The question of prior use was one which lawyers did not seem able to come to a decision upon. What was prior use, and how could it be established? If a process was worked out in the laboratory and a few hundred grammes were made of it, but it was not manufactured, and somebody else came along and took a patent for that process independently, could they bring forward their laboratory books to show that they had made the substance? Could they establish prior use and upset the other man's patent? He was informed by patent solicitors that we had not got in this country a similar law to what they had in Germany. In Germany, if a patent was taken out and another man came along and said he had worked the same thing before, and if he proved it conclusively, the patentee could take no action against him. He could not upset him in any way, but the patent remained good to the rest of the world. In this country he was informed that a patent was either valid or it was invalid. If it was invalid against one person it was invalid against the world. If one single man came forward and showed that he had used that invention before, and that he had put it into use before, the subsequent patent was invalidated. The point he wanted to make was how could they establish prior use if a process was kept secret? As things stood at present, the inventor was thrown back more or less on this position—that if he kept the process secret he was very doubtful whether he was safe. An independent inventor who also patented it might possibly prevent him working his own invention. On the other hand, if he patented it he might simply be giving away his invention to the world. That was a highly unsatisfactory state of things, and something required to be done.

The Chairman said it had been a very great advantage to have had Professor Green touch shortly on this very important subject, because it raised some difficult questions which should be talked over in wide circles and discussed at a later moment so that some proposals could be drafted before the new Patents Bill was again considered.

The following paper was then read:—

"THE MANUFACTURE OF SYNTHETIC DRUGS."

By F. H. CARR.

In its commercial aspects, the manufacture of pharmaceutical chemicals is an important branch of chemical industry, for it utilises the same intermediates as are employed in the dye trade, whilst it also constitutes an outlet for by-products which are not of use in the colour industry. The Association of British Chemical Manufacturers has successfully argued that it is a key industry which should be protected, at least temporarily; and the Board of Trade, by a recent Order in Council, has restricted the importation of foreign-made fine chemicals to those for which a licence is given by a specially appointed committee. The action of the Board of Trade affords a period of time to enable us to set in order a house which was turned topsy-turvy by war, and I wish particularly to direct discussion to those steps which can now be taken for this purpose.

It is in regard to synthetic drugs not protected by patents, for which a big demand has been created, that conditions abroad are at present so much more favourable than at home. In making these chemicals, the cost of primary materials—such, for instance, as caustic soda, chlorine, zinc, acetic acid, and alcohol—is of much significance; and the intermediate products and by-products being intimately connected with the requirements of the dye trade, Germany secures a great advantage by combining their manufacture with that of dyes. The strength of this combination is particularly significant in the manufacture of these pharmaceutical chemicals, because the quantity of them needed for the whole world's requirements is limited, and over-production is readily reached.

By the complete internal organisation of their chemical trade, the German chemical manufacturers are enabled to allocate particular manufactures to that works in which they can most suitably and efficiently be produced. The immense strength of these firms lies in their complete internal organisation in one body known as the *Interessen Gemeinschaft*. What resources and potentialities have we to set against the proved

ability and power of this great German organisation with reasonable prospect of success?

Organisation among the firms engaged in other branches of chemical industry has made great progress, but in regard to synthetic chemicals much remains to be done. It is imperatively necessary, by making agreements or by other means, to prevent useless overlapping, to capitalise each manufacture so that its engineering equipment is of the best, to establish an intimate financial connection between the making of the primary, intermediate, and finished products involved, and, lastly, to achieve, where needed, technical co-operation. Let us consider two proposals: (1) That a large group of the present makers should close down their plants and combine in a united effort; (2) that one or more of the large makers of dye intermediates should manufacture these synthetics and supply them in both crude and purified state, as desired, solely to a group of the present manufacturers, who could, if they chose, purify the crude products, and thereby continue to supply branded material of the quality and specification for which they have established a reputation.

The former plan would possess many of the advantages of co-operative effort, but would be subject to the disadvantage that if such an amalgamation produced its own intermediates the scale would still be small compared with that on which the dye producer makes the same substances, and should it not do so it would not purchase them as cheaply as the intermediate maker would produce them; but this plan has a greater difficulty in that the various firms combining would need to sell goods of identical price and quality, which, it is feared, would be unsuited to businesses which are concerned with branded articles of special quality. The second proposal would possess the advantages of large-scale production and technical co-operation, yet would allow the firms so desiring to purify their own finished products, and thus to maintain their separately acquired reputation.

In the manufacture of many pharmaceutical chemicals there remains room for individual achievement, and any satisfactory organisation of the industry must secure the fullest and freest scope for such effort. If the more important fine chemical manufacturing firms were to combine in the manner indicated to make the substances to which I have referred they would make larger profits out of them, and so have more money to utilise in individual developments and research.

Captain L. M. Nash, of the Department of Industries and Manufactures, Board of Trade, said he had come as the representative of the Board of Trade, and would like to say a few words about the prohibition of imports. When the war broke out there were a number of chemicals the supply of which we had previously relied upon Germany for, but which it became necessary to make in this country. Those chemicals had to be made under very great difficulties with any old plant that could be scraped together, and in any old building that could be got hold of, and more or less regardless of cost. We had now come to the point that the war was over; but if these same chemicals were allowed to be imported straight away, these new industries which had been built up so very capably by the manufacturers must have died a sudden death. Those who had seen those large works in Germany must be convinced that we could not turn out these things in backyards and in 2cwt. boxes. They must be made on a large scale in order to secure economy of production, and therefore he earnestly hoped that something would be done on the lines suggested by Mr. Carr. The next point was quality. He had no doubt that many of these new chemicals were already satisfactory as regards quality, but he believed that in other cases the standard of purity was not yet that which had been reached before the war with imported chemicals. He hoped the industry would give full attention not only to maintaining the pre-war standard, but to improving it, so that when the time came when these new industries were no longer Government protected and supported, they would be able to maintain their position in the world. The prohibition was put on simply and solely to enable the British manufacturers to put their houses in order so that these new industries should not die a sudden death. If the prohibition was taken as a means of enabling the manufacturers to increase their profits, then they would have entirely failed to grasp the value of the prohibition, and it was only to be expected that the manner in which this prohibition was used must be taken into account by the Government when they formulated their future trade policy.

Dr. Levinstein said it was a sign of the times very much to be welcomed that a representative of the Board of Trade should stand up, and, speaking to them as a member of the Society, assure them that the Board of Trade took an interest in everything they did and offered to give a sympathetic

hearing to anything that might be put before it. He did not know that there was any change in our national life during the past five years which was comparable with the change of attitude which was now being experienced from that Department. He was rather inclined to deprecate the general statements of Professor Armstrong and others in which they were told to organise—as if any person did not know that organisation was one of the prime needs of commerce at any time. There was a great difference between telling people to organise and thinking out and creating a satisfactory organisation. He would like to say to some people that organisation did not consist in combining together in one rotten concern all the firms who had pretended, successfully or unsuccessfully, to have made money out of fine chemicals and dyes during the war. If that point was fully appreciated by the gentlemen who talked to the industry about organisation it might be possible to come more quickly to that kind of decision which they all desired. He agreed with Mr. Carr that amalgamation or working arrangements must come from the industry, and not from trade associations; and he would like to point out for the benefit of Mr. Evans with regard to the I.G.—the composition and constitution of which he so entirely misunderstood—that the great power of the I.G. and its danger to this country as a competitor lay in the fact that all the members of the I.G. pooled their profits, and that any real organisation in our present industrial system meant that various people who organised had a common financial interest in their respective undertakings.

Mr. D. Lloyd Howard said he would like to emphasise what Mr. Carr had said with regard to the fine chemical and the great synthetic firms not endeavouring to work for the survival of the fittest, but working in co-operation.

A hearty vote of thanks was accorded to Mr. Carr on the motion of the Chairman.

THE ANNUAL DINNER.

There was a large attendance at the annual dinner at the Savoy Hotel on Wednesday (July 16), the president, Professor Henry Louis, being in the chair.

The loyal toasts having been duly honoured, the Rt. Hon. Sir Alfred Mond, Bart., proposed "The Society of Chemical Industry." There never was a time perhaps when the Society of Chemical Industry had more reason to be glad and proud of its existence and of the work it had done for so many years. It was curious that it required four and a half years of dreadful war to convince this country and its Government of the importance of the chemical industry to the world, and especially to the country in which we lived. Yet what the chemical industry had done during the war was a very small thing compared with what it had done for many years during peace.

Professor Henry Louis said it was an easy task on this occasion to return thanks on behalf of the Society for the toast which Sir Alfred Mond had given. They might pride themselves on taking high rank among the technical societies of the country. The chemical industry, as Sir Alfred Mond had truly said, had proved itself over and over again in these strenuous days or war, and in any task that might be put on it in the future it would not fail. The problems of the chemical industry were the problems of industry in general; the problems that faced them on every side were the problems of under-production. He was not afraid of high wages. The wages paid even to-day were little, if any, higher than they were in the United States before the war, yet nobody would suggest that the United States was then in a moribund condition. There was, however, a difference. The American workman got high wages, but he earned them. (Applause.) There was no minimum wage there. If they paid a man for a day's work, he did a day's work. We were passing through troublous time, but we had passed through troublous times before, and he felt every confidence that the sound common sense of the great mass of the people would before long rise to the occasion. (Applause.)

Sir William J. Pope, K.B.E., F.R.S., proposed "The Health of the Delegates of the Inter-Allied Conference of Pure and Applied Chemistry." He had to associate this toast with the names of several of their distinguished guests. France had sent a number of its first chemists. (Applause.) Professor Moureu was with them that evening not in the simple capacity of a representative of the Inter-Allied Council, but as the president of that Council. They had also a representative of Belgian chemistry, Dr. R. Lucien, one of the former presidents of the Belgian Chemical Society. They had a number of American guests with them, and he had to associate the toast more particularly with the name of Dr. F. G. Cottrell, known

by so many great technical achievements, and who had latterly done such great service in connection with the manufacture of helium on a large scale. They had hoped to have as representative of Italian chemistry Professor E. Paterno. He had been unfortunately prevented from getting there, but Dr. Severini had honoured them with his presence.

Professor Moureu, speaking in French, said that the Inter-Allied Confederation of Associations of Pure and Applied Chemistry had eagerly responded to the invitation of the Society of Chemical Industry. Born at Paris only a few months ago, having as yet made only a few timid steps, it had sought the first occasion to take cognisance of itself, to affirm its vitality, to state its programme, and to develop its means of action. Such an occasion the Society of Chemical Industry had given with the decisiveness and energy characteristic of the British temperament. The success of the Allies had been complete, and it was right to say not only because it was the truth, but also for the sake of the future of the science and in the public interest, that chemists had played a large part in achieving that success. (Applause.)

Dr. Lucien, also speaking in French, said that an illustrious teacher under whom he had studied for many years taught that the happiness of mankind was bound up with the facility for producing quickly and cheaply. Certainly a banquet was not the place where one could best philosophise on such a theory, but his hosts might believe that the need which had brought their guests to London was essentially a productive one. In the course of his career he had noticed two kinds of difficulties—those which came from Nature, which were always surmountable, and those which came from men. These, the regard for oneself, the competition of interests, etc., offered more difficulty; but he was happy to state that here he had encountered nothing but goodwill.

Signor Severini said that it had been with pleasure that he had taken part in the Inter-Allied Conference of Pure and Applied Chemistry. Having brought their labours to the present point, he dared to think the end would be attained.

Dr. F. G. Cottrell said that a hundred years ago the United States had been facing problems similar to those the new nations were facing to-day. The new nations were now looking to the older ones for guidance, and they should be helped, not only by industrial and business contact, but by sympathetic human confidence.

The last toast was "The Health of the Guests." This was proposed by Mr. John Gray, president-elect of the Society of Chemical Industry. There were at the dinner that night, he said, many guests of eminence in the chemical profession and the chemical industries, and the Society welcomed them because of the interest which they had showed in its work. The country was indeed fortunate in possessing such men as the Rt. Hon. Lord Moulton—though he had to regret Lord Moulton was unable to be present with them that night. But they had present Sir James Dobbie, whose services to the country as Chief Government Chemist were well known, though they were carried out in a quiet and unostentatious manner. Sir James had recently relinquished the position as president of the Institute of Chemistry, and now occupied a high position as president of the Chemical Society. They all knew the very great work that he had done in connection with the raising of the status of the chemist. He (the speaker) hoped that the days of the inadequately paid chemist were passed and gone.

Sir James Dobbie, D.Sc., F.R.S., thanked Mr. Gray for the very kind terms in which that gentleman had referred to his services as Government Chemist and to his presidency of the sister society—the Chemical Society. There had never been any time in which it was more important that the most cordial relations should exist between the Society of Chemical Industry and the Chemical Society.

Mr. W. B. M. Bird, Master of the Worshipful Company of Salters, also responded. Some of those present, he said, might not know why the Salters' Company were prominent on such an occasion as this; but some years ago, in the early days of the war, when they began to see what chemistry was doing, they had considered whether a great City company could not employ its funds in a manner more in consonance with the ideas of its original charter than were the distribution of miscellaneous charity and the giving of great banquets. A committee had been appointed, and, after considerable investigation, had come to the conclusion that chemical industry was the one which was originally intended to be promoted, amongst other interests, by the Salters' Company. On the advice of the committee, the company had resolved to see how far it could further the interests of industrial chemistry by applying its funds in that direction. (Applause.) Many

eminent chemists had been consulted, and eventually there had been formed the Salters' Institute of Industrial Chemistry. The object in view was to get hold of young men who had taken their science degree, and whose circumstances would not permit them to continue the course which they had begun, and for which they had a leaning. At the present moment there were 18 beneficiaries, to each of whom was granted a sum of about £250. per annum towards the cost of continuing his education, in the hope that another three years or so of that training would make him a really useful member of the chemical world. (Applause.)

The conclusion of the report of the proceedings of the annual meeting of the Society of Chemical Industry will appear in our next issue.—*Ed. C.T.J. and C.E.*

PARLIAMENTARY NEWS.

Report on British Cellulose Company.

In the House of Commons Sir D. Maclean asked the Prime Minister when the report of the Committee appointed last August to inquire into the cellulose question will be presented to the House?

Mr. Bonar Law: As I stated in reply to a similar question on July 1, it is hoped that the report will be ready this month.

Sir D. Maclean: Will the right hon. gentleman take such steps as will expedite the issue of the report so that we shall have one of the ordinary Parliamentary opportunities of debating it before we rise for the holiday?

Mr. Bonar Law: Yes. I shall try and have it circulated as soon as possible; but as my right hon. friend knows, Lord Sumner is at present in Paris.

Beet Sugar Factory.

Sir J. D. Rees asked the President of the Board of Trade whether any—and, if so, what—assistance is being given by the Government to the establishment of a beet sugar factory at Kellam?

The Parliamentary Secretary to the Board of Agriculture (Sir Arthur Boscawen): The Government have decided in principle to give assistance to the British Sugar Beet Growers' Society for the purpose mentioned by means of an advance of part of the capital required, and a guarantee of interest for a certain number of years on the remainder of the capital up to a fixed amount. The exact terms and conditions of the assistance to be given are now under consideration.

Trading With Germany.

Major Breese asked the President of the Board of Trade whether—notwithstanding the issue of general licences under the trading with the enemy legislation, authorising, with certain reservations, the resumption of trade with Germany and German-Austria—he has reason to believe that British firms are reluctant to renew commercial intercourse with the late enemies of this country; and whether, seeing that it is desirable in the interest of British trade and of the financial credit of this country that British firms who are in a position to do so should exert themselves to the utmost to sell goods to these countries, his Department will issue a general statement on this subject for the guidance of British firms.

Mr. Bridgeman: I think it quite possible that many British firms may feel reluctant to resume relations with our late enemies, but I am not yet able to make any announcement on the subject.

Oil Supply.

Mr. Jesson asked the President of the Board of Trade whether, having regard to the increasing demand for oil fuel for industrial purposes both in this and other countries, he will, in conjunction with the Governments of our Dominions and Colonies and the Secretary of State for the Colonies, consider the advisability of organising and co-ordinating all the sources of oil supply within the British Empire with a view to preventing such supplies coming under the control of cosmopolitan financiers and others seeking to establish a world-monopoly in oil?

Mr. Kellaway: I have been asked by the First Lord of the Admiralty, the Minister in charge of petroleum affairs, to state that this matter is receiving consideration, and was one of the subjects discussed at the last Imperial Conference.

SCOTTISH OIL COMBINE.

INFORMATION is now available concerning the proposed consolidation of the interests of Scottish oil companies by the formation of a new company in which the Anglo-Persian Company will have a substantial interest. The Anglo-Persian Company offer to purchase the whole of the issued ordinary shares of the Scottish companies on the following terms:

Pumpherstons Company.—285,500 ordinary shares of £1., fully paid, at £5. per share.

Oakbank Company.—200,000 ordinary shares of £1. each, 17s. paid, at 37s. 6d. per share.

Broxburn Company.—235,000 ordinary shares of £1. each, fully paid, at £2. per share.

Young's Paraffin Light and Mineral Oil Company.—113,202 ordinary shares of £4. each, fully paid, at 63s. per share.

James Ross and Co., Philpstoun Oil Works.—135,000 ordinary shares of £1. each, fully paid, at 25s. per share.

The capital of the new Scottish company to be formed will be £4,000,000., and will consist of 3,000,000 7 per cent. non-cumulative participating preference shares of £1. each, £3,000,000.; and 1,000,000 ordinary shares of £1. each, £1,000,000. The new company will also acquire the properties and goodwill in Scotland of the British Petroleum Company and the Homelight Oil Company for the sum of £150,000., payable in cash. The ordinary shares will be subscribed for by the Anglo-Persian Company. Participating preference shares of £1. each, fully paid and ranking for dividend as from May 1, 1919, will be issued to the shareholders of the various companies.

When the new company is formed, the Anglo-Persian Company will, it is stated, as from January 1, 1923, supply such quantities of crude oil to the new company as may be necessary, with the supply of crude oil from shale, to enable the present refineries of the existing companies to be kept running to their full capacity at a price to the new company based on a sliding scale which, it is estimated, will enable the new company to pay the 7 per cent. dividend on the participating preference shares and the ordinary shares, and leave a surplus for division between the participating preference and ordinary shares.

IMPORTATION OF CHEMICALS.

ON June 25 a Proclamation was issued under Section 43 of the Customs Consolidation Act, 1876, prohibiting the importation, among other goods, of chemicals of all descriptions, except those which were imported under licence given by or on behalf of the Board of Trade, and subject to the provisions and conditions of such licence. The Proclamation appeared in our issue of July 5. At the same time the Board of Trade gave notice that whereas the Proclamation prohibited the importation of all chemicals, the terms of the prohibition had been thus widely drawn solely for convenience of administration, and that it was not the intention at present to do more than to control the entry into the United Kingdom of certain classes of chemicals of a high degree of purity. The Department of Import Restrictions, it was announced, would issue general licences for a large number of chemicals which were not of this description, and they would also issue licences in suitable cases and for limited quantities of the chemicals which were retained under control.

The first list of chemical products for which general import licences have been issued has, in accordance with the above announcement, just been published by the Department of Import Restrictions, and is as follows:—

Acetate of iron; acetate of lime; acetone; alum; aluminium acetate; aluminium sulphate; ammonia hydrate; ammonium carbonate; ammonia chloride; ammonia chlorate; ammonia nitrate; ammonia phosphate; ammonia sulphate; baryta; bleaching powder; boracite; borate of lime; borate of manganese; borax; boric acid; brimstone; calcium carbide; carbon bisulphide; carbonic acid; chloroform; chromic acid; cinchonic salts; cinchonidine salts; citrate of lime; citric acid; copper sulphate; cream of tartar; epsom salts; ether; ferrous sulphate; formaldehyde; fusel oil; gelatine, photographic; glycerine; hydrochloric acid; hydrofluoric acid; iodine; lactic acid; lead acetate; lead nitrate; lithia carbonate; magnesia; magnesium chloride; magnesium sulphate; manganese dioxide; menthol crystals; mercurial salts; methyl ethyl ketone; nitric acid; oxalic acid; phosphoric acid; picric acid; quinidine salts; quinine salts, other than sulphate; quinidine; sal acetos; soda ash; soda, aluminat; soda, bicar-

bonate; soda, caustic; soda, chloride; soda, crystals; soda, nitrate; soda, nitrite; soda, silicate; soda, sulphate; soda, sulphide; sulphuric acid; tartar emetic; tartaric acid.

CHEMICAL TRADE OF HONG KONG.

H.M. COMMERCIAL SECRETARY at Hong Kong states that the total imports of chemicals and drugs in 1918 were valued at £47,663, the principal items being calcium carbide (£53,735.), caustic soda (£44,297.), and sulphuric acid (£30,969.). Almost half the above total is assigned to Japan. The trade in industrial chemicals, more especially in such articles as soda ash, caustic soda and chlorate of potash, has been very seriously affected by the restrictions in Great Britain, but will doubtless recover its position without difficulty once those restrictions are removed.

The most surprising feature of the imports of dyeing and tanning materials, which were valued at £350,104., is the extremely small import of aniline dyes, amounting to only £6,811., mostly from the United States. It is quite evident that dyes of American, Swiss, or British manufacture are as yet far from taking the place in this market formerly occupied by the German products, and presumably the Chinese are for the time being relying on dyes of vegetable origin. Apart from the difficulties that have hitherto existed in procuring adequate supplies from Great Britain or elsewhere, merchants state that the Chinese are not yet disposed to regard the new dyes from America and other countries with much favour, partly owing to the unfamiliar appearance of the packages, and partly to real or supposed defects in quality. There can be no question, however, of the great demand existing in China for good aniline dyes, more especially for a really fast indigo blue, and it is greatly to be hoped that British manufacturers will do their utmost to meet it.

As regards exports of vegetable oils, the largest trade, and one that promises to reach very important dimensions, was that in wood oil, the exports of which amounted in value to £421,582. Of this total the share taken by the United States was £260,779., whilst exports to the United Kingdom amounted to £54,909. One difficulty encountered in connection with this trade is with regard to the method of packing, there being an excessive leakage in the case of the casks usually employed, whilst steel drums would appear to be too expensive. If some more satisfactory method of shipment could be devised it would certainly tend to the development of the trade.

The total imports of paints were valued at £200,350., those from the United Kingdom amounting in value to £60,062., those from the United States to £36,901., and those from Japan to £27,393. In connection with the paint trade a suggestion has been made by a merchant that British manufacturers would do well to devote more attention to the shipment of paints in liquid form, ready for use, in preference to those requiring preparation by the purchaser. Whilst paints in the form of paste are doubtless easier to ship and cheaper, Chinese merchants frequently prefer to buy paints ready for immediate use, and a good deal of business in this line has in consequence been given to American firms.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

(SPECIALLY CONTRIBUTED.)

The West Cumberland industries have so far been unaffected by labour troubles which have caused the damping down of furnaces in other districts, though it was only at the last moment last week that the iron-ore miners suspended their notices, and so obviated a stoppage which would have compelled an immediate closing of the twenty-seven furnaces in operation between Workington and Carnforth. It has been a hard struggle this week to keep the 380 ovens going on account of the decline in coal production, but it has been managed somehow or other. Had they been working at full capacity it would have been an impossible task. The make of by-products is somewhat reduced, and in the main it is being well absorbed. Benzole is creeping more and more into favour among local users, and the Irish demand for the spirit is also growing. Sulphate of ammonia, though none of it is being exported, is readily marketed. Pitch and tar are not in quite so brisk request as was the case a few weeks ago, and acid products at the chemical works on the coast are weaker.

ITEMS OF INTEREST.

ORGANIC CHEMISTRY AT GLASGOW UNIVERSITY.—The Glasgow University Court on Tuesday appointed Mr. T. S. Patterson, Lecturer in Organic Chemistry at Glasgow University, to the Gardiner Chair of Organic Chemistry.

MANCHESTER UNIVERSITY APPOINTMENTS.—The Council of the Manchester University has appointed Mr. D. H. Bangham, B.A., Lecturer in Chemistry. Mr. J. K. Wood, D.Sc., Lecturer in Chemistry at University College, Dundee, has been appointed Lecturer in Physical Chemistry in the Faculty of Technology.

COMMISSIONER OF DYES.—Sir Evan Jones, Bart., M.P., has found it necessary to resign his position as Commissioner of Dyes, in consequence of the heavy duties attaching to the post of Controller of the Coal Mines Department. In future, therefore, all communications referring to dyes should be addressed to the Assistant Secretary, Industries and Manufactures Department, Board of Trade, Gwydyr House, Whitehall, London, S.W. 1.

TRANSHIPMENT IN THE UNITED KINGDOM.—The Board of Trade (Export Licence Department) announce that it is not now necessary to make application to the Collector of Customs at the transhipment ports on Form S.90 for the transhipment of any goods except those specified in the following list: Seeds, oils and fats on Section "A" of the list of prohibited exports; synthetic dyestuffs; ergot; quinine sulphate; caustic potash; potassium carbonate.

THE FRENCH CUSTOMS DUTIES.—The French Government have suppressed the *ad valorem* duties on imports, and henceforth customs duties will be levied on a new system, under which the amounts payable under specific duties will be multiplied by an enhancement coefficient representing the relation borne by the official value of goods in 1918 to their value in 1913. These coefficient rates will be revised periodically by an Inter-Ministerial Commission to keep them in harmony with the prices of goods as the latter change.

BUSINESS NOTICE.—Messrs. Mann and Cook, of 7, St. Michael's Alley, Cornhill, London, E.C. 3, have decided to transform their chemical department into a branch office, which will be established at 46, Brown Street, Manchester. Telephone: 2348 Central. Telegrams: "Masculine." Manchester. From August 5 next all business relating to chemicals, pharmaceuticals, dyes, varnishes, paints, soaps, candles, and disinfectants will be carried on for home, export, and import from their Manchester address, to which all communications should be sent.

IMPORTATION OF CHEMICALS.—The Board of Trade, Department of Import Restrictions, has agreed to the British Chemical Trade Association being represented on the Advisory Committee, which is assisting the Department in connection with the issue of licences to import chemicals. Mr. William Mann, the President, has been elected by the General Committee to represent the Association. Members are invited to advise the Association of the chemicals which they are likely to wish to import. Members who at any time feel that they have cause for legitimate complaint in connection with licensing restrictions should at once bring the matter to the notice of the Association.

NEW ISSUES.—The subscription list for the new issue of shares in the British Dyestuffs Corporation, Ltd., opened on Monday, and will close on or before July 30. The capital is £10,000,000., divided into 4,500,000 7 per cent. preference shares of £1. each, 4,500,000 preferred ordinary shares of £1. each, and 1,000,000 £1. deferred ordinary shares. The present issue is at par of 2,500,000 preference shares, and 2,500,000 preferred ordinary shares. The scheme of development which is in course of being carried out by the amalgamating companies is intended to provide for the production of complete ranges of dyestuffs and colours required for all industries. Of the proceeds of the present issue, approximately £1,700,000. will be paid to the amalgamating companies to enable them to discharge outstanding liabilities incurred for development purposes, which liabilities were either taken into account in fixing the price paid for the shares of the amalgamating companies or incurred by them subsequent to October 31, 1918. The balance of the proceeds will be utilised for further development of works and plants and for working capital.—The Eastern Chemical Company, Ltd., are offering to shareholders in proportion to their present holdings the balance of the unissued capital—viz., 26,305 participating ordinary shares of £1. each, at 10s. premium. The total capital of the company is £100,000. The list will open on August 11 and close on August 18.

FATALITY AT WOOLWICH ARSENAL.—Some cordite accidentally ignited in one of the huts at Woolwich Arsenal on Wednesday, and a munition girl, Florence Lucas, of Erith, lost her life. Another girl who was at first reported killed was seriously injured. Several others were less seriously hurt.

DYESTUFFS FROM GERMANY.—The Washington correspondent of the *Central News Agency* says: It is learned that officials of the United States Government are favourably considering a proposal to summon a conference of representatives of Great Britain, France, Italy, the United States, Switzerland, and other countries, for the purposes of determining the kind, quantity, and prices of dyes to be taken from Germany under the terms of the Peace Treaty. It is proposed that each delegation shall be composed of one representative of the dye-making industry, one representing dye consumers, and one an impartial business man.

NORFOLK SHALE-OIL DEVELOPMENTS.—We are informed that strong gas pressure, as well as traces of liquid oil, have been found by the drillers on the Norfolk shale-oil fields in making further tests of the properties of English Oilfields, Limited. A new estimate has been made by Dr. Forbes Leslie as to the quantities of petroleum which will be contained in the shales, and the figure is now placed at 200,000,000 tons, obtained from the now proven 1,000,000,000 tons of shale which exist within 300ft. of the surface. Dr. Leslie has presented a report to the directors of the company regarding the sulphur content question referred to in Parliament recently. Dr. Leslie asserts that, apart from the first shale seam, which certainly does contain high percentages of sulphur, all the remaining ten seams are sulphur free.

CHEMISTRY AND THE WAR.—The Birmingham Technical Education Sub-Committee present this week a report to the Education Committee, in which detailed reference is made to the part played by the Chemical Department of the school in regard to research work for the Government. Two of the teaching staff—Dr. T. S. Price (formerly chairman of the Birmingham and Midland Section of the Society of Chemical Industry), the head of the department, and Mr. S. A. Brazier—were given commissions in the R.N.V.R. in connection with special services for the Navy, the former to the rank of Lieutenant-Commander, and he has recently received the O.B.E. (Military Division). In the manufacture for the Government of special drugs—diethylamine and acetal—Dr. Price and Mr. Brazier were assisted by another member of the staff, Mr. A. S. Wood. This work was done under the direction of the Royal Society Committee, and its value has been officially acknowledged. Later Dr. Price and Mr. Brazier took up pioneer work at the Royal Naval Experimental Station, Stratford, which was started by the Government as a result of the German use of poison gas. In April, 1917, Dr. Price was put in charge of all the chemical and technical work undertaken at the experimental station. The work consisted of the manufacture of certain poisonous gases for military use, and also of other gases used for smoke screens and smoke boxes in the Navy. Dr. Price continues to serve as a member of the Chemical Warfare Committee as a representative of the Admiralty.

LEAD POISONING AND WOMEN.—The susceptibility of women to certain forms of lead poisoning and the dangerous effects upon their children are dealt with in Bulletin 253 of the United States Department of Labour Statistics. Lead poisoning is fairly common in America, but before the war few women had been employed in the various lead industries. In England women are barred from lead works. Some German statistics tended to show that women were not really more susceptible than men, but that the sufferers were in general a weakly, badly nourished type of women, not fit for hard work, who drifted into lead works, and that seems to be confirmed to a certain extent in the United States. In the pottery industry more women suffer from lead poisoning than men; but the men belong to a well-to-do trade union and draw good pay, whilst the women have no organisation and are underpaid. In the tile works of the Zanesville district, where men and women are of the same economic class, and badly paid, women show a slightly greater susceptibility. All statistics seem to agree as to the fact that lead poisoning takes peculiar forms in women, and renders them unfit to be mothers, and that they should not be allowed to have anything to do with lead and lead compounds. The danger lies largely also in the deceptive character of the symptoms and in the individual character of the susceptibility. In the same factory one man had worked for thirty-five years in clouds of white lead dust—which should be impossible—and was still hale, while another man fell ill after two weeks, and was dead in five months.

SHALE MINERS' HOURS.—The Scottish shale miners lodged a claim for the seven hours' day granted to the coal miners. A meeting was arranged between representatives of the oil companies and the men, when the representatives of the oil companies stated that they could not see their way to accede to the request. A meeting of the shale miners' executive was held later, when it was agreed to send a deputation to London to lay the matter before the Government.

ZINC AND ZINC DUST PRICES.—No change has been made in the quotation for Australian high-grade zinc dust (88/92 per cent. metallic zinc purity), which remains at £70. per ton f.o.r. Several parcels have changed hands on this basis, and inquiries appear to be more numerous. No further increase has been made in the price of Australian electrolytic zinc (99.95 per cent. metallic zinc), the price remaining at £42. per ton f.o.b. Australia for direct shipment to New Zealand, India, South Africa, and the Far East.

CLEARING HOUSE FOR CASKS.—In view of the widespread attention given to the transport question, the record of the Palm Oil Caskage Clearing House in Liverpool is interesting, says the *Liverpool Daily Post*. Owing to a combination of causes, not the least of which were the difficulties experienced by the brokers in clearing the empty casks on their arrival in Liverpool, the railway companies refused at the close of 1918 to accept empty palm oil casks. As a result of negotiations carried out with the Controller of Oils and Fats (Food Department), a committee of West African merchants and soap manufacturers was formed in order to find a means to overcome the difficulty in regard to the return of the empty palm oil packages to importers. The Committee asked Messrs. Stuart and Douglas, Ltd., to carry out a clearing-house scheme, under the supervision of Mr. Orsini Stuart and staff, and to keep the railway depôts and quays free from congestion, and the trade moving. The first six months' working has proved the benefits of control when carried out with commercial energy and initiative. The Palm Oil Caskage Clearing House (Liverpool) has dealt with 50,000 casks this year from all parts of the United Kingdom, of which about 37,000 have been sorted at and redelivered from the clearing house (representing about 74,000 in and out), and the other 13,000 have been returned to the merchants direct from rail and quay. Congestion no longer exists on the railways, as far as empty palm oil casks are concerned, and the record quoted is one of which the trade and all concerned are justly proud.

EXPLOSIVES.

AT the British Scientific Products Exhibition on Friday (July 18) Mr. J. Young gave an interesting, although more or less popular and elementary, lecture on explosives. The walls of the lecture hall were covered with hanging sheets giving in large educational type information regarding various explosives, and it was not difficult to see that the lecturer's *forte* was that of a teacher. We pick out one or two points of general interest. For instance, the fact that 500 tons of ammonal were employed in the 20 enormous mines which were used to obliterate the Messines Ridge, and that one mine had a crater of 125ft. in diameter gives some conception of the extent to which high explosives were used during the war other than in shells.

Amatol, said Mr. Young, was one of the few real discoveries of the war. It is a mixture of ammonium nitrate and T.N.T. in varying proportions used either in powder form or as a gas. In the latter form it is used in shells, bombs, grenades, and torpedoes. The value of the discovery lay in the fact that there was a shortage of T.N.T., and as only about 20 per cent. of T.N.T. on the average was used, amatol had the effect of doubling our resources of T.N.T.

No matter how much we had of ammonium perchlorate during the war, the supplies were always short, owing to the tremendous quantity required for sea mines, in which also blastine was used to some extent. A mixture of ammonium perchlorate, paraffin wax, and aluminium, however, made an explosive nearly as good as blastine, and an enormous quantity was used for sea mines. Another explosive used when blastine got short was permite, consisting of 82 per cent. NH_4ClO_4 , 10 per cent. zinc dust, 5 per cent. vaseline, and 3 per cent. asphaltum, and varnish. Ammonal consisted of 65 per cent. ammonium nitrate, 15 per cent. T.N.T., 3 per cent. charcoal, and 17 per cent. aluminium filings.

LEGAL INTELLIGENCE.

Carbonate of Soda and Caustic Soda Dispute.

In the Court of Appeal, before Lord Justices Warrington, Duke, and Atkin, on Monday, the case of Chapman and Co., Ltd., v. Agancot was heard upon the appeal of the defendant from an order of Mr. Justice Roche in Chambers.

Mr. Wrottesley, in support of the appeal, said that the defendant appealed from an order of Mr. Justice Roche refusing the defendant unconditional leave to defend the action, imposing the condition that he could not have leave to defend the action unless he brought the whole amount of the plaintiffs' claim into Court within three weeks. Plaintiffs' claim was for the amount due on a bill of exchange accepted by the defendant, and which was given for the amount of freight and other charges on goods sold to the defendant by the plaintiffs, and which were at the time on their way to Italy. The sum claimed was £270. In point of fact the goods never came to the hands of the defendant, but they were sequestered on the frontier owing to the fact that the defendant had become involved in legal proceedings in Italy on former contracts entered into between the partners.

Counsel said that the defendant had a substantial counter claim against the plaintiffs in respect of damages for alleged breach of warranty in respect of 20 tons of carbonate of soda 98 per cent. guaranteed crystal supplied by the plaintiffs to the defendant in 1916, and also in respect of a further 450 tons of carbonate of soda 98 per cent. crystal ordered subsequently. Defendant also had a claim in respect of some soap which the plaintiffs had sold acting as the defendant's agents in December, 1917. In respect of that the defendant claimed an account from the plaintiffs as his agents. Defendant also had another claim in respect of the purchase from the plaintiffs in the autumn of 1917 of 20 tons of 60 to 62 per cent. caustic soda. When it arrived it was not merchantable, and in regard to that heavy claims were made against the defendant in Italy. Defendant asked the plaintiffs to settle those claims, but plaintiffs told defendant to get in touch with the original vendors. Defendant did that, but was told by the original vendors that they could only deal with the parties to whom they sold. Counsel continued that in those circumstances the defendant ought to have unconditional leave to defend the action, as he had a set-off against their claim.

Mr. Jowett having supported the learned Judge's order on behalf of the respondents, their Lordships allowed the appeal, and restored the order of the Master in Chambers, who gave the plaintiffs leave to sign judgment for the amount of the claim, but stayed the levying of execution pending the trial of the defendant's counter-claims.

Foldal Copper Pyrites.

In the King's Bench Division on Monday, Mr. Justice Bray had before him an action under Legal Proceedings Against Enemies Act, 1915, the plaintiffs being Foldal Copper and Sulphur Company, Ltd., of Michael's Alley, Cornhill, London, E.C., and the defendants Duisburger Kupferhuetten A.G., of Duisburg, Rhine Province, Germany.

The plaintiffs claimed a declaration that certain agreements of 1909, 1911, and 1913 for the sale of Foldal copper pyrites were dissolved as from August 4, 1914, by the existence of a state of war between Great Britain and Germany.

Mr. Arthur Sims appeared on behalf of the plaintiffs, and said three agreements had been made between the plaintiffs' company and the defendants. By an agreement of October, 1909, the plaintiffs agreed to sell to the defendants 75,000 tons of Foldal copper pyrites by deliveries of about 15,000 tons during the years 1911, 1912, 1913, 1914, and 1915. There was another agreement in February, 1911, for the sale of 20,000 tons of Foldal copper pyrites, and a further agreement was made in October, 1913, for the sale of 57,000 tons. In August, 1914, there were certain quantities of the goods to be subsequently delivered, and the plaintiffs contended that by the state of war then existing between Great Britain and Germany they were released and absolved from any obligation to supply the Foldal copper pyrites.

Mr. Justice Bray made the declaration in the usual form.

Stafford Coal and Iron Company.

In the Chancery Division on Tuesday, Mr. Justice P. O. Lawrence sanctioned a proposed extension of the objects of the Stafford Coal and Iron Company, Ltd., which gave the company power to deal with its own by-products and manufacture chemicals, cement, gas, and manures, and to set up benevolent funds for its employees.

REPORTS OF COMPANIES.

W. J. Bush and Co., Ltd.

The twenty-second annual general meeting was held in London on July 17, Mr. J. M. Bush (chairman and managing director) presiding.

The Chairman, in the course of his speech, said: The recent increase in the spirit duty up to a total of 51s. 6d. per proof gallon will put essence manufacturers in this country in a most disadvantageous position as compared with their foreign competitors. As soon as freight facilities are restored British manufacturers are almost certain to find that much of their export trade is lost, and the high prices are also likely to cause a smaller demand in the home market. Especially will this be the case in essences in which ethyl compounds are used which have to be made with duty-paid spirits and on which no drawback is allowed. For example, ethyl acetate and ethyl butyrate sell in the United States at one-eighth the price they cost to manufacture in this country at the present rate of duty. Obviously, the remedy is to pay drawback on these compounds, and it is difficult to see the point of view of the Government in refusing so reasonable a request. This situation has been pointed out to the Government by the British Essence Manufacturers' Association. These representations, however, have so far been in vain. All our foreign branches and subsidiary companies, with the exception of Russia, have had a successful year's trading. The sum appearing in the accounts as available for disposal, including the amount brought forward, amounts to £90,257. 19s. 5d., out of which an interim dividend of 5 per cent. has been paid on the ordinary shares. It is now proposed to pay a final dividend of 15 per cent. (making 20 per cent. for the year), to increase the general reserve fund £20,000., and to apply £10,000. to writing down goodwill. This will leave £35,257. 19s. 5d., out of which excess profits duty will be paid and the balance carried forward to next year's accounts.

The report and accounts were adopted.

Borax Consolidated, Ltd.

An extraordinary general meeting was held in London on Tuesday for the purpose of submitting the following resolution: "That the capital of the company be increased from £2,300,000. to £2,900,000. by the creation of 600,000 new deferred ordinary shares of £1. each, to rank equally with the original deferred ordinary shares of the company, and to be issued at such times or time and in such manner and at such premium and generally upon such terms as the directors may think fit." The Right Hon. the Earl of Chichester (the chairman) presided.

The Chairman said: We are at the present time inundated with orders and inquiries for our goods, largely for export. It is evident that, owing to the exhaustion of stocks in many countries, owing to war conditions, there must be a large demand upon us to replenish these, and we anticipate that our mines and refineries will be occupied to their fullest capacity in meeting these demands. That under such conditions more capital must be provided to carry on the business in the most economical manner is evident, and we have most carefully considered, in the interests of the shareholders, the best way to raise this capital, and have come to the conclusion that an enlargement of our deferred ordinary share capital will be the most satisfactory way of providing it. We have confidence that the new capital will enable us to increase our earnings, so that they may correspond to the increased capital, and that if business generally is allowed to carry on we shall be able to show gratifying results.

He then proposed the resolution contained in the notice convening the meeting.

Mr. R. C. Baker seconded the resolution, which was carried unanimously.

British Coalite Company, Ltd.

A series of meetings of the shareholders of the British Coalite Company, Ltd., was held in London on Tuesday for the purpose of passing resolutions providing for the amalgamation of the company with Coalite, Ltd., and Low Temperature Carbonisation, Ltd. Mr. Harry Willmott presided.

The Chairman said: I would assure you that not only has this scheme been the subject of serious consideration by your directors for many months past, but it has been examined with scrupulous care and subjected more than once to the most rigid revision. The directors therefore feel that they can conscientiously recommend it for the acceptance of the shareholders with the certainty that the position of the latter

will be greatly strengthened, and that, as one consequence, the market value of their shares should at no distant date bear a greatly increased and much more equitable approximation to their real value than is the case at present. The chairman concluded by proposing that the scheme for the amalgamation of the company with Coalite, Ltd., and Low Temperature Carbonisation, Ltd., be approved, and that for the purpose of carrying the same into effect the company be wound up voluntarily.

Lieut.-Colonel J. F. C. Hamilton seconded the motion, which was carried unanimously.

A separate meeting of the holders of the ordinary shares was then held, at which a resolution approving of the transfer of the assets and undertaking of the company to Low Temperature Carbonisation, Ltd., and agreeing to accept participating preference shares in that company at the rate of 11 for every 10 ordinary shares of the British Coalite Company, Ltd., was unanimously approved; and at the meeting of the holders of deferred shares a corresponding resolution was also unanimously approved, the proportion of shares in this instance being 17 participating preference shares of Low Temperature Carbonisation, Ltd., for every 20 deferred shares of British Coalite.

Meetings of Coalite, Ltd., were then held, at which corresponding resolutions carrying out the amalgamation were approved.

Cape Asbestos Company, Ltd.

Notwithstanding labour and other difficulties, the Cape Asbestos Company are able to show very satisfactory results for 1918, the net profits for that period amounting to £13,417., as compared with £13,600. and £12,700. for the two preceding years respectively. After adding £5,900., against £4,900., brought forward, there is an available balance of £19,300., against £18,500. last year—an increase of £800. The directors propose to add £5,000., against a similar sum, to reserve, and to pay a dividend of 6 per cent. on the ordinary shares, which compares with a distribution of 5 per cent. for the previous year and 2½ per cent. for 1916. In accordance with the terms of the issue, the preference shareholders are thus entitled to a further distribution equivalent to the dividend on the ordinary shares—viz., 6 per cent. After allowing for the above allocations, there remains a balance of £6,100., against £5,900., to be carried forward.

A. Boake, Roberts and Co., Ltd.

Net profits for the year ended March 31, after providing for debenture interest, depreciation, and excess profits duty, were £31,537. and £18,667. was brought forward. A further dividend of 1½ per cent. is proposed, making 16 per cent. for the twelve months, transferring £5,000. to the reserve (making that fund £75,000.), and carrying forward £6,605.

British South African Explosives Company, Ltd.

Net profits for 1918, after writing off £24,533. for factory depreciation and £1,500. off investments, were £77,648., and £63,565. was brought forward. A dividend of 8½ per cent. is proposed, carrying forward £85,939.

GAZETTE NEWS.

LIMITED COMPANIES.—Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions, Orders, and Official and Other Notices.

Atlas Metal and Alloys Company, Ltd., London, E.C.—Resolved June 20, confirmed July 7: That the company be wound up. H. S. Sugden, 36 and 37, King Street, E.C., and another, liquidators, who are authorised to consent to the Atlas Smelting Company, Ltd., changing its name, with the sanction of the Board of Trade, to the Atlas Metal and Alloys Company, Ltd.

Boundary Chemical Company, Ltd.—Meeting of creditors, H. Sadler's, 31, North John Street, Liverpool, July 25, at 11 a.m.

New Quebec Graphite Company, Ltd.—Resolved June 19, confirmed July 7: That the company be wound up. J. A. Selway, liquidator. Meeting of creditors, 4, Fenchurch Avenue, E.C., July 25, at 11.30 a.m.

Yate Chemical Works, Ltd. (formerly L'Agence Centrale Financiere (The Central Financial Agency), Ltd.), London, E.C.—W. S. Morgan, 3, Pembroke Villas, W. 11, and 18, St. Swithin's Lane, E.C., appointed receiver June 27.

NEW COMPANIES.

Tungsten Manufacturing Company, Ltd.—Private company. Capital £150,000., £1. shares. Manufacturers of tungsten and other metals and articles made therefrom. Office: Thanet House, Strand, W.C.

Whitehall Petroleum Corporation, Ltd.—Private company. Capital £1,000,000., £1. shares. Solicitors: J. Lister, Walsh.

Orchard Sugar Refining Company, Ltd.—Private company. Capital £100,000., £10. shares. Manufacturers, refiners, and importers of and dealers in sugar, syrup, invert sugar, saccharine, laevulose, saccharum, maltose, glucose, caramel, etc. Registered office: Grey Place, Greenock.

Barkershaw Chemical Company, Ltd.—Private company. Capital £1,000., £1. shares. Consulting chemists, chemical engineers, etc. Office: 52a, Heaton Road, Bradford.

F. W. Coombe, Ltd.—Private company. Capital £3,000., £1. shares. Object: To acquire the business of manufacturers of and dealers in glue, gum, and adhesive substances carried on by F. W. Coombe at 8, Arthur Street, E.C., as "Mendine Company," and at 12a, Heron Road, Herne Hill, as "Adhesives Supply Company." Office: 8, Arthur Street, E.C. 4.

Alfred Smith, Ltd.—Private company. Capital £80,000., in 50,000 ordinary and 30,000 6 per cent. cumulative preference shares of £1. each. Object: To take over the business of manufacturing chemists carried on by A., E. and W. Smith, at Excelsior Chemical Works, Clayton, Manchester, as "Alfred Smith," oil refiners, etc.

B. Biggs and Co., Ltd.—Private company. Capital £20,000., £1. shares. Object: To acquire the business carried on at Blondin Works, Old Ford Road, E., by a company of the same name (in liquidation). Makers of methylated spirits, etc. Office: Blondin Works, Blondin Street, Old Ford, E.

Henry Hamilton and Co., Ltd.—Private company. Capital £30,000., £1. shares (10,000 6 per cent. cumulative preference). Merchants, importers, and exporters of oil and general produce. Office: 10, Rumford Place, Liverpool.

James Rudman, Ltd.—Private company. Capital £30,000., £1. shares (10,000 cumulative preference). Paint, varnish, and glue manufacturers, etc. Office: Cambrian Colour Works, River Street, Bristol.

Loftine, Ltd.—Private company. Capital £15,000., £1. shares. Object: To take over the business of manufacturing and dealing in textile detergent compositions for use in wool scouring and other industrial and domestic purposes (particularly the preparation known as "Loftine"). Office: 41, St. Paul's Street, Leeds.

London Metal Company, Ltd.—Private company. Capital £2,000., £1. shares. Office: 5, Laurence Pountney Hill, E.C. 4.

Consolidated Welsh Mines, Ltd.—Capital £300,000., £1. shares. Object: Agreement with W. T. Singleton, of 15, Upper Bedford Place, London, for the sale and purchase of a lease of lead and other mines under certain mine sets in the Cogerriddan Estate, Cardiff. Solicitor: H. Dade, 14, Queen Victoria Street, E.C.

Cornish Meledor China Clay Company, Ltd.—Capital £50,000., £1. shares (15,000 8 per cent. cumulative preference, 15,000 6 per cent. part preference, and 20,000 ordinary). Object: To acquire a portion of Meledor Downs or Common and Meledor Farm, Sun Rising Farm and Break-o'-Day Farm, St. Stephens, Cornwall.

Henry Gardner and Co., Ltd.—Capital £1,000,000., £1. shares. Smelters, rollers, refiners, and manufacturers of and dealers in metals, ores, and metallic and mineral substances, etc. Registered office: 2, Metal Exchange Buildings, E.C.

Resalos Polish Company, Ltd.—Capital £3,000., £1. shares. Office: Reebuck Street, Barnley.

Crosby Trading Company, Ltd.—Private company. Capital £5,500., in 5,000 preference shares of £1. and 10,000 ordinary shares of 1s. each. General merchants, chemical merchants, etc. Office: Alderman House, Bishopsate, E.C.

F. Nickerson and Co., Ltd.—Private company. Capital £10,000., £1. shares. Chemical, druggist, and general merchants. Office: Royal Dock Chambers, Great Grimsby.

Edible Fats (Blackburn), Ltd.—Private company. Capital £3,000., £1. shares (2,998 ordinary and two 5 per cent. preference). Dealers and refiners of tallow and edible fats, bone boilers, etc. Office: Whalley Banks Mills, Blackburn.

Forrest Printing Ink Company, Ltd.—Private company. Capital £15,000., £1. shares. Office: 2-3, Stonecuttet Street, E.C.

Fuelite Company, Ltd.—Private company. Capital £5,000., £1. shares. Object: To acquire the business of a manufacturer of smokeless fuel from coal and coke residues and distiller of tar and rectifier of by-products carried on by W. W. Strafford at "Parkbroke," Hampton-on-Thames. Office: 3, Warwick Court, Holborn.

Harold M. McArthur and Company, Ltd.—Private company. Capital £75,000., £1. shares. Manufacturer and importer of tanning extracts. Office: 327, Vauxhall Road, Liverpool.

Straffon and Co., Ltd.—Private company. Registered July 4. Capital £2,000., £1. shares. Oil and colour merchants, etc. Solicitor: W. G. A. Edwards, 3, Coleman Street, E.C.

United Import and Export Company, Ltd.—Private company. Capital £1,000., 1s. shares. Importers and exporters of general produce, timber, coal, ores, chemicals, etc. First dealers: H. J. Collingwood, 17, Sloane Street, S.W., and W. C. Deere.

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 4, Queen Anne's Gate Buildings, London, S.W. 1, whence further information may be obtained:—

Sweden.

A firm at Carlstad wish to represent, preferably as sole agents, on a commission basis, United Kingdom manufacturers or exporters of chemicals (particularly those used in pulp and paper-making) and tinplates. (Reference No. 187.)

Spain, Portugal, and Northern Africa.

A Bilbao agent desires to obtain agencies for the whole of Spain for first-class United Kingdom manufacturers of metals, tinplates, galvanised sheets, heavy chemicals, dyes, and any speciality likely to suit the Spanish market, and also for Morocco and the North of Africa and Portugal. (Reference No. 136.)

Argentine Republic.

A firm of agents in Buenos Aires desire to obtain agencies for the Argentine Republic for United Kingdom manufacturers of chemical products and Portland cement. (Reference No. 143.)

Roumania.

A commission agent in Bucharest desires to enter into business relations with United Kingdom manufacturers of chemicals and drugs with a view to representing them in Roumania. (Reference No. 184.)

Italy.

The following inquiries for agencies for United Kingdom manufacturers and exporters from persons and firms in Italy have been received at the British Chamber of Commerce for Italy, 7, Via Carlo Felice, Genoa. All communications regarding the inquiries should be sent to the Secretary of the Chamber, as above:—

A commission agent at Genoa desires to represent manufacturers of chemicals, lubricants, paraffin, etc. (Reference No. 1679.)

A manufacturer at Genoa wishes to take up agencies for chemicals, pharmaceutical products, etc. (Reference No. 1682.)

A commission merchant at Mantova requires the following lines: Chemicals, paints, and dyestuffs. (Reference No. 1693.)

A Genoa agent would represent manufacturers and exporters of heavy chemicals, pharmaceutical products aniline dyes, waxes, gums, oils, glues, drugs, wood pulp, and colonial produce. (Reference No. 1700.)

An agent at Genoa seeks agencies for paints and varnishes, tanning materials, fertilisers, lubricating oils, caustic soda, and drugs. (Reference No. 1701.)

A Genoa merchant would represent, on commission, manufacturers and exporters of dyestuffs and chemicals. (Reference No. 1707.)

A Turin agent seeks agencies for manufacturers of chemicals, etc. (Reference No. 1714.)

A Genoa firm seeks connections with large manufacturers of chemicals and colours. (Reference No. 1716.)

An ex-textile manufacturer wishes for agencies for mineral oil, castor oil, dyes, and chemicals. (Reference No. 1718.)

IMPORTS OF CHEMICALS AND ALLIED PRODUCTS.

(Concluded from page 70.)

ARTICLES.	QUANTITIES.		VALUE.		ARTICLES.	QUANTITIES.		VALUE.	
	Month ended		Month ended			Month ended		Month ended	
	June	30th.	June	30th.		June	30th.	June	30th.
	1919.	1918.	1919.	1918.		1919.	1918.	1919.	1918.
OILS :			£	£				£	£
Fish : Train, Blubber, and Sperm tuns	9,463	7,492	676,380	488,704	SOAP : Soft Soap cwts.	37	—	86	—
Coco-nut, Unrefined cwts.	75,092	28,482	259,240	106,110	Household & Laundry Soap, in bars or tablets..... cwts.	6,516	—	16,735	—
Olive, Unrefined tuns	102	—	10,840	—	Polish'g & Scour'g ..	—	—	—	—
Palm (not including Palm Kernel Oil), Unrefined. cwts.	201,532	114,575	673,631	259,769	Powder "	40	14	126	96
					Toilet "	154	593	4,637	3,275
					Unenumerated .. "	200	—	350	—
Petroleum :					STARCH, DEXTRENE, AND FARINA OR POTATO FLOUR :				
Crude gals.	3,120,107	—	78,984	—	Rice Starch cwts.	1,032	1,041	2,590	3,800
Lamp Oils .. "	21,713,771	1,887,205	851,103	134,170	Other kinds Starch ..	90,258	7,576	143,728	16,530
Motor Spirit .. "	14,915,843	14,442,434	1,089,022	1,412,094	Dextrine, and Farina or Potato Flour ..	41,450	122,763	8,902	470,858
Spirit, other than Motor Spirit .. "	—	—	—	—	Total "	132,740	131,380	231,220	491,278
Lubricating Oils ..	7,303,781	12,147,479	648,247	1,215,271	COPPER :				
Gas Oil "	2,382,656	2,221,805	70,477	125,141	Regulus & Precipitate :				
Fuel Oil "	18,307,108	67,245,889	464,598	2,196,639	From Portugal.. tons	130	105	5,500	8,700
Other Sorts "	—	—	—	—	" Spain "	—	858	—	80,451
Total of Petroleum ..	67,743,266	97,944,812	3,202,431	5,083,315	" U.S.A. "	—	40	—	4,000
					" Peru "	1	—	45	—
Seed Oil :					" Chile "	9	18	360	540
Castor Oil tons	1	289	83	28,130	" Cape of Good Hope ... "	—	—	—	—
Cotton Seed Oil, Unrefined "	630	8	28,115	310	" Oth'r C'tries ..	—	753	20	74,880
Linseed Oil :					Total "	140	1,774	5,925	168,571
Pure "	—	—	—	—	COPPER ORE :				
Not Pure "	1	—	84	—	From Spain tons	—	—	—	—
Rape Seed Oil .. "	2,476	3	152,608	176	" Chile "	20	100	600	2,768
Soya Bean Oil .. "	13,8	—	81,961	—	" Cape of Good Hope ... "	—	100	—	4,700
Other Seed Oils ..	192	74	14,728	11,154	" Australia .. "	—	—	—	—
Turpentine cwts.	112,494	4,350	432,760	22,010	" Oth'r C'tries ..	397	713	24,530	51,085
SOAP STOCK "	—	51	—	51	Total "	417	913	25,130	58,553
STEARINE :					MANGANESE ORE tons	15,380	27,237	88,146	259,908
From Belgium ..	—	—	—	—	PYRITES of Iron and Copper "	14,064	63,047	40,585	181,555
" Oth'r C'tries..	3, 05	9,926	17,253	55,296	SILVER ORE val. £	—	—	73,842	28,832
					TIN ORE :				
TALLOW (including VEG-ETABLE TALLOW), Unrefined :					From S. America tons	2,173	2,384	221,611	420,152
From China cwts.	5,225	—	20,823	—	" Brit. S.A. "	7	—	1,155	—
" U.S.A. "	12,416	—	50,366	—	" Oth'r C'tries ..	672	990	81,949	201,470
" Uruguay .. "	12,730	—	42,810	—	Total "	2,852	3,374	304,715	621,622
" Argentine Republic ..	47,461	—	177,403	—	LEAD, PIG and SHEET :				
" Australia .. "	39,205	—	134,590	—	From Spain tons	3,881	1,374	93,950	46,542
" New Zeal'd .. "	45,344	—	190,077	—	" U.S.A. "	4,194	2,050	99,993	68,357
" Other C'tries..	5,583	3	22,709	5	" Mexico "	1,195	—	27,885	—
Total "	167,964	3	638,778	5	" Australia .. "	12,236	4,998	414,835	142,747
					" Oth'r C'tries ..	1,267	200	32,356	6,120
GUM :					Total "	22,773	8,622	669,019	263,766
Arabic cwts.	6,231	13,632	17,783	54,433	QUICKSILVER lbs.	375,000	401,780	75,000	99,100
Kauri "	573	—	3,205	—	TIN, in Blocks, Ingots, Bars, and Slabs :				
Lac-dye, Seedlac, Shellac, and Sticklac ..	4,617	6,557	71,890	63,605	From Straits Settlements tons	1,257	1,317	296,723	452,643
ROSIN "	47,874	30,459	76,806	70,293	" Australia .. "	84	—	20,225	—
CEMENT for Building and Engineering purposes tons	44	—	1,525	—	" Oth'r C'tries ..	126	—	29,511	—
GLUE, SIZE, and GELATINE..... cwts.	3,432	10,555	31,648	87,933	Total "	1,257	1,317	296,723	452,643
OIL-SEED CAKE, not sweetened :					ZINC :				
Cotton seed Cake tons	5,217	6	95,417	108	Crude in cakes .. "	4,977	1,611	194,138	83,863
Linseed Cake .. "	1,897	140	40,466	3,065					
Unenumerated .. "	305	—	5,705	—					
Total "	7,419	146	141,588	3,173					
PARAFFIN WAX . cwts.	65,381	89,740	140,841	264,858					

EXPORTS OF CHEMICALS AND ALLIED PRODUCTS.

(Concluded from page 71.)

ARTICLES.	QUANTITIES.		VALUE.		ARTICLES.	QUANTITIES.		VALUE.	
	Month ended June 30th.		Month ended June 30th.			Month ended June 30th.		Month ended June 30th.	
	1919.	1918.	1919.	1918.		1919.	1918.	1919.	1918.
OILS, Refined :			£	£	OIL-SEED CAKE, not			£	£
Coco-nut cwt.	20	—	234	—	sweetened :				
Cotton-seed tons	8	—	726	—	Cotton-seed Cake tons	—	—	—	—
Olive tuns	5	—	2,115	57	Linseed Cake	3	7	51	171
Palm cwt.	—	—	—	—	Rape-seed Cake	—	—	—	—
Palm Kernel	326	—	740	—	Soya Bean Cake	—	—	—	—
Total val. £	—	—	3,815	57	Unenumerated . . .	4	10	66	200
OILS, Unrefined :					Total	7	17	117	371
Coco-nut cwt.	2,960	—	1,076	—	PARAFFIN WAX . cwt.	12,513	2,070	34,538	10,298
Olive tuns	—	—	—	—	SOAP :				
Palm cwt.	730	—	232	—	Soft Soap cwt.	6,081	1,652	15,258	3,979
Palm Kernel	97,275	—	37,086	—	Household and Laun-				
OIL, SEED :					dry Soap, in bars or				
To Netherlands tons	203,144	—	3,030	—	Tablets :				
„ Belgium „	246,529	—	2,550	—	To China cwt.	3,635	2,713	10,184	8,655
„ Brazil „	10,073	—	133	—	„ Other Foreign				
„ Egypt (includ-					Countries	107,345	36,411	343,698	106,123
ing Anglo-					„ British South				
Egyptian					Africa „	8	84	23	240
Sudan) „	4,736	—	58	—	„ British East				
„ British India ..	4,890	—	58	—	Indies „	30,518	24,117	64,515	57,638
„ Straits					„ Other British				
Settlements . .	2,897	—	28	—	Possessions ..	29,459	47,762	75,206	118,257
„ Ceylon „	97	—	1	—	Total	170,965	111,087	493,626	290,913
„ Australia	5,141	—	64	—	Polishing and Scouring				
„ Canada „	1,909	—	24	—	Soap cwt.	396	403	975	957
„ Oth'r C'tries ..	750,614	44,968	9,568	488	Soap Powder	8,684	1,403	11,443	2,311
TOTAL :					Toilet Soap „	9,455	4,666	100,703	48,108
Castor-seed Oil ..	12,823	44,763	131	485	Unenumerated . . .	427	136	2,422	693
Cotton-seed Oil :					Total of Soap ..	196,008	119,347	624,427	346,961
Unrefined	76,129	—	1,241	—					
Linseed Oil :									
Pure „	931,223	143	11,333	2					
Not Pure „	40,966	38	453	1					
Rape Seed Oil ..	140,276	24	1,842	—					
Soya Bean Oil ..	—	—	—	—					
Other Seed Oils ..	28,613	—	514	—					
Total	1,230,030	44,968	15,514	488					
CANDLES :									
To British South									
Africa cwt.	6	—	57	—					
„ Other C'tries ..	13,107	717	75,968	3,375					
Total	13,113	717	76,025	3,375					
CEMENT for Building &									
Engineering purposes :									
To Netherlands tons	9,080	—	30,528	—					
„ U.S.A. „	—	17	—	210					
„ Brazil „	10,801	243	64,836	1,493					
„ Argentine									
Republic	771	83	5,420	425					
„ British South									
Africa „	—	2	—	10					
„ British East									
Indies „	7,885	9	44,297	300					
„ Australia	—	—	13	—					
„ New Zealand ..	23	—	263	—					
„ Canada „	—	1	—	12					
„ Other C'tries ..	8,776	6,172	52,188	21,584					
Total	37,336	6,527	197,545	24,034					
GLUE, Size, and									
Gelatine cwt.	9,596	1,159	39,784	12,151					

CORRESPONDENCE.

*** We do not hold ourselves responsible for the opinions expressed by our correspondents.*

Exports of Chemicals.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir, —With reference to the announcement appearing in last week's issue of your journal, to the effect that all restrictions on the export of chemicals, drugs, and dye stuffs have now been withdrawn, I think it well to draw your attention to the fact that the Order in Council referred to by you had reference only to certain specified chemicals, drugs, etc., and not to all such materials.

The majority of chemicals and drugs have now, of course been removed from the list of prohibited exports, but the export of some chemicals (such as caustic potash, potassium muriate, sulphate, and carbonate), drugs (such as ergot of rye and quinine sulphate), and all synthetic dyes and dye stuffs is still prohibited to all destinations, and shipments can only be effected under licences from the Export Licence Department.

If any exporter is in doubt as to whether any particular chemical, drug, or dyestuff still appears on the list of prohibited exports, information will willingly be accorded to him if he will be good enough to communicate with this Department.—Yours, etc.,

W. H. AMERY, Assistant Secretary.
Board of Trade, War Trade Department, 4, Central Buildings, Westminster, S.W. 1., July 21, 1919.

CORRESPONDENCE.

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W. H. AMERY, Assistant Secretary.

Board of Trade, War Trade Department, 4, Central Buildings, Westminster, S.W. 1., July 21, 1919.

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

The specifications of the following applications are not printed by the Patent Office until the complete specifications have been accepted.

July 14th to July 18th (inclusive).

Heating Material or Performing Chemical Processes in Electrical Furnaces. Aktiebolaget Kvalveindustri. 17,821.
Purification of Argon, etc. Barbet et Fils et Cie, E. 17,706.
Preparing Barium Hydroxide from Barium Sulphide. Barnes, E. A. 17,991.
Roasting Sulphide Ores, Products, etc., and Manufacture of Sulphuric Acid, Sulphurous Anhydride, and Acid Sulphites and Bisulphites Therefrom. Boyd, J.; and Durant, H. T. 17,642.
Treatment of Emulsions, etc. Broadbridge, W.; Edser, E.; and Minerals Separation, Ltd. 18,038.
Chemical Product Obtained from β -naphthol. Brett, A. H. 17,589.
Removal of Gases from Liquids. Elliott, W. S. 17,931.
Superphosphates, etc. Guillaume, F. 17,752.
Drying China Clay, etc. Kent F. J. 17,986.
Bismuth Compound. Kent, T. O. 17,838.
Refining Lead. Leathart, T. H.; and Locke, Blackett, and Co. 17,785.
Applying Nickel Carbonyl in Manufacturing Processes. Lessing, R. 17,709.
Extraction of Fat, Wax, Oil, Gelatine, etc., from Materials. Macgregor, J.; and Scott and Co., E. 17,880.
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Treatment of Zinc Solutions. Metals Extraction Corporation; and Petersson, F. 17,929.
Reduction of Nitro, Nitroso, and Azo Compounds, etc. Moore, T. S. 17,568 and 17,963.
Hydroxyazo Dyes. Morgan, G. T. 17,848.
4-nitro- β naphthol. Morgan, G. T. 17,849.
Destructive Distillation of Wood, Woody Fibre, etc. Poore, P. 17,728.
Extraction and Recovery of By-products formed by Destructive Distillation of Wood in Suction Gas Plants. Roberts, J. C. 17,547.
Recovering Bitumens from Shale, etc. Ryan, H. D. 17,777.
Manufacture of Ethyl Alcohol and Residue from Fermented Liquor. Wade, H. (Schneible). 18,041.
Recovering Oil from Shale, etc. Wallace, G. W. 17,810.
Distilling Carbonaceous Materials. Wallace, G. W. 17,811.
Condenser for Distilling Apparatus. Zaeckel, J. H. 17,796.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 6d. in stamps to the Comptroller, Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane, W.C.

1917.

Preparation of Lead Acetate. Camus, E.; Duchmine, R.; and Criqueboeuf, G. 6,549. 129,300
Manufacture of Monochloroacetic Acid and of Its Esters. Simon, L. J.; and Chavanne, G. 7,325. 129,301
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1918.

Metallic Lead Powder and Lead Paints. Nelson, J.; and White, W. C. 6,065. 129,392
Treatment of Coal-tar, Pitch, and the Like for the Production of Fuel. Pearson and Son, S.; Smith, J. S.; and Hackford, J. E. 6,280. 129,393
Dye Compositions. Marks, E. C. R. (Sunbeam Chemical Co.). 11,078. 129,417
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Coke-ovens. Marr, J.; Colquhoun, W.; and Coke Oven Construction Company. 11,256 and 11,257. 129,432 and 129,433
Disintegrating and Screening Pulverulent Material. Fraser, L. M.; and Peel, F. 11,730. 129,458
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Producing Metallic Cerium and Similar Rare-earth Metals or Alloys Thereof. Alpha Products Company. 14,238. 119,229
Flexible Waterproof Antiseptic and Antifouling Composition. Kelly, M. A. 15,940. 129,526
Filamentous Material from Viscose. Pellerin, A. 21,084. 121,734

1919.

Evaporating or Concentrating Liquids. Shaw, E. 3,238. 129,584

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Nitrophenols. D. B. MacDonald, Leicester; and J. Calvert, Huddersfield. British Patent, 126,062, of 1916.

Nitrophenols are obtained by treating benzene with nitric acid and mercuric nitrate in the presence of carbon dioxide;

2:4-dinitrophenol is the principal product. The process may be carried out by passing carbon dioxide into the mixture of benzene, nitric acid, and mercuric nitrate, or by passing carbon dioxide through nitric acid and leading the mixed vapours into the mixture of benzene, nitric acid, and mercuric nitrate, or by passing carbon dioxide through benzene and leading the mixture of carbon dioxide and benzene vapours into a mixture of nitric acid and mercuric nitrate. The benzene, nitrobenzene, and *o*-nitrophenol are separated from the dinitrophenol by evaporation or steam distillation.

Catalytic Manufacture of Nitric Acid. E. B. Maxted and G. R. Ridsdale, Walsall. British Patent, 126,083, of 1916.

The catalytic oxidation of ammonia to nitric acid or nitrogen oxides is effected by arranging a constant supply of heat of suitable temperature at every point of contact between the gases and the catalyst, followed by cooling the reaction gases as soon as they leave the catalyst. The gases may be passed through iron tubes of small bore, or through iron tubes which have been flattened to the form of a hollow tape, or between iron plates in loose contact or a short distance apart, the tubes, etc., being externally heated, for instance, by a flame or electrically to a red heat, and the time of contact being a fraction of a second. Nickel or cobalt—or, according to the provisional specification, copper or platinum—may be used instead of iron, and the inner surfaces of the tubes may be activated in any known manner, for instance, by treating with a solution of copper, tungsten, cerium, thorium, bismuth, or lead nitrate; or, according to the provisional specification, by coupling with copper or silver. The tubes may be enclosed in sleeves of silica, porcelain, etc.

Ammonium Nitrate. D. Tyrer, Stockton-on-Tees. British Patent, 125,621, of 1916.

Ammonium nitrate is obtained by double decomposition between approximately equivalent quantities of ammonium sulphate and sodium nitrate, the reaction mixture being boiled to precipitate most of the sodium sulphate—i.e., until the boiling point rises to 120° C.; the sodium sulphate is filtered off hot, and washed with a saturated solution of sodium sulphate, and then with water, the ammonium nitrate solution, preferably after a small addition of water, is then treated with a salt of a metal forming an insoluble sulphate, such as calcium or barium nitrate or chloride, so as to convert a part of the remaining sodium sulphate into a more soluble salt; the calcium sulphate, etc., is filtered off and washed, and the ammonium nitrate solution is concentrated until its boiling point is about 120-125° C., and cooled to effect crystallisation, which takes place at from 35-15° C. The ammonium nitrate crystals are washed in concentrated ammonium nitrate solution, and dried at 100° C., and may be purified by crystallisation. The mother-liquor is used, after addition of water, for dissolving fresh ammonium sulphate and sodium nitrate. The first washings of the sodium sulphate, when enough ammonium nitrate has accumulated, are boiled to precipitate sodium sulphate and filtered, and the filtrate is added to the principal mother-liquor. The washings of the sodium sulphate with water may be used as the saturated solution in subsequent operations. The washings of the calcium sulphate precipitate may be used to dilute the ammonium nitrate solution prior to the addition of calcium nitrate. The washings of the ammonium nitrate may be concentrated to crystallise out some of the salt, and the mother-liquor added to the principal mother-liquor.

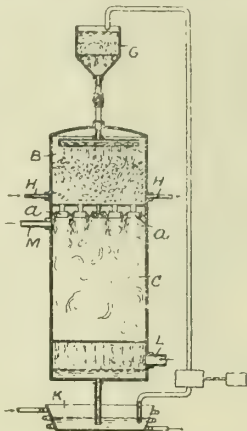
Ammonium Perchlorate. C. W. Bailey, H. S. Denny, and A. J. Dunk, H.M. Factory, Langwith. British Patent, 125,677, of 1918.

Relates to the production of ammonium perchlorate by the interaction of ammonium sulphate and sodium perchlorate in the presence of water. According to the invention, sodium perchlorate is added to the mother-liquor obtained by causing ammonium sulphate and sodium perchlorate to react in the presence of water at about 30-35° C., the temperature is raised to about 100° C. to cause the separation of anhydrous sodium sulphate, and ammonium sulphate is then added to the residual solution cooled to about 30-35° C. to effect the precipitation of ammonium perchlorate; the mother-liquor obtained is then treated in succession with sodium perchlorate and ammonium sulphate as set forth above.

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Halohydrins. Commercial Research Company, New York. British Patent, 126,311. Convention date, May 3, 1918.

In making halohydrins by the action of hypochlorous or hypobromous acid upon gaseous olefines, the acid is prepared by reaction of halogen gas upon water in the presence of a substance which reacts with hydrochloric or hydrobromic acid but not with hypochlorous or hypobromous acid, yielding a solution containing practically no free halogen or hydrochloric or hydrobromic acids. Suitable substances are salts of weak acids, such as carbonates, bicarbonates, acetates, or borates, or acid salts of strong acids such as disodium phosphate. Insoluble salts such as calcium borate or calcium carbonate in the form of soft limestone or pressed blocks of precipitated chalk may be used. Gases containing mixtures of saturated and unsaturated hydrocarbons such as are obtained by destructive distillation of petroleum products or alcohol may be treated. As propylene is reacted upon first, the operation may be conducted in stages to obtain first propylene chlorhydrin and then ethylene chlorhydrin. Hypochlorous acid is prepared by passing chlorine through inlets H into a chamber B containing granular material, which may consist of calcium borate or calcium carbonate, over which is distributed a solution of a salt of a weak acid, such as borax, prepared in a vessel G. The solution of hypochlorous acid passes through water-seals a and falls in a shower through a chamber C, through which a current of gas containing olefines passes from an inlet L to an outlet M. The liquid flows into a tank K, in which it is cooled to remove boric acid, and may be passed through the same or a similar apparatus. The chlorhydrin is separated by distillation or by extraction with ether, gasoline, carbon tetrachloride, or other solvent.



Catalytic Apparatus. Soc Chimique des Usines du Rhone, anciennement Gilliard. P. Monnet et Cartier, Paris. British Patent, 126,279. Convention date, May 3, 1918.

In apparatus for catalytic gaseous reactions, the gases pass through a catalyst which is of such material as can be directly heated by the passage through it of an electric current. To this end, the catalyst may itself be an electric conductor; or if not a conductor, conducting material may be incorporated with it. The container for the catalyst is of non-conducting material. The reactions cited as examples comprise the combination of acetaldehyde and air at 100° C. to give acetic acid, the dehydration of alcohol vapour at 360° C. producing ethylene, and the production of acetone from acetic acid at 460° C., the catalyst in each case being either granulated coke or a mixture of powdered charcoal and alumina, directly heated by an electric current to the requisite temperature.

Alkali Nitrates. F. Bensa, Genoa, Italy. British Patent, 125,453. Convention date, August 4, 1915.

Ammonia is oxidized to nitrogen oxides by the catalytic action of platinized or palladized asbestos followed by the action of layers of the oxides of copper, iron, and rare metals such as thorium, cerium, and didymium in the presence of steam. The nitric and nitrous acids produced are absorbed in solid alkali carbonates or hydrates at a temperature above the melting-point of the nitrates.

Paints, Varnishes, Etc. M. Holzapfel, Newcastle-on-Tyne. British Patent, 126,270. Convention date, May 3, 1918.

A composition adapted for use in the production of paints, varnishes, etc., is prepared by heating wood tar in the presence of basic metal compounds, such as lime, under oxidising conditions, with or without additions of zinc oxide, red lead, litharge, manganese oxide, or similar driers. For example, 90 parts of wood tar, 5 parts of slaked lime, and 5 parts of zinc white are mixed together and heated to about 250° C. for about half an hour, the product being then dissolved in turpentine, benzene, or other hydrocarbon to the consistency

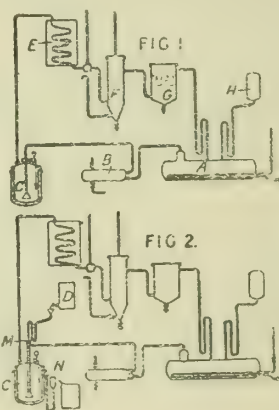
of a varnish or paint oil. The product may be ground up with pigments for the manufacture of paints. During the heating process, a current of air or oxygen may be passed through the mixture. When light-coloured paints, etc., are required, the wood-tar is distilled before use to remove the pitch. A small proportion of whale oil, fish oil, or other fats or fatty acids may be incorporated with the mixture at any stage of the manufacture.

Zinc Sulphides. P. Comment, Dijon, Cote d'Or, France. British Patent 126,274. Convention date, April 30, 1918.

In the production of zinc sulphide by calcining zinc persulphide, ZnS₂, with zinc sulphate and alkali sulphate as described in the parent Specification No. 106,489 and in Specification 114,407, the alkali sulphate may be wholly or partly replaced by an alkali salt capable of producing the sulphate under the reaction conditions, such as sulphite, hyposulphite, or thionate, and the zinc persulphide by a zinc polysulphide containing less sulphur such as may be produced by precipitating a zinc salt with various amounts of alkali or alkaline-earth polysulphide, or by removing some sulphur from zinc persulphide by treatment with solutions of alkalies or alkali or alkaline-earth sulphides. When alkali sulphide is produced as well as sulphate from the salt employed, the zinc sulphate must be sufficient to form zinc sulphide with such sulphide.

Benzene Monosulphonic Acid. Compagnie des Produits Chimiques d'Alais et de la Camargue, Salindres, Gard, France. British Patent, 126,039. Convention date, February 25.

In the production of benzene monosulphonic acid as described in the parent Specification No. 101,793, the benzene vapours are passed through a superheater before entering the sulphonator. Using the apparatus shown in Fig. 1, the



Several continuous treatment apparatus may be arranged in series with a common benzene boiler, the first sulphonator only being fed with sulphuric acid and delivering its sulphonated product to the next sulphonator, and so on; this arrangement permits more complete utilisation of the sulphuric acid.

Methyl Alcohol. J. A. Christiansen, Copenhagen. British Patent, 125,946. Convention date, April 20, 1918.

Methyl alcohol is obtained by reducing an alkyl formate by hydrogen in the presence of a catalyst, such as copper; methyl formate is a suitable parent substance. Methyl formate for use in the process may be made by reaction of carbon monoxide with methyl alcohol under pressure in the presence of sodium methylate, or by passing carbon monoxide into a solution of sodium methylate in methyl alcohol. By combining the processes above described, methyl formate or methyl alcohol can be obtained from the constituents of water gas.

WAGES IN THE RUBBER INDUSTRY.—Women and girl workers engaged in the indiarubber industry of the kingdom have been awarded increases of wages of 5s. and 2s. 6d. respectively, those over 18 years getting the larger sum and those under getting the smaller one. Pieceworkers get an advance which dates back to the first full pay following June 1.

FERTILISER NEWS.

(SPECIALLY CONTRIBUTED.)

Nitrate of Soda.—The report of the Alianza Company, the largest of the English producers, affords an interesting object-lesson on the Chilean nitrate industry, which will be reviewed in detail in next week's issue of this journal. The financial results last year were the best obtained in the 23 years of the company's existence, the gross profit amounting to £480,571.—or about 4s. 9½d. per quintal on 2,010,799 quintals disposed of; the net profit, after deduction of £46,470. for raw material extracted, £65,322. for debenture interest, income tax, etc., and £4,817. for London expenses, was £363,962., compared with £261,388. in 1917. For the second time in succession, a dividend of 40 per cent., free of income tax, is paid on the share capital of £500,000. The Hon. Herbert C. Gibbs, presiding at the general meeting on the 17th instant, explained that a larger distribution would have been made but for the necessity of providing for the excess profits duty (about £50,000.) and the cost of upkeep of one oficina closed and the other likely to follow suit; he further stated that the company had since 1898 distributed £1,690,000. in dividends, returned to the shareholders in 1903 half their capital in cash and debentures (only £99,700. of the latter now outstanding), formed reserves of £246,739., built a new oficina, and acquired new grounds estimated to contain 26 million quintals of nitrate. To finish the picture of phenomenal prosperity the amount "carried forward" to the current year is £299,899., equal to about 60 per cent. of the share capital. Somewhat in the nature of an anticlimax comes the "Alianza's" renewed protest against the payment of income tax upon depreciation funds, seeing that the enormous profits made in the last two years were entirely on sales to the Allied Nitrate of Soda Executive, to which the company's chairman acted as adviser. Equally if not more surprising is the removal of the control to Chili for the admitted purpose of "protecting the foreign shareholders from British taxation." They may find that they, as also their English co-partners, have fallen from the frying-pan into the fire if the Chilean Government carry out the reported intention of replacing the export duty on nitrate by a tax on profits.

Continental Fertiliser Items.—By a decree of July 15, new prices have been fixed for fertilisers in Italy. Per unit of phosphoric anhydride, the price is 1.37 lire, free in wagons Genoa, Leghorn, and Taranto; 1.38 lire, free in wagons at Barletta and Ancona; 1.39 lire, free in wagons at Ravenna; 1.40 lire, free in wagons at Venice. These are the same prices as those recently fixed by the Unione Italiana Concimi, and are very much lower than the old fixed prices, which averaged 1.55 lire per unit.

A considerable improvement is noted in the exportation of Tunisian phosphates for the month of June. This amounted to 26,526 tons, as against 12,336 tons in June, 1918. This makes a total for the first six months of 1919 of 92,490 tons, as against 58,616 tons only during the corresponding period of 1918—an increase of 33,874 tons.

According to French advices, the potash concerns in Alsace that were subsidiary to the German Potash Syndicate will be exploited by a single French company, the capital of which it is intended shall be 50,000,000 francs.

Sulphate of Ammonia.—Not a great deal of business is moving in this material, but the fixed prices appear to have been readily accepted, and may be regarded as fair. Talk of increased production moves from time to time, but there are no special details of moment here. With regard to sulphate of ammonia business in America, news from the Pacific Coast is to the effect that active work in the field is expected to boom the demand for sulphate of ammonia in the coming autumn. Price conditions locally hold back business there at the moment.

Basic Slag.—The rumours of higher prices for basic slag have become again more prominent in connection with dearer coal and consequently dearer iron. Furthermore, the market is apprehensive that the supply may be adversely affected. At the moment there is a fair inquiry for forward, and quite a number of orders are being placed early. This is probably wise in view of what may happen.

Bone Meal.—Bone meals continue to be dear and fairly scarce. Representative prices are £8. for a dissolved bone compound, August delivery, or £8. 2s. 6d. for September delivery. East Indian bone meal is quoted at round about £15. per ton.

Pacific Phosphates.—The chairman of the Pacific Phosphate Company, at a meeting last week, referred to the statement

that a mandate in respect of the important phosphate-bearing island of Nauru had been given to the British Empire. This company and its predecessors have been the pioneers of the phosphate industry in the Pacific Ocean, and they are naturally interested as to what is to happen to these ex-German deposits. It was this company that discovered the phosphates in Nauru, and, by arrangement with the German trading company operating there, obtained an exclusive concession until the year 2000 to work the deposits and any others which might be discovered in the Protectorate. At the same time the rich deposits in Ocean Island were also discovered, and the British Government granted the company an exclusive concession to mine these phosphate deposits until the year 2000. The Pacific Phosphate Company's German shareholdings have during the war been sold to a British corporation by auction. All the ground appears to be cleared for a straightforward progressive policy of exploitation.

Other Fertilisers.—The general fertiliser market is quiet, but there are one or two interesting points. From one source sales of fish guano at £18. to £19. 10s. are mentioned, this material analysing 9 per cent. ammonia and 14 per cent. phosphoric acid. Kainit is again very scarce, but there is more sulphate of potash available at prices as last quoted. In America it is said the potash market is almost stagnant, in spite of certain potash material being offered as low as two dollars per unit. Makers of combined manures are believed to have considerable potash on hand, and the demand is therefore small. The French market is now reported to be regularly quoting cyanamide, nitrate of lime, and nitrate of ammonia. The superphosphate position is without change.

SOUTH WALES NOTES.

(SPECIALLY CONTRIBUTED.)

Trading conditions are becoming chaotic owing to the numerous sectional strikes that spring up day by day, and, in a great measure, to the uncertainty regarding the prices of fuel. Manufacturers absolutely refuse to quote for any large quantities of their productions, and the business transacted in any industry is confined to small limits.

Tinplate manufacturers are much concerned as to their markets, and there are grounds for their fears that many important consumers of plates will be driven elsewhere for their supplies. Hitherto all disputes between masters and men have been settled with the help of a conciliation board, but during the last few days a few of the extremists have taken upon themselves to have an unofficial ballot, the principal question on the paper being, "Are you in favour of an unofficial strike throughout the tinplate trade against the recent findings of the Industrial Council?" Many of the papers have been returned, and these are said to be favourable to the "down tools" policy, and possibly in a few days this industry will be stopped. The men claim that 50 per cent. of the present war bonus should be added to the standard wages, and the remainder retained while the high cost of living continues. The position is fraught with very serious consequences.

The demand for spelter has increased, but this is not so difficult to meet, as there are stocks on hand. There is some difficulty in this industry owing to the employment of Belgians. Employers have explained the position which made Belgian skilled labour necessary at a recent meeting of the Industrial Council, and consideration of the question was adjourned; but during the last few days the speltermen have been holding meetings, and statements have been made that some 24 men from one works received notice, and meanwhile 14 Belgians were brought over. This alleged grievance has resulted in a strike at two of the leading factories.

Coke ovens are working regularly, and at present the supply of sulphate of ammonia has not appreciably decreased, but the outlook is not of a very promising position owing to the coal situation.

The patent-fuel makers, although in a somewhat better position as regards supplies of duff and small coal, are uneasy as to the future. This industry during the war has made considerable progress, but the extra charges for coal are now having a serious effect.

A cargo of 2,000 tons of sulphur ore from Seville came into Swansea Docks on Monday for Messrs. Vivian and Sons.

COURTAULDS, LTD.—Interim dividend of 4s. per share, free of income tax.

MARKET REPORTS.

TAR AND AMMONIA PRODUCTS.

WEDNESDAY.

Benzole: London, 90%, 1s. 11d. to 2s.; North, 1s. 9d. to 1s. 10d.; 50%, 1s. 9d. to 1s. 10d.; North, 1s. 9d., naked. Carbolic acid, crude, 60%, East and West Coast, nominally 1s. 3d.; crystals, 30-40%, 6d. to 6½d., f.o.b. Crude tar London, 42s. to 43s.; Midlands, 37s. to 38s.; North, 36s. to 37s. per ton, ex works. Pitch, 72s. 6d. to 75s.; East Coast, 65s., f.o.b.; West Coast, 52s. to 54s., f.a.s. Solvent naphtha, naked, London, 90-190%, 2s. 5d.; North, 2s. 3d. to 2s. 4d.; 90-160%, naked, London, 2s. 1d.; North, 1s. 10d. to 1s. 11d. Crude naphtha, naked, 30%, 8d. to 8½d.; North, 7½d. to 7¾d. Refined naphthaline, £18. to £22.; salts, £6. to £7. Toluol, naked, London, 2s. 1d.; North, 2s. Creosote, naked, London, 5½d. to 5¾d.; North, 5d. to 5½d.; heavy oil, 6¾d. to 7d. Anthracene, 40-45%, 6d. per unit. Cresylic acid, 95%, 2s. 7d. to 2s. 8d.; 97-99%, 2s. 9d. to 2s. 10d., ex works, London, and f.o.b. other ports. Sulphate of ammonia: Home trade, £19. 10s. per ton; basis 24½%. Nitrate of soda, £21. to £22.

FERTILISER MATERIALS.

LIVERPOOL, THURSDAY.

Nitrate of soda is easier on spot, and the price of 96 per cent. quality has been reduced to £20. 12s. 6d. per ton, net cash, f.o.r., prompt delivery. East Indian bone meal: Shippers are very firm in their views, the nearest value of 4½ per cent. ammonia and 52 per cent. phosphate of lime, August-September shipment, being £14. per ton, net cash, ex ship Liverpool. On spot, holders ask £15. per ton, net cash, for 4½ per cent. and 45 per cent. quality. Mineral Phosphates: Some business is reported to have been done in 63 per cent. grade Tunisian rock at 8½d. per unit, f.o.b. Tunis, July-August shipment. Dried blood is quiet, the value being 25s. to 30s. per unit of ammonia per ton, net cash.

LONDON METAL MARKET.

THURSDAY.

Copper: Standard brands, £103. 15s. to £104., cash; £104. to £104. 10s., three months; electrolytic, £110. to £120. Tin: Standard, £255. 10s. to £255. 15s., cash; £254. 5s. to £254. 10s., three months; Straits, £225. 10s.; English, £252. to £253., f.o.r. Lead: Soft foreign, £23. 10s.; English, £24. 10s. Spelter, £43.; hard, £34. to £35. Antimony, English regulus, 90%, £40. Aluminium, £150. Nickel, £205., delivered, packages extra. Quicksilver, £22. to £22. 10s. Bismuth, 12s. 6d. Platinum, 442s. per oz. Wolfram, 30s. per unit.

MANCHESTER CHEMICAL MARKET.

THURSDAY.

Business in the home trade during the past week has been on the quiet side, but the inquiry for export is, as a whole, satisfactory, and values all round are fairly well maintained. Resale lots of 70% caustic soda are still available at £17. 10s. per ton. Refined bicarbonate of soda, in bags, at £7. per ton, and 58% alkali at £6. 10s. per ton. Bleaching powder quiet at £15., softwoods, on rails. Hardwoods, £14. per ton, f.o.b. There is no improvement in demand for copper sulphate, and price is nominal at £45. per ton, f.o.b., Liverpool. Chlorate of soda again lower at 7d. Potash easy at 1s. 1d. per lb. Bichromates unchanged at 1s. 6d. and 11d. for potash and soda respectively. Roasted saltcake, in bulk, 60s. per ton, delivered. Phosphate of soda steadier at £25. per ton. Commercial hyposulphite of soda slow of sale at £16. 10s., on rails. Nitrite of soda lower at £53. per ton. White powdered arsenic continues scarce, and £40. is quoted for small lots of Cornish make. Yellow prussiate of potash quiet and unchanged at 1s. 9d. per lb. Soda is selling rather better at 7½d. per lb. Carbonate of potash, 80-85%, steady at £85. per ton, but not much inquiry. Lead salts are a shade easier: White acetate, £84. per ton; brown, £75. per ton. Nitrate, £56. 10s. per ton. Acetic acid and acetate of soda are in steady request at recent rates. English brown acetate of lime firm at £10. per ton. American grey, £19. 10s. net, ex ship. Miscible and solvent wood naphtha quiet at 10s. 6d. per gallon. Green copperas is in better demand, but price easy at £4. 10s., carriage paid. Oxalic acid unchanged at 1s. 2½d. per lb.

SWANSEA MARKET REPORT.

THURSDAY.

Tinplate prices are fairly steady, but the volume of business passing is of a meagre description owing to the uncertainty of the future prospects of getting raw material. Standard boxes were quoted at 33s. to 34s., f.o.b. There is a better demand for copper, and prices are somewhat irregular, with an upward tendency. Some sales for delivery over current quarter at £104. were recorded. Tin has a steady inquiry, and is slightly dearer at £256., prompt, with 5s. to 10s. less for three months. Silver, 54½d. per ounce. Zinc sheets remain quiet and unchanged at £65., f.o.b., New York. Lead: Spanish, £23. 15s.; English, £24. 15s. Spelter, with more inquiry, was dearer at £43. 15s. prompt and £45. three months. Linseed oil scarce at nominal quotations. Cottonseed oil steady, with edible at 135s. per cwt. Palm oil is firmly held notwithstanding poor inquiries: Lagos was quoted at £92.; softs, £91. 10s.; Benin, £88.; and hards, £82. per ton, casks free. Turpentine, better sales at 95s. 6d. per cwt., net, in barrels. Sulphate of copper rather dull at £45. per ton for home purposes, and £47. 5s. for export, less 5 per cent., in casks, f.o.b. Arsenic in better request, with irregular quotations round £42. to £44. per ton. Oxalic acid unchanged at 1s. 3d. per lb. Pitch, with short supplies, dearer at 5½s. 6d. per ton. Nitrate of soda firm at 2½s. 6d. per cwt., in bags, net. Bone meal dearer at 14s. 3d. per cwt. Sulphate of ammonia, £19. 10s. per ton.

LIVERPOOL CHEMICAL MARKET.

THURSDAY.

The demand for chemicals for use in the United Kingdom has again been quiet. The market has been disturbed by the uncertainty as to supplies and prices of coal, not only as regards the chemical industry but as regards most other industries. Great dissatisfaction has been caused by the increase in the price that has been announced and by the shortage in the supply, both being caused by the refusal of the miners to bring more than a certain insufficient quantity of coal to the surface. The situation is regarded as not one of legitimate scarcity, but of refusal of those who have been producers of coal in the past, and who have lately been earning at least double their pre-war earnings, to produce sufficient coal for ordinary requirements. All industries alike are affected by the uncertainties of the situation, and everyone is denouncing the selfishness of those who are endangering the trade and stability of the country by the course they are now pursuing. Bleaching powder has been in moderate request, and is £14. 10s. to £15. per ton, free on rail or conveyance, in buyer's packages, and £17. per ton for export. Chloride of calcium has been quieter, and is £8. to £11. per ton, in casks, f.o.r. Caustic soda has been in good request, and is £24. per ton for 76 per cent., £22. per ton for 70 to 72 per cent., and £19. per ton for 60 to 62 per cent. Nitrate of soda has been in quietly steady demand, and is £20. to £21. per ton. Saltcake has been in fair request, and is £6. 10s. per ton, in casks, f.o.b. Soda crystals have been steadily called for, and are £5. per ton, in 2cwt. bags, f.o.r., at works. Bicarbonate of soda has sold with some freedom, and is £7. 5s. to £10. per ton, according to terms of delivery. Borax has been in very fair demand, and is £42. per ton for ordinary and £44. per ton for powdered, in bags. Ammonia alkali continues in good request, and is £6. to £6. 5s. per ton, f.o.r., at works. Hyposulphite of soda has again met with a fair inquiry. Ordinary crystals are £19. to £20. per ton, in 2cwt. bags. Pea crystals are £25. per ton, in 1cwt. kegs. Sulphite has been in quietly steady demand, and is £11. per ton for ordinary and £18. to £19. per ton for pea crystals, in 1cwt. kegs. Bichromate of soda has moved but slowly, and is 9d. per lb. Phosphate of soda has been quiet, and is £25. per ton. Sulphide of sodium has been in fair request, and is £20. per ton, in casks, and £22. per ton, in drums. Chlorate of potash continues to meet with a moderate inquiry, and is 1s. 1d. to 1s. 2d. per lb. Permanganate of potash has been quieter, and is 3s. 6d. per lb. Sulphate of potash has been but little called for, and is £40. per ton. Carbonate of potash has been in very fair demand, and is £85. to £90. per ton for 80 to 85 per cent. Caustic potash has been quieter, and is £90. to £100. per ton for 35° Bé. Nitrate of potash has been steadily called for, and is £58. to £60. per ton for refined and £40. per ton for ordinary. Canadian ashes have been very quiet, and are £200. to £220. per ton.

for first quality, Montreal, and £190. to £210. per ton for second quality. Bichromate of potash has been quiet, and is 1s. 6d. to 1s. 7d. per lb. Yellow prussiate of potash has been but little called for, and is 1s. 9d. to 1s. 10d. per lb. Salamoniac has had a moderate inquiry, and is £80. per ton for lump, £75. per ton for seconds, and £5. per ton extra for ground. Sulphate of ammonia has been very quiet, and is £19. 10s. per ton, less traders' discount of 10s. per ton, free to nearest wharf or railway station, to September 30. Carbonate of ammonia has been rather more in request, and is 6½d. per lb. Muriate has been in very limited demand, and is £50. to £60. per ton, according to quality. Magnesia has been quieter. Carbonate is £3. 10s. per ton, and sulphate £10. to £16. per ton, according to grade. Alum has been in very fair request, and is £18. 10s. per ton for the home trade, and £18. 10s. to £19. 10s. per ton for export. Alumino-ferric has received but little attention, and is £8. 10s. to £12. per ton, according to quality. Sulphate of alumina has again been quiet, and is £12. to £18., according to grade. Sulphur has been in moderate demand. English kinds are: Flowers, £32. per ton; roll, £28. per ton; and rock, £22. per ton, in bags, f.o.r. Sicilian grades are: Flowers, £28. per ton; roll, £22. 10s. per ton; and third quality, £17. 15s. per ton. Cream of tartar has been in very fair inquiry, and is £11. 5s. to £11. 10s. per cwt. Tartaric acid has been quieter, and is 3s. 2d. per lb. Boracic acid has been rather more in demand, and is £72. per ton for crystals and £74. per ton for powdered. Oxalic acid has been quiet, and is 4s. 4d. per lb. White acetate of lead has moved but slowly, and is £85. to £90. per ton. Arsenic has been in quietly steady demand, and the price has further advanced. It may be given as £50. per ton for white powdered. Sulphate of copper has been but little called for on home trade account. For agricultural uses in the United Kingdom it is £45. per ton, and for export £47. to £48. per ton, less 5 per cent., in casks, f.o.b., at Liverpool.

TYNE CHEMICAL REPORT.**TUESDAY.**

Chemicals are unchanged. The demand is steady, and consumption in the home trade is improving somewhat. The recent railway strike has interfered with deliveries to a certain extent, but with the resumption of work to-day matters in this respect will soon improve. Bleaching powder

and caustic soda are in good request. Sulphur continues very scarce and firm at £22. to £23. per ton.

The following prices are per ton, net: Bleaching powder, softs and hards, £15.; caustic soda, 74-77%, £23. 5s.; do., 70%, £22.; do., 60%, £20.; recovered sulphur, 2cwt. bags, £23.; hyposulphite of soda, 5-cwt. casks, £19.; do 1cwt. kegs, £25.; sulphite of soda, 5-cwt. casks, £12.; do., 1cwt. kegs, £20.; silicate of soda, 75° Tw., £9. 12s. 6d.; do 100° Tw., £10.; do., 140° Tw., £10. 10s.; soda crystals, 2cwt. bags, £5.; sulphate of soda (saltcake), in bulk, £3. 10s.; pure white sulphate of alumina, 14-15%, £19. 10s.; blanc fixe, £22.; chloride of barium, £27.; sulphide of sodium, crystals, £18.; do., refined concentrated solid, 60-62%, £25.; hydrate of barium, crystals, £56.

COALS.—Most of the collieries in Durham and Northumberland have been on holiday owing to the peace celebrations, and the coal trade has also been affected by the local railway strikes by reason of the shortage of empty wagons, and a great quantity of tonnage is now awaiting cargoes. Quotations remain very firm. Allies quotations:—Best steam coals, 70s.; best steam small, 45s.; seconds steam coals, 65s. Coke continues in heavy request, and quotations are very firm.

WEST OF SCOTLAND CHEMICALS.**GLASGOW, Wednesday.**

This is Glasgow trades holiday week, and consequently business in the chemical and all other industries locally may be said to be more or less at a standstill. All works are closed down (except in cases of extreme urgency) for the full week, and it will be well into the coming week before business gets back to its normal again. In the circumstances prices for heavy chemicals are scarcely quotable, but the range as given in last issue may, generally speaking, be said still to hold good.

In the sea oil section there is the same holiday inactivity. When the market opens out again next week, however, white oils should still be round about their old figures (80s. for brown and 78s. for black), with Newfoundland cod keeping near to the old quotation of 75s.

Conditions in the coal trade are unchanged, but, of course, the cessation of work industrially in Glasgow and district has materially affected the demand. Export conditions continue quiet.

IMPORTS OF CHEMICAL PRODUCTS**AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.****BRISTOL.**

Publication of Official Returns
Suspended.

GLASGOW.

Week ending July 18.

ALUMINA SULPHATE—
Philadelphia, 56 brls.

BARYTES—

New York, 143 brls.; Philadelphia, 524 brls.

BONE PITCH—

New York, 66 tes.

BORATE (otherwise undescribed)—
New York, 5,328 sks.

CAUSTIC POTASH—

New York, 1 drm.

DEXTRINE—

New York, 1,110 bgs.

OCHRE—

Bombay, 53 cks.; Philadelphia, 303 brls.

SOAP—

New York, 728 brls.; Philadelphia, 500 brls.

TARTARIC ACID—

Bombay, 28 cks.

WAX—

New York, 2,847 brls.

WHITE LEAD—

New York, 118 brls.; Philadelphia, 50 brls.

GRANGEMOUTH.

Week ending July 18.

NIL.

GOOLE.

Week ending July 18.

DECOLOURISING CARBON—
Rotterdam, 21 bgs.

GRIMSBY.

Week ending July 18.

NIL.

HULL.

Week ending July 18.

ACETIC ACID—
New York, 404 brls.

BORACIC ACID—

New York, 1,300 kgs., 854 sks.

LITHOPONE—

New York, 250 brls.

MINERAL WHITE—

Stockholm, 100 bgs.

OCHRE—

Stockholm, 70 cks.

POTASH—

New York, 250 cs.

TALLOW—

New York, 88 cks.

TAR—

Stockholm, 100 brls.

WHITE LEAD—

New York, 88 cks.

ZINC ASH—

Stockholm, 36 brls., 500 cks.

LEITH.

Week ending July 18.

OXALIC ACID—
Rotterdam, 1 t., £130.

LIVERPOOL.

Week ending July 18.

ACETIC ACID—

Havre, 1 cs.

AMMONIA—

Havre, 9 cs.

BARYTES—

New York, 100 brls.

BONE ASH—

Paysandu, 672 t.

CARBON BLACK—

New York, 340 cs.

CARNAUBA WAX—

New Orleans, 151 bgs.

CHEMICALS (otherwise undescribed)

Havre, 41 cs.

CITRATE OF LIME—

Demerara, 16 bgs.

COAL PRODUCTS (otherwise undescribed)

Philadelphia, 13 pkgs.

COPPER RESIDUE—

Bordeaux, 372 cks.

DEXTRINE—

New York, 1,305 bgs.; Philadelphia, 430 pkgs., 1,273 bgs.

DYESTUFFS—

Aniline Colours
Philadelphia, 11 pkgs.

Chestnut Extract
Philadelphia, 129 brls.

DYESTUFFS—

Dyewood Extract
Buenos Ayres, 1,000 bgs.,
1,004 cs.

Logwood Extract

Kingston, 1 cs.

Quebracho Extract

Buenos Ayres, 79,976 bgs.

Tanning Extract

Philadelphia, 3,811 brls.

Vegetable

New York, 14 crts.

FERRO URANIUM—

New York, 1 bx.

GLUE (LIQUID)—

New York, 58 pkgs.

LITHOPONE—

Philadelphia, 125 brls.; Rotterdam, 380 cks.

MERCURY—

Havre, 2 cs.

OCHRE—

Rouen, 35 cks.

PARAFFIN WAX—

New York, 240 brls.; Philadelphia, 208 brls., 883 brls.

PHENOLPHTHALEIN—

New York, 4 cs.

POTASH—

Montreal, 4 brls.

ROSIN—

Bordeaux, 120 cks.

SOAP—

Boston, 500 brls.; Havre, 12 cs. (pt.); Montreal, 11 brls.; New York, 1,100 brls.

TALLOW—

Boston, 600 pkgs., 1,000 brls.; B. Ayres, 1,212 tes., 2,670 cks.

TALLOW—
Montreal, 100 tes.

TALLOW OIL—
Boston, 46 tes.; Philadelphia, 25 brls., 75 tes.

TAR (PURE)—
Philadelphia, 100 brls.

TARTAR EMETIC—
New York, 3 cks.

TURPENTINE—
Boston, 100 brls.; Havre, 1 cs.

ULTRAMARINE BLUE—
Havre, 25 cs.

WAX—
Havre, 11 cs. (pt.), New York, 349 bxs.

LONDON.

Week ending July 18.

ACETIC ACID—
U.S.A., 28 pkgs.

AMMONIUM BROMIDE—
U.S.A., 5 cs.

BARYTES—
Spain, 1,800 bgs.; U.S.A., 185 cks.

BEES WAX—
Morocco, 10 bgs.; Pt. E. Africa, 491 bcks.

CAMPHOR—
China, 130cs.; Hong Kong, 25 cs.; Japan, 325 cs.

CHEMICALS (otherwise undescribed)
France, 3 cs.; Holland, 2 cs.; Switzerland, 39 cs.

CITRIC ACID—
Italy, 50 pkgs.

COPPER ORE—
Norway, 1 t.

CREAM OF TARTAR—
Italy, 60 pkgs.

DYESTUFFS (otherwise undescribed)
France, 151 pkgs.; Switzerland, 4 pkgs.

DYESTUFFS—
Argols
France, 960 pkgs.; Italy, 495 pkgs.
Chestnut Extract
U.S.A., 150 cks.
Indigo
San Salvador, 6 pkgs.
Myrobalans
Brit. India, 6,640 pkgs.
Saffron
Spain, 2 pkgs.
Shumac
Italy, 900 pkgs.
Tartar Extract
France, 263 bgs.
Tartars
Italy, 70 bgs.
Valonia
A. Turkey, 623 bgs., 53 t.
Wattle Bark
Natal, 70 t.

FISH OIL—
B.W.I., 43 cks.

GELATINE—
Belgium, £176.; Holland, £566.; U.S.A., £415.

GLUE—
Belgium, £250.; Italy, £810.; France, £2,106.; U.S.A., £3,000.

IRON OXIDE—
Spain, 46 brls.

LITHOPONE—
U.S.A., 250 cks., 602 brls.

OCHRE—
France, 65 cks.

PARAFFIN SCALE—
U.S.A., 194 t.

PLUMBAGO—
Italy, 500 bgs.; U.S.A., 78 brls.

POTASSIUM CARBONATE—
U.S.A., 265 pkgs.

POTASSIUM IODIDE—
Japan, 40 cs.

QUININE—
Straits, 2,080 oza.

ROSIN—
Brit. India, 98 cks.; France, 14 brls., 400 cks.

SOAP—
Belgium, £540.; Italy, £500.; U.S.A., £3,070.

SODA—
U.S.A., 33 t. 19 c.

SPERMACEETI WAX—
U.S.A., 100 cs.

STEARINE—
Queensland, 634 bgs.

TALLOW—
N.S.W., 851 t. 10 c.; N.Z., 103 t. 10 c.; Queensland, 135 t.; Victoria, 162 t. 16 c.

TANNIC ACID—
Canada, 22 pkgs., 20 brls.

TAR—
Sweden, 358 brls.; U.S.A., 300 brls.

TARTARIC ACID—
Italy, 12 pkgs.

THEOBROMINE—
Holland, £280.

WOOD OIL—
China, £648.

ZINC OXIDE—
Holland, 30 cks.; Japan, 30 cs.

DYESTUFFS—
Myrobalans
Calcutta, 5,129 pkts.

PARAFFIN SCALE—
Baltimore, 700 brls.

PARAFFIN WAX—
Baltimore, 87 bxs.

ROSIN—
Pasages, 1,134 brls.

SODA CRYSTALS—
Baltimore, 50 cks.

MIDDLESBROUGH.

Week ending July 18.

NIL.

NEWCASTLE-ON-TYNE

Week ending July 18.

TAR—
Gothenburg, 100 brls.

ZINC OXIDE—
Rotterdam, 165 cks.

N. & S. SHIELDS.

Week ending July 18.

NIL.

STOCKTON-ON-TEES.

Week ending July 18.

NIL.

SWANSEA.

Week ending July 18.

ZINC CONCENTRATES—
Melbourne, 1,989 t.

MANCHESTER.

Week ending July 18.

BARYTES—
Baltimore, 381 brls.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

BRISTOL.

Publication of Official Returns Suspended.

GLASGOW.

Week ending July 18.

AMMONIA (ANHYDROUS)—
Busreh, 1 t. 5 c.

AMMONIUM MURIATE—
Genoa, 10 t.

CHEMICALS (otherwise undescribed)
Genoa, 2 t. 9 c.; Fremantle, 16 t. 16 c.; Hankow, 5 t.; Singapore, 5 t.

COAL PRODUCTS (otherwise undes.)
Rangoon, £536.

DEXTRENE—
Marseilles, 2 t. 7 c.

DISINFECTANTS (otherwise undes.)
Singapore, 700 gals.

DYESTUFFS (otherwise undescribed)
Busreh, 10 c.

MAGNESIUM SULPHATE—
Busreh, 10 c.

PARAFFIN—
Marseilles, 96 t. 8 c.

PARAFFIN WAX—
Genoa, 4 t. 18 c.; Marseilles, 24 t. 18 c.

PLUMBAGO—
Rangoon, 1 t. 5 c.

RED LEAD—
Rangoon, a qt.

ROSIN—
Rangoon, 18 c.

SALAMMONIAC—
Busreh, 3 t.

SOAP—
Busreh, 2,405 bxs.; Rangoon, 65 bxs.; Penang, 50 bxs.

SODIUM BICARBONATE—
Busreh, 1 t.

SODIUM BICHRIMATE—
Genoa, 9 t. 17 c.; Hankow, 2 t. 4 c.

TALLOW—
Ahwaz, 5 c.

TAR (VEGETABLE)—
Rangoon, £35.

TURPENTINE—
Busreh, 9 c.

WHITE LEAD—
Rangoon, 12 c.

GOOLE.

Week ending July 18.

NIL.

GRANGEMOUTH.

Week ending July 18.

NIL.

GRIMSBY.

Week ending July 18.

NIL.

HULL.

Week ending July 18.

BLEACHING POWDER—
Bilbao, 50 brls.

CHEMICALS (otherwise undescribed)
Amsterdam, 1 drn., 61 cs., 40 bgs.; Antwerp, 16 kgs.; Bilbao, 40 cks., 20 brls.; Belgian Congo, 103 drms., 2 brls., 107 cs., 3 bgs.; Bergen, 30 cks., 1 bx., 1 cs.; Christiania, 40 kgs., 1 pkg.; Cadiz, 6 cs., 20 bgs.; Fiume, 8 kgs.; Genoa, 50 t., 83 cks., 402 bgs.; Lisbon, 10 brls., 1 cs.; Oporto, 10 cs.; Rotterdam, 17 cks., 30 bgs.

CHEMICALS (otherwise undescribed)
Trondhjem, 1 ck.; Venice, 1 cs., 31 cks.

COAL PRODUCTS—
Tar
Amsterdam, 5 cks.; Belgian Congo, 16 brls.; Stockholm, 250 brls.

DISINFECTANTS (otherwise undes.)
Antwerp, 168 cs.; Belgian Congo 22 cs., 12 drms.; Genoa, 166 cks.; Lisbon, 2,500 drms.

GLUE—
Belgian Congo, 11 tins; Trondhjem, 5 cs.

PARAFFIN WAX—
Naples, 175 bgs.

SALT—
Belgian Congo, 675 brls., 4,305 bgs., 259 cs.; Christiansund, 10 cks.; Seville, 500 bgs.

SOAP—
Antwerp, 40 bxs., 16 brls., 190 kgs., 1,290 cs.; Belgian Congo, 140 bxs., 8 brls., 2,472 cs.; Copenhagen, 120 bxs., 349 brls., 200 cs.; Genoa, 1,000 cs.; Leghorn, 2,566 cs.; Stockholm, 100 kgs., 83 cs.; Trieste, 10 brls.

SODA—
Belgian Congo, 24 cs., 2 bgs.

WAX—
Antwerp, 2 cs.

WOOD PRESERVATIVE—
Belgian Congo, 100 drms.

LEITH.

Week ending July 18.

COAL PRODUCTS—
Cresylic Acid
Gothenburg, 9 t. 8 c., £340.

POTASSIUM BICHRIMATE—
Ghent, 8 c., £64.

LIVERPOOL

Week ending July 17.

ACETIC ACID—
Genoa, 2 t. 8 c., £290.; Melilla, 1 t. 4 c., £110.; Buenos Ayres, 4 t. 19 c., £521.; Tammnenfors, 1 t., £112.

ALUM—
Bangkok, 5 c., £6.; Bombay, 1 t. 4 c., £110.; Buenos Ayres, 7 t. 5 c., £135.; Cape Town, 2 t. 10 c., £47.; Calcutta, 7 t. 1 c., £102.; Galatz, 2 t., £44.; Maranhham, 1 c., £12.; Piraeus, 2 t. 2 c., £49.; Salonika, 1 t. 19 c., £40.

ALUMINA HYDRATE—
Oporto, 4 c., £10.

ALUMINA SULPHATE—
Barcelona, 10 c., £12.; Singapore, 1 t. 2 c., £19.

ALUMINA SULPHIDE—
Calcutta, 75 t., £600.

ALUMINO-FERRIC—
Bandjermassin, 13 c., £8.

AMMONIA—
Natal, 1 c., £4.

AMMONIA CARBONATE—
Adelaide, 5 c., £19.; Buenos Ayres, 2 t., £135.; Bilbao, 1 t., £66.; Lyttleton, 2 t. 4 c., £155.; Maranhham, 3 c., £22.; Piraeus, 2 t., £142.

AMMONIUM CHLORIDE—
Alexandria, 2 c., £12.

AMMONIUM MURIATE—
Baltimore, 22 t. 7 c., £1,431.; Genoa, 14 t., £744.; Gothenburg, 1 t., £58.; Kobe, 5 t., £235.; Marseilles, 10 c., £23.; Shanghai, 10 c., £32.; Yokahama, 5 t., £250.

AMMONIUM SULPHATE—
Malaga, 200 bgs.; Mauritius, 200 t.; Santa Cruz, 10 pkgs.

- ARSENIC**—
Genoa, 1 t., £90.
- BARIIUM CHLORIDE**—
Calcutta, 12 c., £21.
- BLEACHING POWDER**—
Bombay, 19 t. 15 c., £493.;
Calcutta, 25 t. 1 c., £338.;
Delagoa Bay, 10 t., £200.;
Kobe, 1 t. 7 c., £282.; Lisbon,
29 t. 7 c., £454.
- BORAX**—
Antwerp, 20 t., £790.; Barcelona,
13 t. 19 c., £554.; Dunkirk,
10 t., £400.; Galatz, 2 t. 2 c.,
£34.; Gothenburg, 2 t., £85.;
Kilindini, 1 c., £2.; Mombasa,
1 c., £2.; Oporto, 6 t., £254.;
Osaka, 30 t., £1,172.; St. John's,
N.F., 7 c., £40.; Tarragona,
10 t., £390.
- BORIC ACID**—
Alexandria, 2 c., £8.; Mauritius,
1 c., £6.
- CALCIUM CARBIDE**—
Kilindini, 3 t., £90.; Maranham,
1 t. 2 c., £30.; Perim, 12 c., £18.
- CALCIUM CARBONATE**—
Barcelona, 1 t. 19 c., £71.
- CALCIUM CHLORATE**—
Barcelona, 40 drms.; Lisbon,
25 drms.; Sydney, 38 drms.
- CALCIUM CHLORIDE**—
Bombay, 30 t., £225.; Buenos
Ayres, 5 t. 5 c., £36.; Brisbane
15 t. 2 c., £115.; Calcutta, 16 t.
2 c., £111.; Genoa, 50 t., £154.;
Leghorn, 20 t. 3 c., £139.; Lis-
bon, 7 t., £63.; Marseilles, 3 t.
19 c., £30.; Naples, 10 t., £95.;
Sydney, 22 t. 15 c., £167.
- CANDELLA WAX**—
Piraeus, 16 bgs.
- CARBIDE**—
Lagos, 1 c., £7.
- CAUSTIC SODA**—
Alexandria, 211 drms.; Bombay,
195 drms.; Brisbane, 28 pgs.;
Cape Town, 50 pgs.; Chris-
tiania, 120 drms.; Curityba,
50 pgs.; Fremantle, 20 pgs.;
Hobart, 11 pgs.; Hong Kong,
200 drms.; Porto Alegre, 950
drms.; Rio de Janeiro, 1 cs.;
Rouen, 70 drms.; Saigon, 100
pgs.; Santos, 125 pgs.; Yoka-
hama, 150 drms.
- CHEMICALS (otherwise undescribed)**
Genoa, 6 t., £565.; Piraeus,
6 c., £53.
- CHINA CLAY**—
Bombay, 220 t.; Valencia, 10 t.
- CITRIC ACID**—
Helsingfors, 2 c., £56.
- COAL PRODUCTS**—
Carbolic Acid
Amsterdam, 1 t., £15.; Antwerp,
3 c., £20.; Genoa, 7 t. 11 c.,
£376.; Mauritius, 5 c., £9.;
Montreal, 1 t. 1 c., £44.; Sydney,
5 c., £12.; Yokohama, 10 t.
1 c., £563.
- Creosote
Beira, 4 t. 16 c., £39.; Lisbon,
89 t. 2 c., £850.; Zanzibar, 1 t.,
£9.
- Creosote Oil
Oporto, 20 t. 3 c., £170.
- Cresylic Acid
Hong Kong, 9 c., £16.
- Dyes
Barcelona, 3 c., £108.; Bombay,
2 t. 12 c., £1,516.; Boston, 1 t.,
£420.; Halifax, 7 t. 17 c., £3,468.;
Havre, 5 t. 13 c., £2,956.; New
York, 5 c., £132.; Shanghai,
4 c., £225.
- Naphthalene
Aden, 20 t., £460.; Buenos
Ayres, 12 c., £14.; Burutu, 4 c.,
£10.; Kilindini, 5 t. 2 c., £150.;
Lagos, 5 c., £8.; Shanghai, 13 t.
7 c., £182.
- Tar
Alexandria, 8 c., £4.; Accra,
4 t., £32.; Burutu, 4 c., £2.;
Cape Coast, 4 c., £2.; Cartagena,
1 t. 6 c., £20.; Conakry, 2 t. 2 c.,
£17.; Lagos, 1 t. 14 c., £20.;
Maranham, 4 c., £2.; Pt. Said,
5 c., £7.; Pt. Swettenham,
110 t. 10 c., £1,024.; Zanzibar,
1 t. 3 c., £6.
- COPPER SULPHATE**—
Beira, 2 t., £120.
- CREAM OF TARTAR**—
Faroe Isles, 2 c., £8.; Seville,
6 c., £195.
- DISINFECTANTS (otherwise undes.)**
Accra, 17 c., £45.; Adelaide,
8 t. 6 c., £236.; Bombay, 3 t.,
£44.; Brisbane, 1 t. 18 c., £754.;
Bangkok, 2 t. 10 c., £83.; Beira,
2 c., £10.; Belawan, 3 t. 12 c.,
£65.; Cape Coast, 8 c., £27.;
Calcutta, 1 t. 1 c., £42.; Calabar,
15 c., £5.; Ceara, 1 c., £3.;
Chemulpo, 14 t. 13 c., £655.;
Cape Palmas, 1 c., £2.; Colombo,
11 c., £15.; Delagoa Bay, 13 t.
15 c., £669.; Dunedin, 1 t. 12 c.,
£77.; Freetown, 8 c., £23.; Pt.
Harcourt, 2 c., £3.; Rangoon,
1 t. 10 c., £41.; Singapore,
5 t. 11 c., £268.; Shanghai, 1 t.
4 c., £28.; Soerabaya, 1 t. 18 c.,
£112.; Secondee, 6 c., £16.;
Winnebah, 3 c., £9.; Valparaiso,
2 c., £6.; Zanzibar, 18 c., £23.
- DYESTUFFS (otherwise undescribed)**
Barcelona, 1 t. 14 c., £179.;
Helsingfors, 8 c., £116.
- DYESTUFFS**—
Aniline Dye
Alexandria, 3 t. 10 c., £424.;
Barcelona, 1 t. 15 c., £413.;
Bilbao, 4 c., £28.; Bombay,
4 t. 1 c., £1,473.; Boston, 14 c.,
£1,120.; Buenos Ayres, 17 c.,
£680.; Calcutta, 18 c., £596.;
Kobe, 14 c., £398.; Montreal,
17 c., £381.; Saigon, 1 t. 15 c.,
£280.; New York, 1 c., £35.;
Piraeus, 10 c., £65.; Rouen,
10 c., £210.; Shanghai, 1 t. £182.
- FORMIC ACID**—
Genoa, 5 t., £699.
- GLUE**—
East London, 10 pgs.; Manila,
2 pgs.; Tokio, 50 bgs.
- GLUE, SIZE, AND GELATINE**—
Alexandria, 27 pgs.; Antwerp,
27 pgs.; Bangkok, 15 pgs.;
Galatz, 100 pgs.; Lisbon, 1
pkg.; Shanghai, 200 bgs.; Singa-
pore, 10 pgs.; Sydney, 142 pgs.
- GLYCERINE**—
Algoa Bay, 5 drms.
- HYDROFLUORIC ACID**—
Rangoon, 1 c., £5.
- LEAD ACETATE**—
Genoa, 3 t., £316.
- MAGNESIUM CHLORIDE**—
Bombay, 18 t. 6 c., £279.; Hong
Kong, 1 t. 6 c., £27.; Lisbon,
5 t., £77.; Majunga, 5 c., £5.
- MANGANESE ORE**—
Rouen, 45 bgs.
- MURIATIC ACID**—
Buenos Ayres, 1 t., £79.
- OXALIC ACID**—
Genoa, 8 t. 7 c., £1,124.
- PHOSPHORIC ACID**—
Zaragoza, 1 c., £10.
- PHOSPHORUS**—
Galatz, 2 t. 19 c., £770.; Kobe,
4 t. 10 c., £959.
- PITCH**—
Genoa, 2 t., £20.; Lagos, 12 c.,
£5.; Sierra Leone, 1 t. 19 c., £39.
- POTASSIUM BICHROMATE**—
Galatz, 4 t. 18 c., £850.; Hel-
singfors, 1 t. 4 c., £276.; Havre,
3 c., £40.; Piraeus, 4 c., £36.
- POTASSIUM CHLORATE**—
Barcelona, 5 t., £467.; Lisbon,
1 t. 19 c., £307.; Piraeus, 3 c.,
£16.; Vigo, 2 t., £237.
- POTASSIUM NITRATE**—
Cartagena, 1 c., £5.
- POTASSIUM PRUSSATE**—
Pernambuco, 1 c., £24.
- POTASSIUM SILICATE**—
Bilbao, 1 t., £60.
- POTASSIUM SULPHATE**—
Orotava, 15 t., £615.
- SALAMMONIAC**—
Buenos Ayres, 2 c., £8.; Bombay
11 t. 5 c., £735.; Coruna, 7 c.,
£30.; Calcutta, 2 t. 7 c., £165.;
- SALAMMONIAC**—
Cartagena, 1 c., £3.; Copen-
hagen, 6 c., £25.; Genoa, 4 t.
1 c., £288.; Kilindini, 2 c., £7.;
Natal, 1 c., £4.; Piraeus, 1 t.,
£90.; Rouen, 3 t. 10 c., £243.;
Salonika, 2 t. 2 c., £155.
- SALT**—
Kingston, 7 t.; Livingston, 10 t.;
Sydney, 1 t.
- SALTCAKE**—
Santos, 44 pgs.
- SALTPETRE**—
Alicante, 10 c., £29.; Coruna,
1 t. 13 c., £97.; Kilindini, 3 c.,
£11.; Maranham, 10 c., £32.;
Oporto, 1 t., £76.; Vigo, 1 t.
3 c., £66.
- SHEEP DIP**—
Buenos Ayres, 65 t. 2 c., £2,067.;
Buenaventura, 14 c., £56.; Beira,
4 t. 8 c., £254.; Cape Town, 11 c.,
£31.; Delagoa Bay, 9 t. 8 c.,
£350.; La Guaira, 2 t. 9 c., £211.;
Monte Video, 17 t. 18 c., £1,500.;
Mombasa, 6 t. 9 c., £262.; Natal,
14 t. 2 c., £525.; Pto. Cabello,
3 t. 4 c., £263.; Pto. Barrios,
3 t., £278.
- SOAP**—
Accra, 62 bxs.; Adjuah, 25
bxs.; Algoa Bay, 97 bxs.;
Antwerp, 195 bxs., 13,826 cs.,
434 brls.; Auckland, 25 bxs.;
Bangkok, 100 bxs.; Belawan,
430 bxs.; Bombay, 22 bxs.;
Calcutta, 572 bxs.; Cape Coast,
50 bxs.; Cape Town, 100 bxs.;
Casablanca, 4 bxs.; Chama,
125 bxs.; Christiania, 3 cs.;
Cochin, 500 brls.; Copenhagen,
4 cs.; Dar-es-Salaam, 5 cs.;
Dixcove, 50 bxs.; Durban,
250 cs.; Gothenburg, 72 cks.;
Havana, 1 cs.; Hereveen, 8 cs.;
Hong Kong, 30 cs.; Kuala
Lumpur, 160 cs.; Maranham,
1 bx.; Menado, 200 bxs.; Mont-
real, 3 bxs.; Oran, 1,405 pgs.;
Paramaribo, 385 pgs.; Penang,
510 bxs.; Pt. Sudan, 350 pgs.;
Rangoon, 34 bxs.; St. Louis,
45 bxs.; Rio de Janeiro, 10
bgs.; Rouen, 80 bxs.; Secondee
100 bxs.; Saigon, 6 cs.; Singa-
pore, 202 bxs.; Shanghai, 90
pgs.; 10,607 bxs.; Soerabaya,
10 pgs.; Sierra Leone, 139 cs.;
Tientsin, 1 cs.; Trinidad, 50 bxs.;
Tulak Anson, 22 cs.
- SODA ASH**—
Antwerp, 50 pgs.; Bahia,
20 cks.; Dunedin, 286 pgs.;
Copenhagen, 225 bgs.; Calcutta,
837 pgs.; Melilla, 60 pgs.;
Santos, 830 pgs.; Wellington,
119 bgs.; Yokahama, 2,166 pgs.
- SODA CRYSTALS**—
Alexandria, 101 pgs.
- SODIUM BICARBONATE**—
Alexandria, 60 pgs.; Amster-
dam, 80 pgs.; Antwerp, 58
pgs.; Auckland, 120 pgs.;
Cajenne, 5 pgs.; Christiania,
40 pgs.; Dunedin, 134 pgs.;
Kobe, 1,724 pgs.; Lytleton,
34 pgs.; Porto Alegre, 50 pgs.;
Pt. Said, 100 pgs.; Santos,
30 pgs.; Singapore, 20 pgs.;
Sydney, 47 pgs.; Timaru,
20 kgs.; Yokahama, 1,507 pgs.
- SODIUM CYANIDE**—
Melbourne, 16 pgs.
- SODIUM SILICATE**—
Alexandria, 48 pgs.; Barbary,
64 cks.; Christiania, 24 pgs.;
Launceston, 45 pgs.
- SULPHUR**—
Bathurst, 1 c., £3.; Cape Coast,
1 c., £2.; Cartagena, 2 c., £12.;
Lisbon, 1 t. 2 c., £54.; Maran-
ham, 4 c., £22.
- SULPHURIC ACID**—
Alexandria, 16 c., £15.
- TALLOW**—
Antwerp, 24 t., 43 cks.; Havre,
75 cks.
- TANNIC ACID**—
Barcelona, 8 c., £174.
- TARTARIC ACID**—
Karachi, 5 c., £84.
- WOOD PRESERVATIVE**—
Colon, 3 c., £9.; Kilindini, 14 c.,
£19.; Penang, 8 c., £10.
- WOOD TAR**—
Singapore, 20 brls
- ZINC CHLORIDE**—
Melbourne, 1 t. 2 c., £95.; Oporto,
5 t. 7 c., £332.
- ZINC SULPHATE**—
Piraeus, 1 t., £35.; Sydney, 1 t.
10 c., £52.; Tammefors, 4 c., £9.

LONDON.

Week ending July 16.

- ACETIC ACID**—
Antwerp, 8 cks., £55.; Constan-
tinople, 4 cs., £55.; Durban,
2 cks., £10.; Napier, 3 cs., £10.;
New York, 10 cs., £28.; Porto
Alegre, 4 cs., £18.
- ACETIC ANHYDRIDE**—
Amsterdam, 2 orbys., £42.
- ACETO SALICYLIC ACID**—
Bilbao (F.), 1 cs., £15.; Cal-
cutta, 5 cs. (pt.), £8.; Christ-
church, 1 cs., £6.; Durban,
1 cs. (pt.), £23.; Hobart, 2 cs.
(pt.), £7.; Melbourne, 1 cs., £11.
- ACETONE**—
Christchurch (F.), 1 cs., £6.
- ALUM**—
Constantinople, 6 c., £25.; Las
Palmas, 8c., £10.; Paris, 2 t.
9 c., £55.
- ALUM ACETATE**—
Cape Town, 1 cs., £7.
- ALUM CHROME**—
Rangoon, 1 kg., £9.
- AMMONIA**—
Buenos Ayres, 69 cs., £212.;
Canton, 3 cs., £12.; Dares
Salaam, 1 cs., £6.; Durban,
8 pgs., £19.; East London,
9 cs., £21.; Madras, 5 cs., £25.;
Orleans, 2 drs., £16.; Paris, 13
drms., £152.; Secondee, 16 cs.,
£32.
- AMMONIUM ACETATE**—
Calcutta, 2 cs., £22
- AMMONIUM BIFLUORIDE**—
Barcelona, 1 ck., £30.
- AMMONIUM CARBONATE**—
Autofagasta, 3 c., £16.; Athens,
2 c., £11.; Bombay, 1 t., £82.;
Constantinople, 12 c., £66.;
Durban, 2 c., £6.; Gothenburg,
2 t. 10 c., £161.; Padang, 8 c.,
£40.; Penang, 2 c., £11.; Pt.
Swettenham, 3 c., £8.; Rio de
Janeiro, 1 t., £81.; Salonika,
2 c., £11.; Singapore, 6 c., £35.;
Samarang, 1 t., £112.; Telok
Semawei, 10 c., £42.
- AMMONIUM CHLORIDE**—
Constantinople, 1 ck., £12.;
Penang, 1 ck., £7.; Samarang,
1 kg., £6.
- AMMONIUM CITRATE**—
Calcutta, 2 cs., £30.
- AMMONIUM MURIATE**—
Bombay, 3 t., £217.; Talca-
huano, 5 c., £29.; Valencia,
3 c., £12.
- AMMONIUM PHOSPHATE**—
Barcelona, 14 cks., £235.;
Piraeus, 5 kgs., £82.
- AMYL ACETATE**—
Soerabaya, 1 drms., £14.
- ANTIMONY (BLACK)**—
Montreal, 1 ck., £6.
- ANTIMONY REGULUS**—
Madras, 8 c.
- ANTIMONY SULPHIDE**—
Antwerp, 4 cks., £152.; Buenos
Ayres, 3 cks., £20.; Dunkirk,
14 cks., £238.; Melbourne, 2 cks.,
£109.
- ANTIMONY TARTRATE**—
Brussels, 1 cs. (pt.), £5.; Gothen-
burg, 9 kgs., £163.
- ARSENIC**—
Buenos Ayres, 2 c., £9.; Karachi,
2 t., £73.; Valencia, 10 c., £18.
- BARBITONE**—
Soerabaya, 1 cs. (pt.), £12.

BARIUM CHLORIDE—
Barcelona, 5 cks., £30.

BARIUM NITRATE—
Antwerp, 5 cks., £60.; Barcelona 2 cks., £22.

BENZOIC ACID—
Christchurch, 1 cs. (pt.), £7.;
Rangoon, 1 cs. (pt.), £7.; Rio de Janeiro, 1 cs., £6.

BISMUTH AND AMMONIUM CITRATE—
Calcutta, 2 cs., £20.

BISMUTH CARBONATE—
Durban, 1 cs. (pt.), £43.; Hobart, 2 cs. (pt.), £6.

BISMUTH SUBNITRATE—
Batavia, 1 cs. (pt.), £8.; Durban, 1 cs. (pt.), £39.; Rio de Janeiro, 1 cs. (pt.), £31.

BISULPHATE OF LIME—
Dunedin, 14 cks., £17.

BITUMEN—
Dunedin, 2 cs., £7.

BORAX—
Antwerp, 1 t. 5 c., £52.; Buenos Ayres, 9 t. 17 c., £413.; Callao, 5 c., £13.; Cologne, 1 t. 3 c., £52.; Delagoa Bay, 2 c., £9.; Demerara, 1 c., £6.; Durban, 11 c., £37.; Paris, 16 t., £718.; Rio de Janeiro, 2 c., £7.; Rio Grande do Sol, 2 c., £6.; Rotterdam, 176 t. 15 c., £7,007.; Soerabaya, 6 c., £13.

BORIC ACID—
Antwerp, 15 t. (F.), £1,100.; Athens, 17 c. (F.), £60.; Bombay, 2 c., £13.; Calcutta, 10 c., £45.; Cape Town, 11 c., £44.; Canton, 6 c., £34.; Constantinople, 4 c., £22.; Iquique, 1 c., £6.; Karachi, 3 c., £13.; Pt. Elizabeth, 2 c., £8.; Pt. Sudan, 2 c., £16.; Rotterdam, 4 t. 7 c., £348.; Rotterdam, 10 t. (F.), £740.; Samarang, 1 c., £6.

CALCIUM CARBIDE—
Channel Islands, 2 t. 2 c., £76.; Lagos, 4 cs., £9.

CALCIUM CHLORIDE—
Piraeus, 8 c., £13.

CALCIUM GLYCEROPHOSPHATE—
Brussels (F.), 1 cs., £10.; Melbourne, 1 cs. (pt.), £13.; Soerabaya, 1 cs. (pt.), £16.

CALCIUM LACTATE—
Antwerp, 5 cks., £84.; Durban, 1 cs. (pt.), £6.

CALCIUM PERMANGANATE—
Calcutta, 1 ck. (pt.), £6.

CAMPHOR—
Gothenburg, £1,150.

CARBON (RETORT)—
Boulogne, 100 t., £500.

CAUSTIC SODA—
Rangoon, 1 c., £6.; Smyrna, 60 t. 2 c., £1,260.

CERESINE WAX—
Bordeaux, 10 c.; Goth'burg, 4 c.

CHEMICALS (otherwise undescribed)—
Antwerp, 6 cks., £45.; Auckland, 6 cs., £14.; Bangkok, 4 cs., £54.; Beira, 3 cs., £7.; Bombay, 1 cs., £7.; Buenos Ayres, 1 cs. (pt.), £18.; Calcutta, 5 cs., £72.; Dunedin, 4 cs., £19.; Durban, 26 cs. (pt.), £839.; Hobart, 1 cs. (pt.), (F.), £21.; Hobart, 6 cs. (pt.), £79.; Hong Kong, 7 pkgs., £59.; Jamaica, 8 pkgs. (pt.), £10.; Montreal, 8 cs., £218.; Madras, 2 cs., £11.; Malacca, 2 cs., £27.; Melbourne, 2 cs., £19.; Napier, 1 cs., £7.; Ottago, 7 pkgs., £27.; Pt. Swettenham, 6 cs., £92.; Pt. Sudan, 2 cs., £25.; Singapore, 1 cs., £14.

CHLORAL HYDRATE—
Auckland (F.), 1 cs. (pt.), £6.; Leghorn (F.), 1 cs., £25.

CITRIC ACID—
Bombay, 1 cs. (F.), £7.; Colombo 1 c., £25.; Constantinople, 2 c., £65.; Durban, 3 c., £85.; Georgetown, 1 cs. (pt.), £6.; Kilindini, 1 c., £14.; New York, 5 t., £2,300.; Rio de Janeiro, 5 c., £159.; Rotterdam, 9 c., £169.; Rotterdam, 5 c. (F.), £119.; Zanzibar, 1 c., £26.

COAL PRODUCTS—

Alizarine
Barcelona, 17 pkgs., £324.; Bombay, 100 cks., £3,182.; Madras, 100 cks., £3,182.

Aniline Dye
Barcelona, 12 pkgs., £279.; Bordeaux, 1 cs., £24.; Cape Town, 1 cs., £6.; Durban, 1 cs., £37.; Launceston, 1 kg., £21.; Ostend, 2 drms., £39.; Rio de Janeiro, 1 cs. (pt.), £17.; Saffi, 1 ck., £20.

Benzol
Copenhagen, 46 drms., £414.

Benzonaphthol
Batoum, 1 cs. (pt.), £20.; Corral, 1 ck., £77.; Porto Allegro, 1 cs. (pt.), £23.; Rio de Janeiro, 2 cs. (pt.), £18.; Rio Grande do Sul, 1 cs. (pt.), £8.

Betanaphthol
Amsterdam (F.), 1 cs., £25.

Carbolic Acid
Beira, 1 ck., £41.; Calcutta, 4 cs., £21.; Kobe, 158 drms., £890.; Singapore, 8 cks., £39.; Sydney, 1 cs., £8.

Cresote
Bordeaux, 20 cks., £82.; Dordrecht, 18,804 gals., £505.; Durban, 10 drms., £9.; Penang, 2 cks., £11.; Rotterdam, 25 cks., £98.; Rouen, 25 cks., £97.

Cresylic Acid
Melbourne, 30 drms., £38.; Sydney, 300 drms., £375.

Mirbane Oil
Auckland, 1 dr., £27.; Lyttleton, 2 drms., £112.

Naphthalene
Bordeaux, 89 pkgs., £256.; Constantinople, 14 cs., £120.; Madras, 6 cs., £27.; Melbourne, 7 cks., £38.; Mombasa, 2 cs., £6.; Napier, 3 cs., £12.; New York, 136 cks., £300.; Paris, 56 cks., £269.

Pitch
Antwerp, 793 t., £2,740.; Brussels, 160 t., £520.

Tar
Durban, 270 drms., £45.; Lagos, 10 rnfts., £19.; Porto Allegro, 20 brls., £38.; Pt. Elizabeth, 63 drms., £9.; Pt. Sudan, 500 drms., £337.

Tar Oil
Buenos Ayres, 250 cks., £449.

COBALT OXIDE—
Melbourne, 1 cs., £48.

COPPER ARSENITE—
Montreal, 1 cs., £14.

COPPER SULPHATE—
Buenos Ayres, 2 t. 2 c., £104.; Constantinople, 8 c., £32.

COPPER SULPHATE & CYANIDE
Barcelona, 3 drms., £96.

CREAM OF TARTAR—
Abo, 6 c., £68.; Bombay, 4 c., £47.; Beira, 1 c. (F.), £10.; Christiania, 10 c., £193.; Cape Town, 1 cs. (pt.), (F.), £8.; Coronel, 1 c. (F.), £13.; Callao, 2 c., £34.; Delagoa Bay, 2 c. (F.), £32.; Durban, 5 c. (F.), £73.; Durban, 3 c., £17.; East London, 1 c. (F.), £12.; Gibraltar, 2 c., £35.; Gothenburg, 10 c. (F.), £125.; Karachi, 1 cs. (F.), £10.; Punta Arenas, 1 c. (F.), £16.; Rio de Janeiro, 1 c., £35.

DIETHYLBARBITURIC ACID—
Batoum (F.), 1 cs. (pt.), £7.

DISINFECTANTS (otherwise undes.)
Antwerp, 2 t., £264.; Barbados, 4 c., £7.; Bombay, 6 c., £14.; Brussels, 1 t. 11 c., £121.; Brussels, 3 c. (F.), £25.; Callao, 8 c., £17.; Calcutta, 5 t. 15 c., £216.; Cape Town, 2 t. 3 c., £84.; Canton, 7 c., £27.; Christchurch, 1 c., £7.; Christchurch, 1 c. (F.), £20.; Colombo, 8 c., £18.; Constantinople, 1 c., £6.; Dunedin, 2 c., £6.; Durban, 1 t. 2 c., £61.; Hawkes Bay, 9 c., £65.; Iquique, 1 c., £12.; Jamaica, 5 c., £10.; Lagos, 2 t. 13 c., £336.; Lisbon, 1 t. 2 c., £97.; Madras, 1 t. 8 c., £56.; Malta, 3 c., £8.

DISINFECTANTS (otherwise undes.)
Melbourne, 5 c., £56.; Montreal, 4 c., £35.; Napier, 91 c., £111.; Penang, 7 c., £10.; Pt. Sudan, 4 c., £39.; Puerto Barrios, 4 t. 8 c., £286.; Pt. Elizabeth, 12 c., £21.; Pt. Swettenham, 1 t. 1 c., £61.; Rotterdam, 5 t. 7 c., £643.; Rouen, 5 t. 15 c., £110.; Seremban, 1 t., £35.; Soerabaya, 8 t. 3 c., £651.; Suva, 5 c., £8.; Sydney, 1 c., £7.; Trinidad, 1 t. 7 c., £36.; Winnebuh, 1 c., £6.; Wellington, 3 t. 17 c., £376.; Weihaiwei, 5 c., £12.

ETHER—
Callao, 14 cs., £150.; Constantinople, 3 cs. (pt.), £84.; Iquique, 1 cs., £10.

ETHER (ACETIC)—
Porto Alegre, 4 cs., £18.

ETHER (NITRIC)—
Madras, 4 cs., £23.

ETHER (SULPHURIC)—
Constantinople, 1 cs., £60.

ETHYL CHLORIDE—
Cape Town, 1 cs. (pt.), £13.; Christchurch, 1 cs., £12.

FATTY ACIDS—
Dunkirk, 20 t.; Nantes, £3,370.

FULLERS EARTH—
Genoa, 35 t.

GLUE, SIZE, AND GELATINE—
Antofagasta, 1 c.; Calcutta, 11 c.; Gothenburg, 1 t.; Ghent, 16 c.; Madras, 5 t. 1 c.; Rotterdam, 3 c.; Sydney, 1 c.

GLYCERINE—
Athens, 5 c., £36.; Brussels, 5 c., £30.; Bombay, 4 c., £57.; Buenos Ayres, 2 c., £16.; Calcutta, 4 c., £37.; Canton, 4 c., £35.; Callao, 5 c., £36.; Constantinople, 5 c., £36.; Karachi, 1 c., £8.; Madras, 1 c., £7.; Paris, 7 t., £910.; Pt. Swettenham, 1 c., £10.; Pt. Sudan, 3 c., £25.; Rouen, 1 t., £60.; Zanzibar, 2 c., £18.

GYPNUM—
Wellington, 20 cks., £24.

HYDROBROMIC ACID—
Cape Town, 1 cs., £7.

HYDROCHLORIC ACID—
Colombo, 2 c., £5.; Christchurch, 3 c., £18.

HYDROFLUORIC ACID—
Auckland, 2 cs., £6.

HYDROGEN PEROXIDE—
Antwerp, 3 cks., £25.; Calcutta, 3 cs., £17.; Melbourne, 5 cs., £37.; Pt. Said, 1 cs. (pt.), £16.

HYPHOSPHORIC ACID—
Sydney, 1 cs., £12.

IODINE (RESUBLIMED)—
Amsterdam, 2 cs. (pt.), £23.; East London, 1 cs. (pt.), £6.; Rotterdam, 1 cs., £83.

IODIFORM—
Calcutta, 2 cs. (pt.), £17.

IRON AND AMMONIUM CITRATE—
Buenos Ayres, 1 cs., £5.
Calcutta, 1 cs. (pt.), 1 cs., £23.
Toronto, 1 cs., £130.

IRON AND AMMONIUM OXALATE
Montreal, 1 cs., £30.

IRON PERCHLORIDE—
Brussels, 5 cks. (pt.), £12.

LACTIC ACID—
Antwerp, 7 cks., £94.; Auckland (F.), 1 cs. (pt.), £6.; Iquique, 1 cs. (pt.), £50.; Mollendo, 1 cs. (pt.), £10.

LEAD ACETATE—
Buenos Ayres, 6 brls., £111.; Constantinople, 1 kg., £15.; Paris, 8 cks., £160.; Pt. Sudan, 1 dr., £5.

LEAD ARSENATE—
East London, 1 ck., £11.

LEAD NITRATE—
Montreal, 3 kgs., £20.

MAGNESIA (CALCINED)—
Buenos Ayres, 2 cs., £45.; Bombay, 4 cs., £35.; Callao, 1 cs., £10.

MAGNESIA (CALCINED)—
Corral, 1 cs., £23.

MAGNESIUM CARBONATE—
Constantinople, 3 cs., £33.; Karachi, 1 cs., £6.; Sydney, 10 cs., £30.

MAGNESIUM CITRATE—
Durban, 1 cs., £8.

MAGNESIUM PEROXIDE—
Batoum, 1 cs. (pt.), £9.

MAGNESIUM SULPHATE—
Accra, 10 c., £22.; Canton, 15 c., £28.; Delagoa Bay, 4 c., £8.; Durban, 4 c., £9.; Iddo, 3 c., £7.; Karachi, 10 c., £25.; Lagos, 12 c., £27.; Montreal, 1 t., £21.; Pt. Said, 10 c., £24.; Pt. Sudan, 2 t., £44.; Rio Grande do Sol, 2 c., £6.; Sierra Leone, 1 t. 8 c., £63.; Toronto, 2 t. 12 c., £53.; Zanzibar, 4 c., £8.

MANGANESE HYPOPHOSPHATE
Gothenburg, 1 cs., £20.

MANGANESE RESINATE—
Antwerp, 1 ck., £8.

MERCURY CHLORIDE—
Bilbao, 1 cs. (pt.), £16.

MERCURY PERCHLORIDE—
Pt. Sudan, 52 cs. (pt.), £17.; Rangoon, 1 cs. (pt.), £9.; Toronto, 1 cs., £31.

MERCURY SUBCHLORIDE—
Cape Town, 1 cs. (pt.), £24.; Pt. Sudan, 52 cs. (pt.), £8.

METHYL ACETONE—
Boulogne, 1 dr., £20.

METHYL SALICYLATE—
Durban, 1 cs., £9.; Paris, 4 drms., £20.

MURIATIC ACID—
Rio de Janeiro, 3 c., £32.

NICKEL SALTS—
Brussels, 5 cks. (pt.), £16.

NICKEL SULPHATE—
Brussels, 5 cks. (pt.), £16.; Novorossik, 20 t. 1 c., £1,142.

NITRIC ACID—
Auckland, 4 c., £30.; Christchurch, 3 c., £15.; Colombo, 2 c., £6.; Mollendo, 1 c., £6.; Pt. Swettenham, 1 c., £12.; Rio de Janeiro, 3 c., £55.; Secondee, 1 c., £7.

OXALIC ACID—
Constantinople (F.), 1 ck., £72.; Mollendo, 1 kg., £16.; Rangoon, 1 kg., £29.; Rouen, 6 cks., £39.

PARALDEHYDE—
Auckland (F.), 1 cs., £6.; Christchurch (F.), 1 cs., £8.

PHENIC ACID—
Athens, 2 cs. (pt.), £20.

PHOSPHORIC ACID—
Cape Town, 2 cs., £8.; Christchurch, 15 cs., £127.; Durban, 2 cs., £18.; Perth, 4 cs., £36.

PHOSPHORUS—
Blenheim, 2 cs., £25.; Launceston, 5 cs., £66.; Rangoon, 1 cs. (pt.), £13.

PICRIC ACID—
Pt. Sudan, 1 cs., £6.

PITCH—
Antwerp, 8 c.

PLUMBAGO—
Bilbao, 3 t. 5 c.

POTASSIUM ACETATE—
Calcutta, 4 cs. (pt.), £12.; Singapore, 1 cs., £8.

POTASSIUM BICARBONATE—
Launceston, 1 kg., £11.; Wellington, 1 ck., £10.

POTASSIUM BICHROMATE—
Brussels, 1 ck., £15.; Ostend, 1 ck., £80.

POTASSIUM BROMIDE—
Calcutta, 3 cs. (pt.), £33.

POTASSIUM CARBONATE—
Bombay, 1 cs. (pt.), £9.

POTASSIUM CHLORATE—
Brussels, 4 c., £30.; Christchurch 3 c., £34.; Colombo, 1 c., £9.; Montreal (F.), 10 c., £70.; Pt. Elizabeth, 1 cs. (pt.), £6.; Rangoon, 1 cs., £20.

POTASSIUM CITRATE—
Calcutta, 1 cs. (pt.), £16.
Launceston, 1 cs. (pt.), £5.

POTASSIUM CYANIDE—
Bombay, 1 cs., £15.

POTASSIUM HYPOPHOSPHATE—
Brussels, 1 cs., £7.

POTASSIUM IODIDE—
Amsterdam, 2 cs. (pt.), £150.;
Antwerp, 1 cs., £40.; Calcutta,
1 cs. (pt.), £10.; Demerara,
1 cs. (pt.), £39.; Durban, 1 cs.
(pt.), £77.; Launceston, 1 cs.
(pt.), £6.; Melbourne, 1 cs., £10.

POTASSIUM METABISULPHATE
Paris, 4 cks., £88.

POTASSIUM PERMANGANATE—
Pt. Sudan, 52 cs. (pt.), £5.;
Rangoon, 1 cs. (pt.), £18.; Rio
de Janeiro, 1 cs. (pt.), £14.

POTASSIUM PRUSSIAN—
Christchurch, 1 cs., £11.

POTASSIUM SULPHOGUAIA-
B; Ayres, 1 cs. (pt.), £9. **COLATE**

PRUSSIAN BLUE—
Buenos Ayres, 2 cs., £30.; Rio de
Janeiro, 1 cs., £15.

PYROGALLIC ACID—
Cape Town, 1 cs. (pt.), £11.

QUININE—
Calcutta, 3,770 ozs.

SALTCAKE—
Antwerp, 200 t. 3 c., £724.

SALTPETRE—
Brussels, 4 c., £15.; Cape Town,
4 c., £12.; Lytleton, 1 t., £59.;
Lagos, 3 c., £18.; Montreal,
1 t., £68.; Rio de Janeiro, 3 t.
18 c., £235.; Rotterdam, 3 t.,
£165.; Santos, 4 t. 18 c., £294.;
Secondee, 6 c., £21.; Singapore,
5 c., £21.; Valencia, 1 t., £56.

SHEEP DIP—
Buenos Ayres, 116 t., £3,132.;
Mombasa, 2 t. 19 c., £192.

SILVER NITRATE—
Barcelona, 3 cks., £57.

SOAP—
Accra, 1 c.; Antwerp, 247 t. 15 c.;
Beira, 2 c.; Bombay, 1 t. 9 c.;
Boulogne, 4 c.; Brisbane, 17 c.;
Buenos Ayres, 16 c.; Calcutta,
5 c.; Cape Town, 2 c.; Christian-
iania, 7 c.; Colombo, 7 c.;
Constantz, 9 c.; Dieppe, 2 c.;
Durban, 3 c.; Galatz, 17 c.;
Gothenburg, 8 t. 4 c.; Ghent,
1 t. 3 c.; Gibraltar, 3 c.; Kilin-
dini, 1 t.; Karachi, 3 c.; Malmo,
7 c.; Malta, 4 c.; Mazagan,
3 c.; Melbourne, 1 t. 1 c.; Mom-
basa, 2 c.; Montreal, 15 c.;
New York, 16 c.; Otago, 1 c.;
Pt. Elizabeth, 1 c.; Punta
Arenas, 14 c.; Rangoon, 1 c.;
Rotterdam, 36 t. 16 c.; Sekondi,
6 c.; Shanghai, 19 c.; Stavanger
4 c.; Stockholm, 1 t.; Sydney,
1 c.; Treport, 4 c.

SODA ASH—
Rotterdam, 70 t., £561.

SODA CRYSTALS—
Karachi, 1 t. 10 c., £14.; Rouen,
1 t., £10.; Trinidad, 1 t. 1 c., £9.

SODIUM BENZOATE—
Christchurch, 1 cs. (pt.), £5.;
Calais, 1 cs., £6.; Rio de Janeiro,
(F.), 1 ck. (pt.), £15.

SODIUM BICARBONATE—
Barbados, 8 c., £5.; Barcelona,
10 c., £16.; Bombay, 2 c., £6.;
Callao, 2 t. 10 c., £45.; Canton,
1 t. 10 c., £44.; Constantinople,
4 c., £5.; Delagoa Bay, 4 c., £8.;
Durban, 16 c., £20.; Grenada,
1 t., £11.; Montreal, 2 t. 1 c.,
£209.; Nassau, 5 c., £6.; Pt.
Sudan, 5 t., £71.; Sierra Leone,
3 c., £5.; Zanzibar, 1 t., £15.

SODIUM BICHRONATE—
Smyrna, 5 t., £9.

SODIUM BROMIDE—
Christchurch (F.), 1 cs., £9.

SODIUM CARBONATE—
Bombay, 4 c., £9.; Brussels, 1
brl., £11.; Montreal, 1 ck., £16.;
Rangoon, 1 kg., £7.; Secondee,
1 t., £60.

SODIUM HYPOPHOSPHITE—
Buenos Ayres, 2 cs. (pt.), £5.;
Constantinople, 1 t., £26.; Ran-
goon, 1 kg., £6.

SODIUM HYPOSULPHITE—
Samarang, 1 kg., £11.

SODIUM IODIDE—
Amsterdam, 2 cs. (pt.), £21.;
Calcutta, 2 cs. (pt.), £27.

SODIUM METABISULPHATE—
Algiers, 2 t., £150.

SODIUM NITRATE—
Brussels, 1 brl., £12.; Montreal,
3 brls., £41.; Rotterdam, 1 ck., £14.

SODIUM PERBORATE—
Barcelona, 5 c., £69.

SODIUM PRUSSIAN—
New York, 1 ck., £17.

SODIUM SALICYLATE—
Auckland, 1 cs. (pt.), £8.; Buenos
Ayres, 1 cs. (pt.), £5.; Athens,
1 cs., £50.; Calcutta, 4 cs., £47.;
Demerara, 1 cs. (pt.), £6.; Dur-
ban, 1 dr., £15.; Medan, 3 cs.
(pt.), £40.; Rotterdam, 3 pkgs., £3.

**SODIUM SULPHATE (GLAUBER
SALTS)**—
Buenos Ayres, 1 t. 1 c., £18.;
Copenhagen, 10 t., £83.

SODIUM SULPHITE—
Antwerp, 4 c., £6.; Dunedin,
3 cs., £30.; Piraeus, 5 c., £41.

SODIUM TARTRATE—
Sydney, 2 t., £325.

**SUPERPHOSPHATE (otherwise
undescribed)**—
Channel Islands, 135 t., £810.

SULPHUR—
Brussels, 2 t. 3 c., £68.; Brussels
(F.), 19 c., £65.; Durban, 2 c.,
£5.; Lagos, 6 c., £11.; Montreal,
14 c., £15.; Penang (F.), 4 c., £5.

SULPHUR (FLOWERS)—
Paris, 5 t., £225.; Rouen, 10 t.,
£260.

SULPHURIC ACID—
Auckland, 1 c., £5.; Christ-
church, 5 c., £26.; Gothenburg,
5 t., £125.; Rio de Janeiro,
3 c., £32.; Secondee, 4 t., £90.;
Trinidad, 2 t. 10 c., £46.

SULPHUROUS ACID—
Amsterdam, 108 cks., £294.;
Auckland, 2 hlds., £10.; Rotter-
dam, 200 cks., £512.

TANNIC ACID—
Athens (F.), 1 cs. (pt.), £7.;
Brussels (F.), 2 cs. (pt.), £23.;
Buenos Ayres, 1 cs. (pt.), £26.

TAR—
East London, 2 cs. (pt.), £12.

TARTARIC ACID—
Bombay, 1 cs., £6.; Callao, 4 c.,
£98.; Cape Town, 4 c., £69.;
Constantinople, 2 c., £60.;
Colonel, 1 c. (F.), £12.; Delagoa
Bay, 2 c., £16.; Durban, 7 c.,
£151.; East London, 1 cs., £6.;
Karachi, 1 c., £23.; Karachi,
12 c. (F.), £209.; Napier, 2 c.,
£35.; Pt. Elizabeth, 3 c., £52.;
Soerabaya, 1 c., £24.

THEOBROMINE—
Amsterdam, 2 cs., £400.; Batoum
1 cs. (pt.), £18.; Rio de Janeiro,
1 cs. (pt.), £24.

WAX—
Antwerp, 4 c.; Barbados, 2 t.;
Paris, 7 c.

WHITE LEAD—
Antwerp, £259.; Calais, £500.;
Dieppe, £604.; Kilindini, £52.;
Sydney, £111.

ZINC OXIDE—
Soerabaya, 1 ck., £8.; Sydney,
1 cs., £7.

ZINC VALERIANATE—
Brussels, 1 cs. (pt.), £6.

MANCHESTER.

Week ending July 16.

ACETIC ACID—
Alexandria, 2 cks.

ACETO SALICYLIC ACID—
Alexandria, 1 cs.

ALUM (CHROME)—
Alexandria, 1 kg.; Antwerp,
6 cks.

ALUM (LUMP)—
Alexandria, 558 bgs.

ALUMINA SULPHATE—
Antwerp, 61 cks.; Rouen, 100
bgs.

AMMONIUM CARBONATE—
Alexandria, 12 cks.; Rouen,
32 cks.

AMMONIUM MURIATE—
Antwerp, 2 cks.; Alexandria,
10 pkgs.

ANTIMONY SALTS—
Rotterdam, 2 cs.

BARIUM CHLORIDE—
Rouen, 25 cks.

BLEACHING POWDER—
Alexandria, 7 drms.

BORAX—
Alexandria, 50 kgs.; Rouen,
200 bgs.

BORIC ACID—
Alexandria, 6 kgs.

CARNAUBA WAX—
Antwerp, 1 kg.

CAUSTIC SODA—
Alexandria, 352 pkgs., 382 drms.

CERESINE WAX—
Alexandria, 10 bgs.

COAL PRODUCTS (otherwise undes.)
Alexandria, £25.; Bordeaux,
£35.; Antwerp, £3,654.; Havre,
£262.; Rouen, £225.

COAL PRODUCTS—
Carbolic Acid Crystals
Rotterdam, 20 pkgs.

COPPER SULPHATE—
Alexandria, 5 kgs.; Antwerp,
2 brls.

DEXTRINE—
Antwerp, 5 bgs.

DISINFECTANTS (otherwise undes.)
Havre, 5 cks.

DYESTUFFS (otherwise undescribed)
Alexandria, 3 kgs.; Antwerp,
2 pkgs.; Havre, 1 kg.

DYESTUFFS—
Aniline Dyes
Brussels, 2 cks.
Cutch
Antwerp, 23 pkgs.
Myrabolans
Bergen, 150 bgs.

FERRO MANGANESE—
Philadelphia, 400 t.

GLUE—
Rouen, 10 bgs.

GLYCERINE—
Alexandria, 125 cs.; Bordeaux,
63 cs.; Alexandria, 30 cs.

LEAD ACETATE—
Alexandria, a qty.

MAGNESIA—
Alexandria, 9 cs.

MAGNESIUM CHLORIDE—
Ghent, 7 cks.

MAGNESIUM SULPHATE—
Alexandria, 80 bgs.

MANGANESE CARBONATE—
Rouen, 1 ck.

POTASSIUM BICHRONATE—
Alexandria, 23 cks.; Rotterdam,
1 ck.

RED LEAD—
Alexandria, 5 kgs.

SALAMMONIAC—
Alexandria, 291 brls.; Antwerp,
144 cks.

SALT—
Antwerp, 5,000 sks.; Montreal,
1,600 pkgs.; Quebec, 15,800
pkgs.; St. John, 50 t., £9,616.

SOAP—
Antwerp, 1,952 cs., 457 pkgs.;
Alexandria, 102 cs., 2,410 pkgs.;
Melbourne, 1 pkg.

SODA ASH—
Quebec, 20 cks.

SODA CRYSTALS—
Alexandria, 179 brls.

SODIUM BICARBONATE—
Alexandria, 310 pkgs.

SODIUM BICHRONATE—
Antwerp, 1 brl.

SODIUM PHOSPHATE—
Alexandria, 1 bg.; Antwerp,
20 bgs.

SODIUM SILICATE—
Alexandria, 10 brls.

SULPHUR—
Antwerp, 43 bgs.

SULPHUR (FLOWERS)—
Rouen, 322 bgs.

TALLOW—
Havre, 240 cks.

TANNIC ACID—
Bordeaux, 29 kgs.; Havre, 5 kgs.

TARTARIC ACID—
Montreal, 30 brls.

WHITE LEAD—
Bordeaux, 316 kgs.

MIDDLESBROUGH

Week ending July 18.

AMMONIUM SULPHATE—
Kobe, 919 t. 18 c., £15,628.;
Yokohama, 797 t. 8 c., £13,468.

COAL PRODUCTS—
Naphthalene
Dieppe, 175 t. 16 c., £5,427.
Pitch
Antwerp, 888 t. 16 c., £2,666.

SALT—
Adelaide, 3 t. 17 c., £146.; Ghent,
500 t., £1,460.; Sydney, 19 t.
5 c., £765.

SODIUM SILICATE—
Sydney, 4 t. 15 c., £57.

TAR OIL—
Dunkirk, 2 t. 16 c., £77.

TOLUOL—
Dieppe, 65 t. 4 c., £1,878.

NEWCASTLE-ON-TYNE

Week ending July 18.

AMMONIUM CARBONATE—
Gothenburg, 1 t. 10 c.

ANTHRACENE OIL—
Gothenburg, 540 gals.

BORAX—
Copenhagen, 2 t.; Gothenburg,
1 t.

CAUSTIC SODA—
Gothenburg, 4 t. 18 c.

GELATINE—
Bergen, 2 c.; Copenhagen, 10 c.

LITHARGE—
Copenhagen, 5 c.

RED LEAD—
Copenhagen, 7 t. 5 c.

SOAP—
Copenhagen, 2 t. 10 c.

SODIUM SILICATE—
Gothenburg, 7 t. 10 c.

WHITE LEAD—
Copenhagen, 11 c.; Gothenburg,
3 t.

N. & S. SHIELDS.

Week ending July 18.

CHROME ORE—
Christiania, 320 t.

STOCKTON-ON-TEES.

Week ending July 18.

NIL.

SWANSEA.

Week ending July 18.

AMMONIUM NITRATE—
Barcelona, 10 t., £255.

NICKEL SALTS—
Genoa, 1 t., £50.; Havre, 19 t.
5 c., £900.; Rotterdam, 8 c., £20.

OXALIC ACID—
Havre, 5 t. 1 c., £700.

PRICES CURRENT.

THURSDAY, July 24, 1919.

PREPARED BY MESSRS. HIGGINBOTTOM AND CO., 21, SPRING GARDENS, MANCHESTER.

The values stated are F.O.R. at makers' works, or at usual ports of shipment in U.K., unless otherwise specified.
The prices in different localities may vary.

Acids:—

	£	s.	d.
*Acetic 40% and 60% per cwt.	31/-	8	47/-
* " Glacial per ton	80	0	0
Arsenic, S.G. 2,000° per ton	50	0	0
Boric, Crystals per lb.	72	0	0
*Fluoric per lb.	0	0	7
*Muriatic (Tower Salts), 28° Tw. per carboy	0	6	6
*Nitric, 80° Tw. per ton	31	10	0
Oxalic per lb.	0	1	2½
Phosphoric, 1,750° per ton	0	1	9
*Sulphuric (fuming, 70%) per ton	—	—	—
* " (Pyrites, 168°) per ton	7	18	9
* " (" 140°) per ton	4	10	0
* " (free from arsenic, 144°) per ton	5	7	4
Tannic (commercial) per lb.	0	2	9
Tartaric (crystals) per lb.	0	3	2
*Acetone per ton	80	0	0
*Alum, loose lump (delivered) per ton	17	0	0
Alumina Sulphate (pure) per ton	17	0	0
Aluminoferrie (in slabs) per ton	8	10	0
Aluminium (Ingot Metal, 98/99%) per ton	150	0	0
*Ammonia, Anhydrous per lb.	0	1	10
* " 880 per ton	33	0	0
* " 920 per ton	20	0	0
" Carbonate per lb.	0	0	6½
" Muriate (grey) per ton	50	0	0
" (salmoniac) 1st & 2nd, per cwt.	80/-	&	75/-
" Nitrate per ton	60	0	0
" Phosphate per ton	114	0	0
" Sulphate (grey), London, net	—	—	—
" " Hull per ton	—	—	—
" " Manchester per ton	—	—	—
*Aniline Oil (pure) per lb.	0	1	2
Aniline Salt per lb.	0	1	2
Antimony per ton	45	0	0
" (tartar emetic), 43/44% per lb.	0	3	4
" (golden sulphide) per lb.	0	1	3
Arsenic, white powdered per ton	40	0	0
Barium Chloride (in casks) per ton	24	10	0
" Carbonate (native), 92/94% per ton	11	10	0
" Sulphate (native levigated) per ton	£7 to	£14	
Baryta Chlorate per lb.	0	1	3
*Bisulphide of Carbon per ton	55	0	0
Bleaching Powder, 35% per ton	15	0	0
* " Liquor, 7% per ton	6	0	0
Casein (commercial) per ton	82	0	0
Chromium Acetate (crystals) per lb.	0	1	6
Calcium Chloride per ton	8	0	0
China Clay (at Runcorn), in bulk per ton	70/-	to	90/-

Coal-tar Products and Dyes:—

Alizarine (artificial), 20% per lb.	0	2	0
Magenta per lb.	18/-	to	35/-
Anthracene, 40/50% A, f.o.b., L'don, per unit,	6	to	7
Benzol, 90's (naked) per gal.	0	1	11½
" 50/90's per gal.	0	1	9½
Carbolic Acid (crude, 60°) per ton	—	—	—
" " (crystallised, 40°) per lb.	0	0	6½
" " Acid (pale liquid, 97/98%) per gal.	0	2	9
*Creosote (ordinary), naked per ton	0	0	5½
*Crude Naphtha, 30% at 120°C. per ton	0	0	8½
*Grease Oils, 18° Tw. (naked) per ton	6	10	0
Pitch, f.o.b., Liverpool or Garston per ton	2	11	0
*Solvent Naphtha, 90% at 100° per gal.	0	2	1
Copper per ton	104	0	0
" Sulphate per ton	45	0	0
" Oxide (copper scales) per ton	85	0	0
Dross Salts per ton	39	0	0
*Glycerine (crude), 80% per ton	72	0	0
* " (industrial, S.G. 1,260) per ton	110	0	0
*Iodine per oz.	0	0	10½
*Iron Nitrate, 80° Tw. per ton	12	0	0
" Sulphate (copperas), delivered per ton	4	10	0
" Sulphide per ton	7	15	0
Lead (Foreign Pig) per ton	23	15	0
" Litharge Flake per ton	45	0	0
" Acetate (white), (ex ship) per ton	84	0	0
" " (brown) per ton	75	0	0

Lead, Carbonate (White lead), pure per ton	51	0	0
" Nitrate per ton	56	10	0
Lime, Acetate (brown) per ton	10	0	0
" " (grey), 80% (ex ship) per ton	19	10	0
Magnesium Chloride per ton	15	10	0
" Carbonate (light) per cwt.	3	7	6
" Calcined Magnesite per ton	25	0	0
" Sulphate (Epsom Salts) coml. per ton	10	10	0
" " (druggists) per ton	16	0	0
Manganese, Sulphate per ton	80	0	0
" Borate per ton	109	0	0
*Methylated Spirit, 64° (industrial) per gal.	0	5	7
*Naphtha (Wood), Solvent per ton	0	10	6
" " Miscible, 60° p. per ton	0	10	6

Oils:—

*Cottonseed per ton	135	0	0
*Linseed per ton	135	0	0
Stearine, 115-120° M.P. per ton	95	0	0
Potassium, Bichromate per lb.	0	1	6
" Carbonate, 80/82% per ton	85	0	0
" Chlorate per lb.	0	1	1
" Cyanide, 98% per ton	—	—	—
" Hydrate (Caustic Potash) 90° per ton	150	0	0
" " 75/80° per ton	135	0	0
" Potash Hydrate Liquid, 38° B. per ton	70	0	0
" Nitrate (refined) per ton	60	0	0
" Permanganate (B.P. crystals) per lb.	0	3	6
" Prussiate (yellow) per lb.	0	1	9
" " (red) per lb.	0	5	6
" Sulphate, 90% (ex ship) per ton	40	0	0
" Muriate, 80% per ton	30	0	0
Silver (metal) per oz.	0	4	6½
Sodium (metal) per lb.	0	1	3
" Acetate per ton	52	10	0
" Arseniate, 45% per ton	48	0	0
" Borate (Borax), Crystals per ton	39	0	0
" Bicarbonate (1 cwt. kegs) per ton	9	10	0
" Bichromate per lb.	0	0	11
" Carb. (Caustic Soda-ash), 48% per ton	10	0	0
" " (Alkali), 58% (bags) f.o.r. {	6	0	0
" " (Soda Crystals), (bags) wks. {	4	2	6
" Chlorate per lb.	0	0	7
" Cyanide (100% basis) per ton	0	0	10
" Hydrate (76% C. Soda) (f.o.r.) per ton	22	10	0
" " (74% C. Soda) per ton	22	0	0
" " (70% C. Soda) per ton	21	0	0
" " (60% C. Soda) per ton	20	0	0
" " (pure liquid, 90° Tw.) per ton	8	10	0
" 77/78% Powdered (99%) Hydrate per ton	24	10	0
" Hyposulphite (commercial) per ton	16	10	0
" Manganate, 25% per ton	65	0	0
" Nitrate, 96% refd., f.o.r., L'pool per ton	21	0	0
" Nitrite, 100% per ton	53	0	0
" Phosphate per ton	25	10	0
" Prussiate per lb.	0	0	7½
" Silicate (glass) Alkaline per ton	12	5	0
" " (liquid, 100° Tw.) per ton	9	10	0
" Sulphate (Saltcake), delivered per ton	3	0	0
" " (Glauber's Salt) per ton	3	0	0
" Sulphide (conc.), 60/65% casks per ton	20	0	0
" Sulphite per ton	10	0	0
Sulphocyanide, Ammonium, 95% per lb.	0	2	1
" Barium, 95% per ton	0	1	4
" Potassium per ton	0	2	4
" Calcium, 7% per lb.	0	1	4
Sulphur, (Flowers) Sicilian per ton	20	0	0
" (Roll Brimstone) per ton	19	0	0
" Brimstone (best thirds) (ex ship) per ton	12	10	0
Tallow per ton	100	0	0
Tin Crystals per lb.	0	1	3
" English Ingots per ton	253	0	0
Titanium, Potass. Oxalate per lb.	0	1	6
Titanous Chloride per cwt.	4	10	0
Zinc (Spelter) per ton	43	15	0
" Powder, 88/12° per ton	70	0	0
" Chloride (solution, 102° Tw.) per ton	3	0	0
" Sulphate, Crystal per ton	22	0	0

* Packages extra or returnable; otherwise, prices usually include packages.

THE CHEMICAL TRADE JOURNAL AND CHEMICAL ENGINEER.

No. 1680.

LONDON, SATURDAY, AUGUST 2, 1919.

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NOTICES.

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NEW ARRANGEMENTS.

The "Chemical Trade Journal" will be published in future a day earlier.

SUBSCRIBERS to whom the Journal is posted direct will therefore receive it each week on Friday.

THE TRADE will in future be able to secure their supplies from our London office, 265, Strand, at 10 a.m. on Fridays.

EDITORIAL NOTICES.

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Copies of the Index to Volume LXIV. (January-June, 1919) of the "Chemical Trade Journal and Chemical Engineer," which is now available, will be forwarded to those readers who make early application to the Publishers.

Readers are invited to forward items of intelligence, company reports and balance-sheets, or cuttings from local newspapers of interest to the trades concerned.

Articles, reports, and correspondence on all matters of interest to the chemical and allied industries, home and foreign, are solicited. Correspondents should condense their matter as much as possible, write on one side only of the paper, and in all cases give their names and addresses, not necessarily for publication. Sketches should be sent on separate sheets.

Communications for the Editor, if intended for insertion in the current week's issue, should reach the office not later than Wednesday morning.

CURRENT TOPICS.

THE NEW PATENTS BILL.

JUDGING by the reception given to the Government's new Patents and Designs Bill, which was read a second time in the House of Commons on Monday, they have been more successful in meeting the needs of industry than they were in their previous attempt to amend the present admittedly imperfect state of the law as regards patents. That was in the autumn of 1917, but the opposition to the measure was so great that it never got beyond the first-reading stage. At the same time, the present Bill must not be regarded as perfect, and it may be that several amendments will be made during the Committee stage which will give effect to at least some of the ideas which exist as to what is necessary if inventors are to be given a fair chance. One point which will need careful consideration is the extension of the life of a patent from 14 to 16 years under Clause 6 of the Bill. We gather from the speech of the Solicitor-General on the occasion of the second reading that this extension is regarded as sufficient to compensate those inventors whose patents could not be worked, for obvious reasons, during the war, but that will not be the general view. Under the Bill all patents, irrespective of the effect of the war upon their working, will receive the benefit of the two years' extension, so that from that point of view alone this does not treat the patentee affected by the war by any means fairly. Again, many patents expired during the war, and during such period of the war in which they were in force they could not be worked. No provision is made in the Bill for these patents, and we cannot help holding the view that as the Government found no difficulty in preventing certain classes of patents being worked during the war, there should equally be no difficulty, quite apart from the

general revision of the patent law of the country, in publishing an order extending the life of these particular patents, after an inquiry in each case, if need be, for a similar period. More will be heard of this during the Committee proceedings.

The Bill alters the present law in two other important respects, to which attention may be drawn. Clause 1, which consists of no fewer than thirteen sub-sections, aims at making effective what the famous Section 27 of the Act of 1907 failed to do—viz., prevent the abuse of monopoly rights, including the adequate working of patents in this country. As we have previously pointed out, this section of the 1907 Act was very adroitly turned to good account by some foreigners, who were able to secure an order of the Court declaring a patent invalid on account of insufficient working, and then imported the patented article themselves. That was never the intention. It was, in fact, the aim of that section to compel foreign owners of British patents to work them in this country, but most people know how that was evaded. Under Clause 1 of the Bill application is to be made to the Comptroller of Patents, alleging that there has been an abuse of the monopoly rights, and the grounds upon which this allegation can be made are set out. Then it rests with the Comptroller, after inquiry, to deal with the patent in one of several ways, and only in the last resort to revoke it. Thus, Clause 1 of the Bill deals much more comprehensively with the whole position than did Section 27 of the Act of 1907, and covers actual abuse of monopoly rights where these are being exercised, in addition to cases in which the patent is not being worked. During the second reading debate the case of boot and shoe machinery was mentioned, from which it appears that a company in this country which controls all patents for this class of machinery refuse to sell machinery, and will only lease it on onerous terms. The law officers of the Crown suggest that Clause 1 deals with such a position, but the industry does not think so, and it is a point which will have to be fought out during the Committee stage. Then under Clause 2 of the Bill a new class of patent is created. These are to be endorsed "Licences of Right" at the request of the patentee, who may ask for this to be done when he finds himself unable to work the patent for want of means. It will then be open to any person to be granted a licence under the patent upon terms which will be settled by the Comptroller if the parties are unable to agree.

Clause 2 of the Bill applies specifically to chemical products and substances intended for food or medicine. It reads as follows:—

"11. (1) After section thirty-eight of the principal Act, the following section shall be inserted:—

"38a (1) In the case of inventions relating to substances prepared or produced by chemical processes or intended for food or medicine, the specification shall not include claims for the substance itself, except when prepared or produced by the special methods or processes of manufacture described and claimed, or by their obvious chemical equivalents. Provided that in an action for infringement of a patent where the invention relates to the production of a new substance, any substance of the same chemical composition and constitution shall, in the absence of proof to the contrary, be deemed to have been produced by the patented process.

"(2) In the case of any patent for an invention intended for or capable of being used for the preparation or production of food or medicine, the Comptroller shall, unless he sees good reason to the contrary, grant to any person applying for the same, a licence limited to the use of the invention for the purposes of the preparation or production of food or medicine, but not otherwise; and in settling the terms of such licence and fixing the amount of royalty or other con-

sideration payable, the Comptroller shall have regard to the desirability of making the food or medicine available to the public at the lowest possible price.

"Any decision of the Comptroller under this subsection shall be subject to appeal to the Court.

"(2) This section shall apply only to patents applied for after the passing of this Act."

Another point upon which criticism will be offered is that no alteration has been made in the form of appeal from decisions of the Comptroller. Many people wish to see a special appeal tribunal set up, consisting at any rate partly of technical men, and not consisting solely of a judge of the High Court.

These may be regarded as the principal provisions of the Bill, although, of course, there are a very large number of detailed amendments and modifications proposed, the purport of which will be better grasped during the discussion in Committee.

ALKALI WORKS INSPECTION.

THE annual report of the Chief Inspector of Alkali, etc., Works (Mr. W. S. Curphey) for 1918 is to hand as we go to press, and only a brief survey is possible this week. The number of works under inspection (including Scotland) was 1,580, as compared with 1,582 in 1917. There was a further increase in the number of processes under inspection, these being, in 1918, 2,352, or 26 more than in the previous year, and an increase of 99 compared with 1916. There were fluctuations in various processes, but the chief increases were in smelting works, arsenic works, and works dealing with residual products from the carbonisation of coal. These increases were, however, counterbalanced materially by decreases in several classes of works, of which the most numerous were associated with the production of materials used for munitions purposes. In three works registrable processes of manufacture were found in operation in unregistered works, but penalties for the contravention of the Act were not enforced. Complaints were received of the alleged emission of noxious gases or vapours from six registered works. In only one or two cases, however, were there real grounds for complaint. On the whole the general average amounts of acid gases escaping were below those of 1917.

LEAD-COATING IRON.

A THIN coating of lead for sheet iron, iron wire and wire gauze seems to promise considerable usefulness. Such coating, as exhibited by Dr. Charles Baskerville to the American Chemical Society, is applied by a process stated to consist in part in dipping the pickled and washed article into a solution of antimony chloride, then placing in a bath of molten lead or antimony lead, and finally withdrawing, and quenching in oil. Lead-coated iron shingles, 10 by 16 inches in size, painted and unpainted, have been exposed to the weather nearly three years without showing rust spots. The shingles can be bent without cracking the coating, and are claimed to be better and cheaper than tin plates. The thin coated plates can be pressed into desired shapes, such as motor-car hubs, which can be nickel-plated and burnished. Lead-coated wire gauze is stated to be equal to the galvanised, and its production is less expensive. The lead coating is unsuitable for some purposes. The rough surface of heavy pipe for water mains is imperfectly coated and further subject to abrasion in screwing the joints together, and, as iron is electropositive to lead, the uncovered parts of iron or steel exposed to water rust more rapidly than the metal unprotected by lead. The thin coating on cast-iron plates, however, is an inexpensive binder for thick layers of lead cast upon it.

HUDDESFIELD TECHNICAL COLLEGE.—The Huddersfield Technical College has been approved by the Council of the Institute of Chemistry as an institution for the training of candidates for the associateship of the Institute.

RECENT DEVELOPMENTS IN THE FERMENTATION INDUSTRIES*

SIR James J. Dobbie, F.R.S. (the Chairman), after calling attention to the great age of fermentation processes, said that the methods employed four or five thousand years ago were not essentially different from those employed to-day.

It was only in quite recent times, mainly owing to the work of Pasteur and his successors, that the chemical and biological factors involved in the processes employed had begun to be understood, and, as yet, only a small portion of the wine and beer produced was manufactured under efficient scientific control. It was more than a thousand years since the alchemists succeeded by means of their alembics in extracting spirit or alcohol in a comparatively dilute form from wine, and the use of alcohol except for medicinal or drinking purposes was quite a recent development. The invention of the Coffey still and similar fractionating apparatus had made possible the production on a commercial scale of alcohol of sufficient concentration to permit of its use for lighting, heating, solvent, and many other important industrial purposes. The yeast industry was naturally closely bound up with the production of alcohol, which, indeed, was in many cases only a by-product of yeast manufacture. During the war the quantity of yeast produced from a given quantity of grain had been doubled without any considerable loss in amount of alcohol produced. Incidentally it might be noticed that the cost of industrial alcohol had been reduced by about one half owing to the concurrent production of yeast. As every chemist knew, ethyl alcohol might be produced from such compounds as ethylene and acetylene or even from its elements; but so far those processes had not proved successful on a manufacturing scale, and the time still seemed far distant when the production of alcohol would cease to be the principal fermentation industry. The manufacture of other important commercial products, such as acetic acid, dependent on fermentation methods, had only quite recently been subjected to control on scientific principles, and the range of the fermentation industries extended as the result of research. Before the war the manufacture of butyl alcohol had excited much interest in connection with the production of artificial rubber, and, under the stimulus of war, the manufacture of acetone became a national concern of the first importance.

Colonel Sir Frederick Nathan then read a paper on

"THE MANUFACTURE OF ACETONE."

Before the war the main sources of acetone were the United States and Austria. Austria ceased to be a source of acetone when war broke out and the United States became the only source of supply. Steps were therefore taken to augment the American output from acetate of lime, and in addition a contract was placed with a firm who adopted a process for making acetone from vinegar, but although the process proved a success up to a point the yield was poor and the price was very high, and it was eventually abandoned. Two other methods of producing acetone formed the subject of much experimental work. Both were catalytic processes; in one alcohol and in the other calcium carbide were the raw materials employed. The former process, suggested by Dr. Perkin, was worked out by Messrs. Joseph Crosfield and Sons, of Warrington; the latter process was the result of experiments conducted at the McGill University of Montreal, and was worked by the Canada Electro Products Co., of Montreal, the calcium carbide being supplied by the Shawinigan Water and Power Co. Acetone was successfully produced by both these firms, but when the requirements of acetic acid for aeronautical purposes became very large it was necessary to stop the process, which was a three-stage one, at the second or acetic acid stage to provide the necessary quantities.

In the spring of 1915 Dr. C. Weizmann, of Manchester University, brought to the notice of the Admiralty his laboratory experiments on the production of acetone by bacterial fermentation from maize or other substances containing starch. Steps were taken to carry out large-scale experiments on the Weizmann process, for which purpose semi-manufacturing scale plant was fitted up at Messrs. J. and W. Nicholson's Distillery at Bromley-at-Bow, and at the same time arrangements were made to carry on research work under Dr. Weizmann at the Lister Institute. The Lister Institute research work and the experiments at Messrs. Nicholson's Distillery, proved that the process, if carried on under proper

conditions, would produce acetone on a manufacturing scale, and it was decided by the Admiralty to erect a plant at the Royal Naval Cordite Factory for the production of acetone by this process. The factory was duly completed and acetone was made very satisfactorily so long as raw materials were available; damaged rice was mainly used. It was also decided by the Ministry of Munitions to adapt some of the spirit distilleries for the process, and three in London and three in Scotland were selected. The distilleries at Bromley-at-Bow and at Ardgowan, near Greenock, were the first to be completed, and the difficulties encountered at the start were being successfully overcome when it became necessary, owing to the shortage of grain, to abandon the manufacture of acetone by this process at the distilleries.

The use of horse chestnuts having been suggested as a source of acetone in view of the fact that they contain a considerable proportion of starch, experiments were carried out at the Lister Institute which indicated the probability of horse chestnuts being suitable for the purpose. It was established that for the successful fermentation of horse chestnuts the following conditions are essential:—(1) The nuts must be of good quality; (2) they should be dried to a moisture content of not less than 1%; (3) they should be ground to as fine a meal as possible; (4) the meal should be as free from husk as possible.

The manufacture of acetone by the Weizmann process attained the greatest success at the factory of British Acetones, Toronto, Ltd., in Canada. The plant started to work in January, 1917, and continued in operation until the signing of the armistice. At the start there were nine fermenting vessels, each of 30,000 gallons capacity; seven more were added in the early part of 1917 and six more in 1918, making 22 in all, and an output of nearly 200 long tons a month was reached.

In the fermentation of maize or other substances containing starch by the Weizmann process, acetone and butyl alcohol are produced in the proportions of approximately one part of acetone to two of butyl alcohol. As butyl alcohol had only a restricted use both for war and industrial purposes, experiments were started by Dr. Weizmann in order to develop a process for converting normal butyl alcohol into methyl-ethyl-ketone which, in the pure state, is equally suitable as acetone for the manufacture of cordite. The process, which was a catalytic one, was worked out on a laboratory scale and promised to give good yields. An experimental plant was erected at Toronto early in 1917, and as a result of the operation of this plant a suitable type of large scale catalyser was evolved. Samples of methyl-ethyl-ketone were made to enable tests to be carried out with it in the manufacture of cordite. The results of these tests being quite satisfactory it was decided to erect a large scale plant at Toronto which, however, only commenced successful operations just before the signing of the armistice.

The results obtained during the war, especially in Canada and the United States, have proved that acetone can be produced successfully on a large manufacturing scale by the fermentation of substances containing starch. The process cannot, however, be considered as a commercial one likely of being capable of competing with the production of acetone by the destructive distillation of wood, because of the relatively high cost of the raw material and the fact that the production of every part of acetone involves the production of two parts of butyl alcohol having very little value for industrial purposes.

Mr. Amos Gill, B.Sc., followed with a paper on—

"THE ACETONE FERMENTATION PROCESS AND ITS TECHNICAL APPLICATIONS."

In this process, said the author, there is still abundant scope for investigation, both academic and practical. From the point of view of academic research, there is yet to be settled the question of exactly what happens during the fermentation. Briefly, the present knowledge is as follows:—When the fermentation begins, gas, consisting of approximately equal volumes of carbon dioxide and hydrogen, is evolved, and the acidity of the mash, as shown by titration against $N/10$ sodium hydroxide solution, begins to rise, until a maximum is reached. At this stage 10 c.c. of the fermenting mash is neutralised by 4.0 to 5.0 c.c. of the alkali. Up to this point no acetone or butyl alcohol is formed, but as the acidity falls the oil content of the mash increases, when fermentation

* Report of conference at the recent annual meeting of the Society of Chemical Industry.

ceases and no further gas is evolved nor any more acetone and butyl alcohol, the acidity is not completely destroyed, the final acidity of the mash being usually in the vicinity of 2.0 c.c. of alkali considerably higher than the initial acidity of the mash.

It is probable that the maximum acidity is produced by a mixture of acids rather than by a single one, because it cannot be completely neutralised by the addition of milk of lime, and the question arises as to whether some interaction takes place between these acids, the proteins, and the starch present. It is not yet clear what part is played by the actual bacteria and what part by the enzymes present. Certainly the reactions are of a complex nature, but if thoroughly investigated the knowledge gained might be of considerable utility in the working of the process. I think the starting point in this work would be the identification of the acids formed during the early part of the fermentation.

Another question which requires investigation is the loss of acetone and butyl alcohol after the completion of the fermentation, if the mash is kept even for a comparatively short time.

From the purely practical point of view the chief field for investigation is the utilisation of the waste products. In a maize mash fermentation there is a solid residue of approximately 13% of the total maize used. This has a very high oil content, since during the fermentation the maize oil is unaltered. The albuminoid content is also fairly high because all the nitrogen present is not used up by the bacilli during fermentation. The carbohydrate content is small—in fact in a successful fermentation the whole of the carbohydrate should be used up. The chief disadvantage here is the cost involved in recovering this residue in the dry state.

Another problem for the technical investigators is the utilisation of the waste gases produced. A small amount of acetone vapour is carried out with the waste gases, particularly when the fermentation is at the vigorous stage and there is considerable "foaming" or "frothing." The amount of gas being approximately 5 cub. ft. per lb. of maize used (or perhaps slightly less), a factory consuming 100 tons of maize per week would produce over a million cubic feet of gas per week. The first suggestion usually offered is to burn the gases under the boilers and so save fuel. Apart from the risk of explosion and the expense incurred in putting up the necessary plant, it was found at the factory in Toronto that the saving would only be about 1%. Another suggestion is to use the waste gases in a gas engine. Here again, for obvious reasons, the engine must be at a long distance from either the fermenting house or the stills, or there would be considerable risk, and if so placed the gas engine could not be used. If the fermentation factory were near a works using large quantities of hydrogen for fat hardening processes some arrangement might be devised whereby the carbon dioxide could be separated, possibly by cooling and compressing, and the hydrogen liberated in a pure state.

Other investigations should be directed at increased yields or economy in working. In this direction some workers favour a continuous fermentation system, and I understand that some time ago an experimental plant was constructed at Toronto, but I have not heard what results were obtained.

Another point is the disposal of the butyl alcohol. There is in existence a process, patented by the Synthetic Products Company, for the conversion of this into synthetic rubber, but they have their own source of supply for butyl alcohol. During the war the butyl alcohol produced (containing about 90% actual butyl alcohol) was in fair demand for patent cookers and as a methylated spirit substitute, but now that this is again on the market this outlet for the butyl alcohol is closed. Research has been done, and plant erected for the conversion of butyl alcohol into methyl ethyl ketone, and has given satisfactory results under the patent of Dr. Weizmann and Mr. D. A. Legg.

The working of this process in this country is always carried out under the disadvantage of the comparatively high price of raw material. In foreign countries the raw material can be grown cheaply and bought on the spot. For example, in India unpolished rice might be used. Again, the experience at Toronto has upheld the belief that it is best to work the process where a continuous supply of fresh grain is available. Considering that the total weight of finished product is not more than 24% of the grain used, it follows that even if costs of running the factory were approximately the same as in this country the saving in freight would be very considerable.

It therefore seems that the future of the Weizmann process lies abroad, rather than at home, although from the pure research point of view much might be attained in the laboratories at home.

Discussion.

Professor Fernbach discussed at some length the discovery of the fermentation process by which acetone and butyl alcohol were obtained from starchy raw material. It was generally accepted both at home and abroad that he first discovered the process in 1910. At the same time he said that certain misleading statements had been made which he felt ought to be put right. In the first instance it appeared that Sir Frederick Nathan had not been informed by Dr. Weizmann that it was in Professor Fernbach's laboratory that Dr. Weizmann had been taught in 1910 and 1911, under strictly confidential conditions, how acetone and butyl alcohol were produced in the fermentation of maize or other substances containing starch in the proportions approximately of one part of acetone to two of butyl alcohol. As early as 1911 fermentations had been successfully carried out on maize, potatoes, and glucose at an experimental factory in this country; and it was therefore misleading to say that the process used by the Synthetic Products Co. had never employed anything but potatoes.

It was true that at the time of his (Professor Fernbach's) work, one process of fermentation was known in which small amounts of acetone were produced, and others in which butyl alcohol was obtained; but no process was known in which acetone and butyl alcohol were obtained simultaneously in one fermentation. He could support Sir Frederick Nathan's view that the Weizmann process and the Fernbach process were generally similar; he would go further and say that from what had been published the processes were identical. They might wonder why the points now mentioned had not been published earlier; but when asked in 1916 to read a paper on the production of acetone by fermentation before the London Section of this Society, he had been formally vetoed by British Government officials; and it would have been an anti-patriotic act for him—a citizen of the French Republic—not to comply with this decision, or to do anything that appeared objectionable to the Government authorities of an allied nation. In Mr. Gill's paper the plant that had been in work at King's Lynn was described at length and finally reported to be an ideal one. Would it not have been simple justice to say what parts of the plant erected by Professor Fernbach's friends had been maintained and what parts had to be altered? The successes of the so-called Weizmann process dated from the time that the King's Lynn factory was taken over by the Government, after having been worked with complete success by the Synthetic Products Co. in so far as fermentation operations were concerned. The failure to produce acetone in any quantity mentioned by Sir Frederick Nathan, had been entirely due to incomplete and inadequate plant for distillation; and immediately this effect was remedied the plant had been worked at its full output with complete success by the staff of the Synthetic Products Co. The reasons for this success, and for those which Mr. Gill reported in his paper, were mainly that the King's Lynn factory possessed a plant which had been specially designed for the working of the process. A works in France had been manufacturing acetone continuously since 1917, and had only recently been stopped through lack of raw material. The fermenting tanks, which had an average capacity of from 16,000 to 18,000 galls., were charged with a mash containing about 8% of maize or rice which was inoculated with a pure culture contained in a two litre flask. The average duration of fermentation had been 40 to 42 hours. Experience had taught in this sort of manufacture exactly what the practice of alcohol manufacture had shown, namely, that the most perfectly erected lines of pipes did not always avoid infection, and that it was best to dispense with the seed tank, and to seed the fermenting tank direct with a pure culture prepared in the laboratory.

Mr. Grant Hooper said he was sure there was nobody in England who denied to Professor Fernbach the credit of having been the first to produce butyl alcohol and acetone by a fermentation process. He expected that Sir Frederick Nathan and Mr. Gill would say that the reason why the process had been referred to as the "Weizmann process" was because Mr. Weizmann had been placed in charge of the production, and they could only speak of the products under his actual operation. He would like to know a little more precisely perhaps as to the exact cost. Could it under the most favourable conditions ever compete with acetone derived from, say, the destructive distillation of wood? It seemed a little difficult to understand also, that it should not have been possible to produce acetone by the acid process at a cheaper rate than had been possible to produce acetone by this process. He gathered that the

residue in this particular process amounted to 13% solid. It was stated that there was practically no carbo-hydrate remaining. No starch remained, but he wondered whether any dextrinous substance was present; he took it that it was not wholly albuminous matter which remained. In any case, all would agree that the products of existence of any organism were fatal to the continued existence of that organism; but here we had apparently an organism which could exist in the presence of such substances as butyl alcohol and acetone.

The Hon. F. R. Henley said he had found it impossible to carry through fermentation with horse chestnut meal unless it was completely freed from husk, and that was in practice impossible. Another material he had used was acorns. He had used fermented quantities up to 2cwt. in the same way as with horse chestnuts; but in that case he believed the tannin interfered with the fermentation, though with a mixture of 40% of acorn and 60% of rice or maize, the issue was fairly normal. One interesting point that had not been touched upon was the course of the chemical reactions which took place during fermentation. In his experience in the factory the acidity rose steadily for the first 12 hours of fermentation, and then fell steadily until a minimum was reached, which was maintained to the end. If that acidity was neutralised as it was formed the salts of two acids were produced—butylic and acetic acid.

Colonel Gooderham said that in Toronto they had started with a 5% mash and had gradually worked it up to at least 10%. They had had their best results at 10%. They had found that the sluggishness of the ferment was due to using it too soon after it had been put aside for future use.

Dr. Reiley, of the Royal Naval Cordite Factory, said that during several fermentations they had attempted to separate the acids which were formed. In the course of their experiments they had found that butylic and acetic acids were not the only acids produced; there was also a small quantity of another organic acid which they did not succeed in identifying. They had found as fermentation proceeded and acidity was formed, that it was mainly butylic and acetic—four parts acetic to one part butylic. After a few hours the proportion of butylic to acetic increased, and the ratio got smaller and smaller until you got a bigger proportion of butylic as against the acetic. Then as fermentation proceeded the proportion of acetic again rose. They had found they got a rising curve of acidity for a certain number of hours and that afterwards it fell off. As it fell off, they added acetic acid to bring it up to the maximum point again. They found they could keep adding acetic acid slowly and that it seemed to be used up. There was a remarkable action going on there; the bacteria or enzymes were actually able to reduce the acetic acidity and in considerable quantities. In fermentation they had found they could increase the percentage of acetone by the addition of acetic acid. If you made acetic acid by an ordinary fermentation process, for example, by souring cheap wines, you could pump that dilute solution directly into your fermentation and get it converted into acetone. In that way you improved your yield of acetone to about 10.5% and got the normal butyl alcohol production. During the war, however, when the production of acetone was important, that might be useful; but he doubted whether in peace time such a process would have an economic value.

Sir Frederick Nathan said he would like to endorse the statement made by Dr. Grant Hooper that they all perfectly well knew that Professor Fernbach was the first to produce a mixture of acetone and butyl alcohol from potatoes. But in the brief sketch he (Sir Frederick Nathan) had put before the conference, he had tried to avoid anything of a controversial nature. He had stated as briefly as he could, certain facts as far as they concerned the production of acetone in this country, and in Canada and the United States during the war. That acetone had been produced by means of bacteria which were given to the department by Dr. Weizmann. It had been used in this country, in Canada and the United States, and was used in every case with some form of grain and not with potatoes.

The chairman proposed a hearty vote of thanks to the authors of the papers, and at the same time assured Professor Fernbach how heartily they all recognised the unique value of the work he had done.

The following paper was then read by Mr. A. Chaston Chapman:

"A PLEA FOR A NATIONAL INSTITUTE OF INDUSTRIAL MICRO-BIOLOGY."

The first, and perhaps the most important, object of the Institute which I have in my mind would be to provide for the

systematic prosecution of original research, in connection with any industry in which micro-organisms or enzymes play an important part. In the next place, the Institute would serve as a centre for the specialised training of men intending to devote themselves to the teaching of micro-biology and bio-chemistry in our Universities and Technical Schools, and also for the practical instruction of factory managers and other technical employees engaged in the various biological industries. A further function which the proposed Institute might fulfil would be that of providing breweries, distilleries, and other factories with any required organisms in pure culture and in sufficiently large quantities for industrial purposes. At the present time scarcely any such facilities exist in this country. In France the want is to some extent met by the *Service des Levures* of the Pasteur Institute. In Germany the work is done by the Institute for Fermentation Industries, and in one or two other countries there are more or less well-known private establishments such as Jørgensen's Laboratory in Copenhagen.

Then again, the Institute would serve to house as complete a collection of industrial micro-organisms in pure culture as could be got together. No such collection exists in Great Britain, and scientific workers, industrialists, and others are compelled to apply to their friends on the chance that someone may happen to have a specimen of the organism required, or to endeavour to obtain it from the Centralstelle für Pilzkulturen in Amsterdam or (before the war) from the Fermentation Institute in Berlin, from Kral of Prague, or from some other foreign public or private institution. Finally—and this would possibly be not one of the least important of its functions—the proposed Institute would serve as a central home for British micro-biological science, and as the Institution to which all workers in this field of natural knowledge in every part of our Dominions would apply for information to which they could send rare specimens for identification or for investigation, and to which they could, subject to proper safeguards in the matter of priority, communicate any discovery of importance. I am well aware of the excellent work in the domain of industrial micro-biology which is being done in a number of isolated institutions such as the Lister Institute in this country, in one or two well-known American colleges, in the Pasteur Institute in Paris, in the Institute for Fermentation Industries in Berlin, in the Carlsberg Laboratory in Copenhagen, and in some others which it is not necessary to enumerate. Each of these institutions, however, deals with this immense subject in certain aspects only, and as compared with the scheme which I am advocating, they suffer from the great disadvantage that there is no co-ordination and that consequently a combined attack on any of the big problems which are calling for solution is rendered very difficult, if not impossible.

Mr. Wm. B. Brierley (of the Institute of Plant Pathology, Rothamsted Experiment Station, Harpenden), said that as a micrologist, he welcomed the opportunity to say one or two words on the proposition that Mr. Chapman had brought before the meeting. Probably Mr. Chapman, as well as others, would remember that at the Newcastle meeting of the British Association, Section K had held a discussion on the organisation and future progress of the science of micrology. To the great disappointment of many, the Government had not taken up the proposition in its fullest aspect; they had acted on it but only to a certain degree. They had created an Imperial Bureau at Kew but had not had the Industrial micrologist in mind. Last November the Pathological Laboratory at Kew had been transferred to the Rothamsted Experimental Station at Harpenden. An institute of micrology had been set up there, and it was proposed to establish a laboratory where pure cultures might be obtained and supplied to those who wanted them. That laboratory was just about to be inaugurated, and he asked help from those who were interested in the pure cultures of micro-organisms. At that laboratory they would have to confine themselves to those organisms which were pathogenic to plants, and more commonly found in agriculture; but they hoped to extend their activities so as to include those micro-organisms which were of use for industrial purposes, and, possibly, finally, to include a good many of those which were pathogenic to man. If such an institute as that suggested by the author was created, biologists would give it the greatest welcome.

Mr. J. J. Lloyd said this was probably the only country of any importance where there was no Bacteriological Society, and he strongly supported the proposal made in the paper. The difficulty of obtaining and retaining pure cultures was far greater than many people thought, and an institution such as that proposed would be of immense value.

RESIDUAL PRODUCTS OF THE GAS INDUSTRY.

IN the report of the Central Executive Board of the National Gas Council, presented at a general meeting of the Council in London last week, appear the following references to matters concerned with residual products:

The Council communicated with Messrs. Chance and Hunt and Messrs. Brothertons, Ltd., with regard to the possibility of increasing the contract prices paid for crude and concentrated ammoniacal liquor. The Council also laid the facts before the High Explosives Department of the Ministry of Munitions, who expressed the opinion that the Council's arguments regarding increased cost of materials and labour constituted a basis for negotiation between producers and contractors for the purchase of crude and concentrated ammoniacal liquor as to revision of prices. A copy of the letter from the Ministry was sent to the District Institutions and Associations by whom the question of prices had been raised.

On November 15 last, the Council were notified officially that gas need no longer be scrubbed to extract benzole for the High Explosives Department of the Ministry of Munitions. In view of the necessity for maintaining the production from home sources of benzole for motor spirit or other purposes, the Board of Trade and the Coal Mines Department were approached on the subject.

The National Benzole Association having been formed for the purpose of marketing as motor spirit the benzole produced by gas undertakings and coke-ovens, the Council were requested to appoint four district representatives to its Executive Committee. The following were accordingly nominated, and have accepted office: Mr. Alex. Wilson (Glasgow), Mr. J. H. Canning (Newport, Mon.), Mr. J. H. Ellis (Plymouth), and Mr. C. S. Shapley (Leeds). The President of the Association is Mr. D. Milne Watson; and Mr. J. H. Ellis has been nominated by the Council to represent the gas industry as a Vice-President.

The Council having been informed that in certain localities there was a slump in the price of spent oxide owing to the importation of pyrites from abroad, the Secretaries of the District Associations and Institutions of Gas Engineers and Managers were asked to furnish particulars of stocks and prices ruling in their districts, in order that these might be laid before the War Cabinet Industrial Transition Committee. When the information had been received, Mr. Napier, of the Scottish Gas Council, and Mr. P. E. Williams, of the London Commercial Gas Company, were asked to appear on the Council's behalf before the War Cabinet Industrial Transition Committee. Mr. Williams thereupon reported on the whole subject; and this report was circulated for suggestion for action to be made by the members of the Executive Committee. The War Cabinet Industrial Transition Committee is apparently no longer in existence, but the Council propose to take further steps to secure better prices for spent oxide supplied by gas undertakings.

A draft scheme for the purchase of tar by distillers from gas undertakings has been agreed upon by the Joint Committee of Tar Producers and Distillers. In December last, a communication (covering a questionnaire) was sent to gas undertakings throughout the country. About 100 replies have been received, indicating that the scheme appeared to be a suitable one for adoption by the undertaking. An agreement has now been drawn up by counsel; and this will shortly receive the further attention of the Joint Committee.

ESTIMATION OF NITROGEN.

ONE of the drawbacks of the highly accurate Dumas' method is the length of time occupied in cooling the tube between one estimation and the next. L. Dexheimer (*Zeitsch. anal. Chem.*, 1919, 58, 13-19) has devised a method of continuous operation which avoids this necessity, and enables 15-20 estimations of nitrogen to be carried out in a day. After the end of the first combustion the current of carbon dioxide is sent through the tube in the reverse direction, and the flame under the hinder portion of the tube is extinguished as far as the granulated cupric oxide. The latter and the copper spiral are heated continuously during a series of estimations. The reversal of the carbon-dioxide current prevents the access of air during the operation of withdrawing the combustion boat and the plug of copper oxide at the hinder end and the substitution of a fresh boat and fresh

plug of copper oxide, which are kept ready. In order to prevent the immediate volatilisation of the new substance the combustion tube should project 15-20 cm. beyond the furnace at this end, and this portion of the tube is always cold. When the boat has been inserted in this portion and the stopper of the tube replaced, the current of carbon-dioxide is again passed in the forward direction and a fresh nitrometer is fitted to the apparatus. The absence of air is next confirmed by means of this nitrometer, and as soon as this is indicated, the boat is pushed forward into the combustion zone. After two or three estimations it becomes necessary to regenerate the copper oxide by passing a current of oxygen through the tube in the reverse direction, and this is so arranged that it is introduced through a capillary tube which passes through the copper spiral so that the latter is not oxidised. The passage of oxygen is performed at the same time as the current of carbon dioxide is reversed, and the excess of oxygen is subsequently swept out by the carbon dioxide. The manipulation of the boat is effected by a wire with a loop at the end which is passed through the stopper of the combustion tube and is lubricated with glycerol.—*Analyst*.

ELECTRO-CHEMICAL INDUSTRIES OF NORWAY.

A CORRESPONDENT of the *Financier*, writing from Christiania on recent developments in the Norwegian electro-chemical industries, states that during the war large sums were put up for the erection of new plant and machinery, mostly at an excessive cost, but for the time being huge profits were made. The question that is exercising the minds of people now is the extent to which these industries will be able to maintain an output commensurate with the power available and the capital employed when markets resume a more normal condition. Generally, the opinion obtains that, whilst the future is promising, an anxious time will be experienced during the next year or two, and that many factories will have to close down wholly or partially until existing supplies are diminished and absorbed. To the extent to which some industries are dependent upon the importation of raw materials the outlook is more dubious. So far as raw materials can be obtained in Norway, however, the position is more promising, and in the manufacture of such articles as ammonium, calcium and sodium nitrates there is little to fear beyond the uncertainty of the labour position. The whole problem would be easier if more experience of pre-war conditions had been gained, but so many products are entirely the result of abnormal war activity that those concerned with the management are filled with anxiety as to the future.

Large factories have been built for the manufacture of concentrated sulphuric acid, whilst alumina sulphate has been produced for the first time in Norway. The making of electrodes is a new industry. A process has been elaborated during the war in Norway, and has proved a great success, so much so that manufacture is now being undertaken in several parts of the world. This results from the complete carbonisation of a combination of anthracite, pitch, and other similar materials. It has been found possible to obtain 99 per cent. of pure carbon content at quite a reasonable cost, and the product possesses quite a long life. By this process the electrodes are produced by the factories for their own use, and no outside labour is employed. In ferro-alloys a lot has been done during the war with ferro-chrome, ferro-manganese, and ferro-silicates, whilst another war development is the production of molybdenum, but that is not entirely treated in Norway, and is exported in the form of a concentrate. As already stated, so far as these industries are self-contained, it is believed that, with the use of electric power, they will, apart from labour troubles, be in a favourable competitive position for some years to come, but considerable anxiety exists regarding those that are dependent upon imported raw materials, and a policy of marking time has been adopted.

ZINC AND ZINC DUST PRICES.—Australian high-grade zinc dust (88/92 per cent. metallic zinc purity) is quoted at £70. per ton f.o.r. Substantial sales have taken place during the past week, and it is understood that period contracts have been entered into at a reduced price. The price of Australian electrolytic zinc, containing 99.95 per cent. metallic zinc, is unchanged at £42. per ton f.o.b. Australia for direct shipment to New Zealand, India, South Africa, and the Far East.

CHROME TANNING INDUSTRY.

A Conference on the Chrome Tanning Industry took place at the annual meeting of the Society of Chemical Industry, in collaboration with the United Tanners Federation and the Federation of Curriers, Light Leather Tanners and Dressers.

Dr. Chas. Keane, in introducing Mr. Francis H. Briggs, President of the Federation of Curriers, Light Leather Tanners and Dressers, expressed the appreciation of the Society of Chemical Industry, which was a society of chemists only, at being brought into touch with those who were connected with special industries which had relation to chemistry.

Mr. Briggs then took the chair. The subject to be discussed, he said, had been very much neglected, yet from the national standpoint the subject of chrome tanning was one of profound interest, because we controlled the greater portion of raw material. In India alone, the total of hides was in the neighbourhood of 12 millions, but whilst the largest proportion of that, some 20 years ago, was dealt with in this country mostly by vegetable tanning, in the year 1913, 80 per cent of these hides were dealt with by the Central Powers, and made mostly into chrome leather; a very large proportion of which found its way back to London. The same position existed in regard to Indian goat skins which were tanned, dressed, and made into glacé kid. That was a very sad state of affairs, and he could not help thinking that a great deal of it was due to the world of science. Austrians, Germans, and especially the Americans, had fostered the process of tanning to such an extent that they had left us high and dry to look on and regret that we had been so slow in pushing forward with the raw materials which we controlled.

Professor D. McCandlish read a paper on—

"THE DEVELOPMENT OF THE CHROME TANNING INDUSTRY IN THE UNITED STATES."

As the United States has been so closely associated with the chrome tanning industry since its inception, it seems appropriate that special consideration be given to the part taken by that country in originating and developing what is comparatively a new method of tanning. The commercial employment of chromium compounds as tanning materials in America commenced about 1884, when Augustus Schultz of New York was granted a United States patent for what he described as "An improved process for the tanning of hides and skins." In this method of tanning, the skin is impregnated with chromic acid, which is readily absorbed by the skin fibres in the first bath. The chromic acid is subsequently reduced in a second bath to a basic chromium salt, which is the actual tanning agent. A mixture of sodium or potassium bichromate with hydrochloric or sulphuric acid is used for the first bath, and a mixture of sodium thiosulphate with either of these acids constitutes the second or reducing bath.

Several years before Schultz patented his method, Professor Knapp in Germany had described a process for making chrome leather by the use of basic chromium chloride solution, made by dissolving precipitated chromic hydroxide in hydrochloric acid and rendering the solution basic with sodium carbonate. Martin Dennis, of Newark, N.J., evidently became aware of the possibilities of this method, and in 1893 was granted a patent for a basic chrome tanning liquor which closely resembled Knapp's basic solution. By means of such a liquor, properly prepared hides and skins may be converted into very satisfactory leather, and as the tanning is completed in one solution, this system is known as the "one-bath," as distinct from Schultz's "two-bath" process. Although the ultimate tanning agent in both processes is the same, i.e., a basic chromium salt, there is one essential difference between the methods. In the two-bath process finely-divided sulphur, liberated from the thiosulphate-acid solution in the second bath, is deposited in and upon the fibres of the leather, giving a certain characteristic softness not readily obtained by the one-bath tannage.

The processes described form the foundation upon which the chrome tanning industry of the United States has been built. Whilst the advantages and disadvantages of chrome and vegetable tanned leathers have been the subject of many controversies, the fact remains that so far as upper leather is concerned, the former has largely supplanted the latter during the past twenty years in the United States as well as in this country.

The actual tanning processes have been greatly improved. In the one-bath system a better understanding of the necessary relationship between the basicity of the liquor and the condition of the raw pelt has helped to do away with a great deal of the uncertainty which existed in the earlier days.

The fat-liquoring of leather was formerly carried out with emulsions of animal and vegetable oils in soap solution. Mineral oils have been looked upon with disfavour not only because they were used as adulterants of the more expensive oils mentioned, but because they did not give satisfactory emulsions with soap solution. A development which may have far-reaching effect is the utilisation of mineral oils for fat-liquoring purposes in conjunction with sulphonated animal, vegetable, or fish oils, which are excellent emulsifying media and possess lubricating properties themselves.

A noteworthy addition to the mordants available for use upon chrome leather previous to dyeing with aniline colours was made a few years ago. An extract prepared from osage orange wood, introduced under the name of Aurantine, has found successful application as a substitute for fustic extract. The yellow colouring matter of the extract is readily absorbed by chrome leather and this preparation will probably be more extensively used when it is better known.

In the finishing operations considerable ingenuity has been exercised in devising means of overcoming defects in the skins and improving the appearance of the leather. A process for finishing coloured chrome leather which fairly effectively covers irregularities arising from uneven colour absorption in the dyebath, and tends to give a desirable even appearance, employs what are known as pigment finishes. These consist of finely ground earth colours suspended in suitable gum or resin solutions, and can be applied in the same way as ordinary finishes. If the skin defects are very prominent, it may be necessary to buff the grain lightly on an emery or carborundum wheel to obtain an even bottom on which to apply the finish. The finishes are so constituted, and have such good covering property, that it is not always easy to decide without the aid of a microscope if the grain has actually been buffed.

Mr. M. C. Lamb followed with a paper dealing with:

"THE CHROME TANNING INDUSTRY IN GREAT BRITAIN."

The first attempt at the conversion of prepared hide into leather by a process of mineral tanning is generally credited to Professor F. L. Knapp, who obtained patent rights for the use of normal or basic salts of chromium iron, manganese, etc., in combination with fatty acids for the purpose. The patent of Christian Heinzerling of 1878 was the first process of mineral-tanning to be applied on a commercial scale. Heinzerling's method consisted of the application of a mixture of potash alum and potassium bichromate and the subsequent treatment of the hide with albuminous matter such as blood. During the period when the Eglinton Chrome Tannery Co. were endeavouring to pioneer this process, Professor J. J. Hummel, of the Yorkshire College, Leeds, was consulted with a view to devising a process for fixing the chrome salt on the fibre. After some experimenting, he suggested a method then used in the chrome-mordanting of wool and cotton, of applying chromic acid to the prepared hide and subsequently reducing this by treatment with sodium bisulphite or thiosulphate. Samples of leather were actually produced by this process, but for some reason, unknown to the author, the method was not worked on a commercial scale, though it anticipated the method patented by Augustus Schultz in America in 1884.

In 1893, Martin Dennis took out patent rights in America for the use of a basic chromium chloride solution for tanning. The Martin Dennis process as regards the preparation of the chrome tanning liquor is very similar to that originally advocated by Knapp. This process was the commercial pioneer of the now common method of chrome tanning by what is termed the "single-bath" process, depending upon the utilisation of a basic chromium sulphate or a basic chromium chloride solution.

The methods of Schultz and Martin Dennis were brought to the notice of the British leather trade by Professor H. R. Procter.

The progress of the application of the "single-bath" method of chrome tanning became more rapid after the publications of Procter in 1897 and 1898, in which he advocated, in the first place, the reduction of an acidified solution of potassium bichromate by organic reducing agents, e.g., glucose, sugar, etc., following on somewhat similar lines to the method described by Hummel in the account of chromium mordants in his book entitled "The Dyeing of Textile Fabrics," published in 1886; and a still more simple method of making a basic chrome liquor by the addition of an alkaline carbonate to a solution of chrome alum. This salt, which was obtainable in large quantities as a by-product in the manufacture of alizarine from anthracene, having very little

commercial application, was available at a very low price. The liquor was more simply prepared than that patented by Martin Dennis and was more uniform than that obtained by the reduction of chromic acid with organic reducing agents. In consequence, this method of preparing chrome liquors was almost universally adopted and continued to be used up to 1914, when owing to difficulties in obtaining chrome alum, tanners had of necessity to revert to the manufacture of chrome liquors by the reduction of chromic acid by reducing agents, glucose, farina and starch being employed until the use of these materials was prohibited, when sodium bisulphite, sodium thiosulphate, and sulphurous acid were pressed into service.

A few special points of importance showing the progress that has been made in the manufacture of chrome leather in Great Britain may be mentioned.

It was found that, in the original formula of Schultz, consisting of 5% of potassium bichromate and 2½% commercial hydrochloric acid, only about two-thirds of the total quantity of bichromate is converted into chromic acid, and the unconverted bichromate is not absorbed and subsequently reduced. Considerable economy was effected by the use of a sufficient amount of acid in the first bath to effect the almost complete conversion of the bichromate into chromic acid. The quantity of thiosulphate (10%) and hydrochloric acid (5%) recommended by Schultz was found to be insufficient, and the quantities were materially increased.

Whereas it was customary a few years ago to use a fresh solution of thiosulphate and acid for each pack of goods, it is now more general to use a standing bath; this has resulted in considerable economy and it is generally conceded that the finished leather is improved.

During the past few years great attention has been drawn to the importance of the degree of basicity of the chrome liquor, when processing goods by the single-bath method and to the necessity for adjustment of this for the particular class of goods being processed.

Discussion.

The Chairman said the trade was now beginning to do what it ought to have done 10, 15 or 20 years ago. Firms were now spending £5,000 per annum in research work and there was a great opening for chemists in consequence. The paper proved conclusively that the scientific man had not been sufficiently recognised by the trade in England. He hoped, however, that scientific men would now recognise that the tanners were out for the best, and that best could only be obtained by co-ordination. The question of combining on a large scale was a question for the various firms concerned.

Mr. Richardson asked whether it was possible for a steady, quiet business man here in a moderately large way to compete with the large American tanners.

Professor McCandlish said it was rather a wide question, and his opinion must be considered to be that of one man only. Possibly a word as to the development of the large American tanners might be interesting. One particular firm was started by a practical working German tanner, who started with a few skins which he dressed himself. In the course of 20 or 30 years that business developed into a tannery turning out 5,000 skins per working day. The firm was now spending £10,000 a year on research. He did not feel in a position to answer the question put by Mr. Richardson, although the chances were that the small English tanners could compete. The chrome leather and glacé kid produced here were equal in quality to American, and why they were not produced in a larger quantity was a question for the tanner to answer and not the chemist.

Mr. F. Innes thought the whole question came back to education. If the tanners of to-day had been taught science at school there would have been more hope of chemists getting earlier into the trade. He had known of firms here where the chemists had had considerable difficulty in getting the confidence of the firm which employed them and who found that alterations in processes were made without their knowledge. That was altogether wrong in principle.

Professor McCandlish said that on the whole American tanners were making more use of chemists than English tanners. At the same time a chemist must have a good working knowledge of tannery conditions before he could be regarded as competent to guide the chemical necessities of a tannery.

Mr. Challis spoke of the difficulty there had been in obtaining chromium chemicals during the war, and asked if that difficulty still existed. A little before the war there had been difficulty in getting sodium chromate. He also referred to a new process called "Pyrotan." The description he had seen

spoke of baths of alum and other salts being used, and he asked if anybody could say whether this process was likely to beat chrome tanning in the future.

Mr. Richardson said he had found Pyrotan leather unsatisfactory.

The Chairman said that Pyrotan leather was more or less in its infancy.

Mr. Woodruff said that what he believed was lacking in the tanning industry was that there were no process chemists, and until we could get some process chemists, or some tanners in the trade who could tan and also understand the language of the chemist, we should not make progress.

Mr. Sage proposed a vote of thanks to the authors of the papers.

Professor McCandlish replying, said he knew some of the difficulties encountered by the chemist in a tannery. One essential thing was to obtain the goodwill of the foremen and workpeople. The tanning industry had been conducted on certain lines for centuries and anybody who proposed to vary the old rules was looked upon with suspicion. One point that had not been touched on was the question of a tariff. He had omitted all reference to it in his remarks, but the American chrome tanning industry had been built up behind a tariff which had remained in force for a great number of years, and only in recent years had been taken off. He had been in America at the time when chrome leather was put on the free list. The removal of the tariff had adversely affected the American industry and the German leather was coming in in large quantities. The English tanner had had a real difficulty in having to compete with the cheap labour of Germany on the one hand, and the highly organised production of America on the other. These had been severe difficulties to face in an open market.

Mr. Lamb also briefly replied.

NIGERIAN INDIGO.

THE native indigo plant of West Africa, *Lonchocarpus cyanescens*, yields under suitable conditions the same blue dye, indigotin, as the ordinary indigo plant (*Indigofera*) and is largely used by the natives in dyeing. In Abeokuta, in the Southern Provinces of Nigeria, there are plantations of the plant extending to several hundred acres; but, as a rule, the leaves and young shoots are collected from wild plants, which are, however, commonly preserved by clearing away the surrounding scrub. In its natural state the plant is a climber, reaching a height of 30ft.; but under cultivation it becomes a bush 7 or 8ft. high, owing to the regular cutting.

Specimens of the dried plant from Sierra Leone and the Southern Provinces, Nigeria, examined at the Imperial Institute some years ago, were found to yield 0.65 per cent. of indigotin, whilst a sample of lump indigo prepared from the plant by natives of Kontagora, Northern Provinces, Nigeria, gave only a low yield of indigotin, viz., 21.5 per cent., as compared with 60 per cent. in good commercial Bengal indigo derived from *Indigofera*. A further specimen of indigo from Nigeria examined in 1917, the botanical source of which was not stated, was also of rather low grade, containing 27.5 per cent. of indigotin; but in this case the yield was reduced owing to the presence of a large amount of mineral matter in the sample.

In order to determine the yield and quality of indigo which *L. cyanescens* will furnish, a series of experiments was conducted recently in the Southern Provinces, Nigeria, and ten samples of indigo were forwarded to the Imperial Institute for examination last year. The results of this investigation, according to the *Bulletin* of the Institute, indicate that indigo of good quality containing up to 56 per cent. of indigotin can be prepared from the fresh leaves of *Lonchocarpus cyanescens*. The indigo of best quality was obtained by the use of the usual method employed in India, but the yield was much less than that obtained in India from green plants of *Indigofera* spp.

INSTITUTE OF CHEMISTRY: PASS LIST.—In the July Examinations for the Associateship of the Institute (A.I.C.), held recently, one candidate passed in branch (a), mineral chemistry, Lieut. Cecil William Wood, King's College, London; two candidates passed in branch (d), organic chemistry, Lewis Guy Peirson, B.A. (Cantab.), and John Edwin Pollock, B.Sc. (Lond.), University College, Reading; and one candidate in branch (g), chemical technology, with textile chemistry as special subject, Percy Edward Stanhope, Royal Technical Institute, Salford.

THE NITRATE POSITION.

THE world-war having practically come to an end in November last on the signature of the armistice, hopes were entertained that supplies of nitrate of soda from Chili might reach Europe in time for the agricultural season of 1919. Not until May 15, however, was the article released from Government control, and so small were the available stocks that the most optimistic trade estimate of the consumption, including that for chemical purposes, in the United Kingdom in the past six months is under 20,000 tons. This figure compares with 80,610 tons in the corresponding period in 1914, and shows that the British farmer paid little attention to the Board of Agriculture's tempting offer of the Chilean fertiliser at £20. per ton, which, by the way, was soon withdrawn at the instigation of the Ministry of Munitions, able to dispose of its surplus stock at higher prices to Continental buyers. Large transshipments were so made to Holland, Belgium, Denmark, and Spain, but as nitrate was "a closed book," and the Government are not at all likely to have published particulars, we hesitate to follow the more or less guess-work current estimates. The European total of "about" 450,000 tons, comparing with 1,495,860 tons in the first half of 1914, is considered "quite satisfactory," and the quota allowed to Holland, 115,000 tons, is certainly imposing, considering that out of 88,600 tons delivered in the pre-war period from Rotterdam a large part was sent to Germany, now out of the running. At all events, there is little risk in agreeing that France and Belgium, which then accounted for 544,000 tons, "would last season have taken more than 237,000 tons if their richest agricultural regions had not been ravaged by war, if larger supplies had been available, and if exorbitant prices had not been asked by the Government agents." The following are the official statistics relating to the industry in Chili:—

	1919. Tons.	1918. Tons.	Inc. or Dec. Tons.
Production six months to June 30 ..	900,000	1,438,000	- 538,000
Shipments:—			
To Europe (including Egypt	58,000	522,000	- 464,000
.. United States and other destinations	181,000	816,000	- 635,000
Total Shipments	239,000	1,338,000	- 1,099,000
Stocks in Chili, June 30	1,488,760	990,000	+ 498,760

Through the closure of oficinas, crowded with nitrate and unable to market their stocks, the output steadily diminished from January onwards, until in June it reached only 128,000 tons, or about half the normal monthly total. The decrease on the half-year was consequently half a million tons compared with the corresponding period in 1918; and while some of the more favourably placed companies with extensive "canchas," or drying-floors, will no doubt continue to produce nitrate, the majority are by *force majeure* compelled to cease operations. This is the more to be regretted as the cost of production has considerably fallen, through the depreciation of the Chilean currency in which wages are paid and the lessened competition for labour. Bags, fuel, and all imported articles are still dear, but, on the other hand, the export duty has, with the aforesaid fall in exchange, returned to a normal level. The cost of production varies according to the grade of the raw material available, and it is therefore difficult to fix an "average," but it may safely enough be placed at under 7s. per quintal, f.o.b., excluding those oficinas able to live only on fancy prices. It is generally admitted that the cost can be reduced through improvements in the mode of extraction, leaving less nitrate in the *ripio*, or sludge; but inasmuch as the best scientific brains have been occupied over the matter during the past quarter of a century, recent claims in that direction may be accepted *cum grano salis*.

The great decrease in shipments from Chili, although synchronising with a material falling-off in production, has resulted in an enormous accumulation of stocks, now exceeding 1,500,000 tons, and, unfortunately, there is no prospect of an early removal of the incubus. If the war had lasted until now the necessary tonnage would have been provided by the Allies in order to meet their urgent requirements of munitions. In ordinary times the nitrate wanted in Europe and elsewhere for agricultural purposes would have been sold on the West Coast and shipped to the different destinations at moderate freights. At the present moment the required shipping is unavailable, except for a few neutral boats asking exorbitant rates, and the nitrate producers, through no fault of their own, are landed in a blind alley. The Shipping Con-

troller has just informed a deputation that, much to his regret, he will be unable to allow British vessels to go to Chili for some months to come, as these are wanted to load foodstuffs in other parts of the world. A certain number of the French ships regularly employed as nitrate carriers before the war may be available, although many were victims of the submarines; while several of the German sailing vessels and steamers laid up in Valparaiso were lost in the great storm at that port a couple of weeks ago. It will therefore be seen that, although a few hundreds of thousands of tons may be shipped this year to Europe and the United States (to the latter in American bottoms), the bulk of the present stocks of nitrate in Chili, plus the balance of the 1919 output, will remain stranded there until next year.

To complicate an already sufficiently confused situation comes the formation of the so-called "Nitrate Producers' Association," particulars of which have been given in these columns. Alarmed at the prospect of a falling market, the majority of the producers, representing about 73 per cent. of the total output capacity, determined in January last to "centralise" sales at "fixed prices," instead of allowing individual transactions as in all previous "combinations," merely restricting the output. This step, long advocated in some quarters, but never carried out, was ostensibly taken in order to counteract the not unnatural intention of the Chilean Government henceforth to have a voice in the control of the industry, officially considered to have lapsed into a condition detrimental to the national interests. These producers, however, reckoned without their host. Having fixed their prices at the inordinately high level of 10s. 1d. per quintal, f.o.b., for ordinary nitrate, and 10s. 4d. for "refined," they discovered to their dismay that they were being undersold by the Government dealing with the production of the native Antofagasta and Union Companies, and the powerful German oficinas remaining outside the ring. Exact particulars of the transactions are not yet available, but their importance can be gauged from the semi-official mention of 900,000 tons to France, 100,000 tons to Italy, 50,000 tons to Holland, and 20,000 tons to Spain. The consequence is that the association, whose members have not sold a ton of nitrate since November, is completely shut out of the market! It is therefore hardly surprising that the associated producers are already regretting the new regime, not a voice being raised in its favour at the recent meetings of nitrate companies held in London, and its early demise may safely be expected, in the absence of a *modus vivendi* with the Chilean Government. The latter's intervention is variously described as incomprehensible, inconsistent, and disastrous, but inasmuch as the industry is the corner-stone of the national finances, the official steps taken for the removal of the deadlock can readily be understood. The loss in revenue from the export duty alone was nearly three millions sterling in the six months compared with the corresponding period last year, and its continuance would seriously imperil the solvency of the State. Judging from the experience at home, we are by no means enamoured of Government interference with trade, but in the present case the insinuations in the Press seem far-fetched—that the main object is to provide political protégés with "soft jobs." The sale of nitrate at prices considerably below those "fixed" by the Association, however distasteful to the latter, is, at all events, not a heinous offence to the consumer, the leading performer in the piece.

Before the war the major part of the exports of the Chilean fertiliser passed through the hands of the big German houses—Weber, Vorwerk, Gildemeister, of Hamburg, Bremen, and Valparaiso,—the British share of the business being comparatively small. It remains to be seen to what extent those firms will be able to resume their activities; and meantime the Allied and neutral merchants should have an excellent opportunity of extending their operations, when tonnage becomes available. At present, however, they and the large dealers are up in arms at the system of "fixed prices," relegating them to the position of mere commission agents, precluding chances of profit, and thus removing all incentive to "forward" purchases. The interests of company agents and directors, themselves nitrate merchants, are also threatened, and there is a general cry for "a free market," even at the risk (*sic*) of a temporary collapse in values. The withdrawal of the obnoxious condition may therefore be expected at an early date, since it is a *sine qua non* to the revival of the trade; yet it is to be feared that even the removal of this principal plank in the Association's platform will have little immediate effect. After comparing notes, and as a result of abstruse calculations, the leading statisticians have come to the conclusion that the world's requirements of Chilean nitrate of soda—excluding Germany and Austria, formerly the largest

consumers—are likely to reach two million tons in the year ending June 30, 1920. That the demand would be heavy if abundant supplies were available at moderate prices goes without saying, but, unfortunately, both those indispensable conditions are absent, the dearth of tonnage preventing the shipment of anything like the above total within the period named, and excessive freights raising the c.i.f. value of nitrate to a prohibitive level for agricultural purposes. It is said that 130s. per ton has recently been paid for steamers to the United Kingdom, and 200s. to the Continent, compared with about 25s. before the war.

The next manurial season in Europe is so distant that there is no occasion to indulge in predictions beyond the safe one that nitrate of soda will be dear for some time to come. Fortunately, the British farmer has got on very comfortably with sulphate of ammonia; likewise Germany with the synthetic product, an exceptionally fine harvest being expected there. Germany has by the way, undertaken under the Peace Treaty to supply France with 30,000 tons per annum for three years—sufficient proof in itself of the "atmospheric nitrogen" competition of which the Chilean nitrate producers will have to run the gauntlet. Every civilised country is now busy tapping the boundless nitrogenous sources in the air, and the annual output of these substitutes for natural nitrate of soda, already running into formidable figures, will rapidly expand. The latter's present parlous position will no doubt improve with the eventual increase of tonnage available for exports, but high authorities in the trade are of opinion that it will not return to normal conditions before 1921. In the meantime, the producers, instead of earning big profits like a year ago, are carrying heavy stocks at high rates of interest, and in many cases incurring stoppage expenses. As it never rains but it pours, the extremely profitable sales of iodine to the Allies for the treatment of the wounded have practically ceased since the signature of the armistice. On the prospective reduction or disappearance of dividends, nitrate shares have, as we expected, suffered a severe fall, and those of our readers who happen to hold these cannot complain of not having been warned against the risk.

NEWS FROM THE ANTIPODES.

[FROM OUR OWN CORRESPONDENT.]

SYDNEY, June 9.

Wages in the Soap Industry.—Fresh claims have been submitted by the Factory Employees' Union in connection with the soap and candle industry. It is requested that the hours of labour shall be 44 per week, except in cases of night work. The rate of wages includes: Working foreman on any shifts in glycerine room, £5.; man alone, or with only one assistant, in glycerine room, £4. 15s.; all other labour in glycerine department, not classified, £4. 10s.; yardsmen and warehousemen, £4. 7s. 6d.; man in charge of soapmaking, £5. 10s.; assistant soapmaker, £5. 5s.; soap mixer and boiler, £4. 5s.

Castor Oil.—In addition to the castor oil made in the Commonwealth from imported beans, Australia and New Zealand import 500,000 gallons annually from India. And this expensive importation, it is claimed, is quite unnecessary, for, according to Mr. Pye, Director of the Dookie Agricultural College, Australia could supply her own needs as to this commodity. In the course of his report on the subject to the Institute of Science, Mr. Pye states that undoubtedly in Queensland and in the warm parts of other States the production of castor beans would be excellent. He recommends that a small area of one of the northern irrigation settlements be devoted to the production of castor beans, for, judging by his experience in the north, he is of the opinion that complete success would be met with.

By-products From Wood.—Giving evidence before the Industries Committee at Palmerston North, New Zealand, as to the value of by-products obtained from wood, Mr. J. A. Nash stated that from one cord of rata wood £56. worth of acid, 16s. worth of oil, 15s. worth of tar, and £10. worth of charcoal could be obtained. He said any wood could be used, and even sawdust. A company was being formed to carry on the work here. Captain Proove stated that dyes could be obtained from native woods, and had been used by Maoris for dyeing flax mats. He suggested scientific investigation by the Government. Mr. J. M. Johnston suggested that the Gov-

ernment should make experiments with English hemp in suitable districts, and advocated a geological survey of the Dominion to locate coal and minerals in payable quantities. Mr. M. A. Elliott urged the Government to assist in producing by-products from wool scouring.

Dye Imports.—The importation into Australia of dyes of other than British origin was prohibited by Proclamation of February 25 last. The Commonwealth Government state that permission will be given for the importation of foreign dyes in cases where the Commissioner for Dyes, Board of Trade, certifies that the same dye of British manufacture or an effective British substitute is non-existent or produced to an inadequate extent, but the quantity admitted under this concession is not to exceed six-months supply. It is also explained that for the purposes of the Commonwealth Proclamation, "British" means produced or manufactured in a finished state in some part of the British Empire and thence shipped to Australia.

Market.—Caustic soda, English brands, is becoming very scarce. For 76 per cent. holders are asking £35., and for 72 per cent. £32. American is obtainable at about £28. in distributing lots. G grade rosin, in wholesale parcels, is quoted at from £30. to £30. 10s., and N grade at from £34. to £34. 10s. net. Distributing rates are somewhat higher. A small lot of soda ash has changed hands at £15., but it is stated that this is somewhat above the market. Japanese carbide sells at from 38s. to 40s. a drum. Regarding chemicals generally importers emphasise that present prices in Sydney are, and have been for some time, below indent equivalents. Trading has been done from stocks in hand, and when these are exhausted different prices must rule. Some of the wholesale quotations for various lines are interesting. Citric acid is quoted for large parcels at 3s. 7½d., English make, while Italian is cheaper. Cream of tartar, English, is quoted at 3s. 3d., while Italian has sold as low as 2s. 9d. These prices are below indent equivalents, as the c.i.f. and e. prices quoted from abroad are—for citric acid 4s. 7d., and for tartaric 3s. 4d. Sales of silicate of soda between houses have been made at £28. Other quotations are:—Alum: Japanese, £30.; English, £33. per ton. Arsenic: White, £70.; grey, £65. per ton. Bluestone: Macclesfield's, £54.; Japanese, £44. net per ton. Boracic acid, £90. per ton. Borax: Powdered or lump, £60. per ton. Carbon bisulphide: Colonial, 10d. per lb. Carbolic acid: English, 98 per cent., 9s.; colonial, 9s. per gallon. Cyanide, 98 per cent., 1s. 7d. per lb. Quicksilver, 7s. per lb. Soda: Bicarbonate, in kegs, £18.; soda crystals, £10. Sulphur: American flowers, £36.; Japanese, common, £18. per ton. Oxalic acid, 2s. 9d. per lb. Chloride of calcium, £20. per ton. Whiting, English, £19. per ton. Oils and paint materials prove slow of sale, the prolonged spell of wet weather having affected business. Linseed oil is quieter on the basis of 8s. 4d. per gallon for raw. American white lead is offered at from £68. per ton, and Australian at from £67., according to quantity. Stocks of British white lead are reported small at £86. basis. Turpentine steady at about 5s. 8d. per gallon. Vegetable and Eastern seed oils dull. Japanese cottonseed oil offered at 8s., rapeseed oil at 8s., and soya bean oil at 7s. 6d. per gallon. Australian castor oil is to be had at 7s. 6d. Fish oils weak. Japanese cod oil on offer at 4s. 6d., and herring No. 1. at 4s. 3d., while New Zealand whale oil has sellers at 4s. In sympathy with the rise in the value of tallow, candles have advanced in price about ½d. per lb., and all tallow derivatives are higher. It is stated that soaps, what with tallow prices, and the other ingredients advancing, are now about 75 per cent. dearer than they were a few months ago.

SCIENTIFIC PRODUCTS EXHIBITION.—A notable exhibit at the British Scientific Products Exhibition, now being held in London, is that of the Lennox Foundry Co. Ltd., Tantiron Foundry, Glenville Grove, London, S.E. 8. In addition to working plant which is on view, photographs are shown of chemical plant manufactured by them, including autoclaves up to 500 gallons capacity and for pressures up to 50 atmospheres; compressors for Haber synthetic ammonia plant; nitrate of ammonia separators (plants having a capacity of 70 tons per day have been constructed); and semi-industrial electrically-heated plant for vacuum drying, etc. The Lennox Foundry Company also show their well-known acid-resisting metal, "Tantiron," in various forms, including special metal for hydrochloric acid.

BRITISH ASSOCIATION OF CHEMISTS.

"It we don't hang together we shall assuredly all hang separately."
—JOHN HANCOCK, when signing the Declaration of Independence.

Hon. Registrar: Dr. FRANCIS W. KAY,
Chemical Department, The University,
Liverpool.

NOTICES.

NOTICES and reports from secretaries of local Sections and articles and correspondence for these pages should be sent to the hon. editor, Dr. E. H. Rodd, 7, Mauldeth Road West, Withington, Manchester, and not to the *Chemical Trade Journal and Chemical Engineer*.

The hon. editor will be glad to receive short articles on the views of members with respect to the B.A.C., its aims and aspirations, for publication in these pages. Such articles should be accompanied by the name and address of the writer, not necessarily for publication.

Reprints of the proceedings of the British Association of Chemists as published in the *Chemical Trade Journal and Chemical Engineer* can be obtained from the hon. editor on payment of an annual subscription of 4s.

Applications for membership of the B.A.C. should be sent to the Registrar, Dr. F. W. Kay, not to the Hon. Editor.

THE PROCEEDINGS OF THE ASSOCIATION.

The Council.

A meeting of the Council was held on Saturday, July 12, at the St James's Hotel, Derby, Professor J. W. Hinchley in the chair, and ten members present.

Nominations Committee.—On the recommendation of the Nominations Committee, forty-seven candidates were elected to full membership of the Association. A number of other names of candidates were submitted, but were referred back to the Nominations Committee. These latter names had been referred back by the Nominations Committee to the local assessors, by whom, after further scrutiny, they had been approved, but they had not been finally confirmed by the Nominations Committee. Complaints of delay in dealing with applications have been made, but it was pointed out that the Nominations Committee have a difficult task to perform, requiring considerable care, and that there is a certain amount of inevitable delay because the members of the committee live in different parts of the country. The work is to be accelerated as much as possible.

It was reported that certain sections have not yet appointed local assessors, and a motion proposed by Mr. Millington, seconded by Mr. Crowther, "That local sections which have not appointed assessors be asked to do so at once," was carried unanimously.

Whitley Councils Committee.—The minutes of a conference held in Manchester on June 21 between the National Union of Scientific Workers, the National Association of Industrial Chemists, the Oil and Colour Chemists' Association, and the British Association of Chemists to consider the question of the representation of chemists on Whitley Councils, were read by Dr. Forster. At this meeting the practical steps to be taken for the formation of a federal body representing the various societies had been considered, but little progress had been made, because some of the delegates had not been invested with full powers by the societies which they represented. The Whitley Councils Committee of the B.A.C. therefore requested to be given authority to come to definite decisions on behalf of the Association at the next conference. After a lengthy discussion, a motion was carried unanimously: "That the delegates attending the next conference should have full power to act for the B.A.C., but that the result be submitted to the Council for ratification."

Trade Union Registration.—Mr. Millington submitted the first draft of the proposed regulations. It was agreed that a copy of this draft be sent to all local section committees for suggestions and amendments, which are to be forwarded to Mr. W. E. Kay. The draft is then to be submitted to a solicitor.

Munition Chemists Committee.—The Committee appointed at the last meeting of the Council to inquire into the treatment of chemists employed by the Ministry of Munitions presented a full report. It was shown clearly in the report that the Ministry refused to consider applications for a revision the scale of salaries of chemists because the chemists were taking joint action, whilst, at the same time, the Government were encouraging the organisation of other classes of workers in self-defence by promoting the formation of Whitley Councils. It was decided to bring the matter before the notice of Parliament with the least possible delay. Pro-

fessor Hinchley promising to approach members of Parliament at once.

Salaries.—The question of minimum salaries for qualified chemists came up for discussion, and various suggestions were made. As some of the sections had not yet given the matter full consideration, it was decided to submit the proposals to the local sections for them to consider before coming to a final decision.

Income Tax Rebate.—The question of income tax rebate for chemists on account of books, subscriptions to societies, and other necessary expenses of the professional chemist, was brought forward for discussion by the Leeds and Bradford section. It was pointed out that at present the granting of a rebate seemed to depend on the personal idiosyncrasies of the local surveyor of taxes. The Society of Dyers and Colourists has definitely obtained a rebate on the subscription of its members, and there is no reason why all subscriptions should not be exempt from tax. It was resolved: "That the members of the Committees should send any suggestions with regard to rebate on income tax to the secretary of the Leeds and Bradford section, who shall draft a letter to the Income Tax Commissioners for submission to the next Council meeting."

Other Business.—A letter was read from Miss A. S. White, of the Chemists' Department of the Admiralty, Portsmouth, asking for propaganda material in connection with the B.A.C., and for a list of chemists in Government employment who have joined the Association to date. It was resolved: "That Miss White be asked to act as consul to the Civil Service Section of the Portsmouth district for the B.A.C."

In connection with the advertisements which are discussed in a separate article in this issue, the Council decided to take action by writing to the editors of the journals in which the advertisements appeared, pointing out their undesirable character.

A motion was passed requesting local secretaries to supply matter for the Proceedings of the Association for publication in the *Chemical Trade Journal and Chemical Engineer* at least once a month.

The next meeting of the Council will be held at Derby on August 23.

UNPROFESSIONAL CONDUCT.

At the meeting at Derby on July 12 the attention of the Council was drawn to two advertisements which had recently appeared in the technical press, and which revealed the possibility of the existence of two forms of very undesirable conduct practised, presumably by members of the chemical profession. Such practices are unanimously condemned by the Council as being against the best interests of all members of the profession, whether employers or employees, and it is felt that they should be brought prominently before the notice of the members of the B.A.C.

The first example is contained in an advertisement in which a prize of £100. is offered for the best descriptive method of producing a commercial chemical of a prescribed strength and purity. The offer may have been perfectly innocently made by the advertiser, but the procedure furnishes obviously a means of obtaining the greatest possible amount of information for the least possible outlay—a sprat to catch a whale; a prize of £100. in exchange for perhaps many thousands of pounds profit. Apparently all the competitors for the prize put their information unreservedly at the disposal of the advertiser, who, although he may reluctantly be compelled to withhold the prize on account of none of the attempts being suitable for his purpose, may still make out a composite process from the information thus gained gratuitously.

Who, it may be asked, is likely to enter for this competition? Not a manufacturer having a working process. Nor, it is to be hoped, would a chemist or a workman employed by such a manufacturer sell the confidential information which he has acquired in the course of his service. On the other hand, no chemist who had laboriously worked out a process at his own expense would be likely to part with information on the chance of winning an amount which might easily be less than he had expended on his research. Many chemists are, however, so poorly paid that the prize offered might be a real temptation to some of them to commit a breach of trust. It is difficult to conceive to whom the advertisement would appeal except to such people as these, and in these circumstances the method of procedure cannot be too severely condemned. Any person who wishes to obtain information regarding a chemical manufacturing process can approach a consulting chemist, or employ research chemists of

his own, or make a reasonable arrangement with somebody having practical experience of the subject. The offer of a prize, as in this instance, gives rise to grave suspicion.

In the second case to which the attention of the Council was drawn, an analytical chemist was advertised for, and applicants were required to carry out a difficult test analysis before their applications for the post could be considered. Up to the present, so far as is known, the advertiser has proved very difficult to satisfy, or is extremely slow in coming to a decision. Here, again, it appears that the information is being obtained "on the cheap." The analyses are done, and the advertiser is under no obligation to employ the applicant or to pay him a farthing for the work he has carried out. The procedure is one which must be condemned. A chemist must be accepted on the strength of his qualifications, to obtain which he has been through an expensive training. When a standard qualification is recognised for all chemists we shall be adequately protected against such attempts at exploitation, and this is one of the objects for which the B.A.C. is fighting. These two instances emphasise most strongly the need for thorough organisation of our profession on the lines which have been adopted by the B.A.C.—the union of all qualified chemists for their economic welfare.

A SWEATED INDUSTRY.

The following has been received from a correspondent:—"It was with great interest that I read the article 'A Sweated Industry' in your issue of July 5, and I can fully endorse the same. I am an analytical chemist and assayer with considerable experience during the past 16 years both here and abroad. I have just returned from the front, where I was chief gas officer to the 1st Australian Division, with which I left Australia in 1914. On arriving here last January I looked around for months for a position, and was really astonished at the salaries offered to experienced men. The standard appears to be £150., and this is ridiculous in these days. Further, girls seem to be preferred to men.

"What sort of a show would we have made in the past war if we had not had the services of our chemists? Think of the gas attacks and the experiments and research which had to be carried out before we got the upper hand in this direction. Then, again, look at the advance made with our flying machines, which would not have been possible without the aid of chemists. Many of our people do not seem to realise this. Our profession is the worst paid of all; and, personally, I am sorry now that I did not go in for coal-mining, as the miners appear to get all they ask for!"

Our correspondent concludes with the suggestion that the B.A.C. should organise an employment bureau, keep a register of qualified chemists, and secure for chemists a reasonable standard of salaries. All these matters are, of course, engaging the closest attention of the Council, and are gradually becoming materialised.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

(SPECIALLY CONTRIBUTED.)

The outlook in West Cumberland has worsened rather than improved. It is true that there is as yet no slackening in the demand for the low phosphorus brands of iron, but requirements of ordinary iron are dwindling, and there is a furnace less in blast this week on the kind of iron for which the local coke is used. The prospects are not good. Rail-makers on the coast are working from hand to mouth. They are not able to get orders in face of the American competition, and there seems nothing for it presently but the closing down of the rolling mills at Workington and Barrow. In that case, of course, the coking industry will be the first to suffer, and unless an export market can be found it is to be feared that most if not all of the plants will be laid idle. Up to the present, however, all but one of the coking plants are working, though only at two-thirds of their capacity; and the make of by-products has, of course, correspondingly declined. None, save benzole and sulphate of ammonia, however, are in keen request. Benzole is being taken largely by Irish users, but there is also a good local market for the spirit. Sulphate of ammonia is freely absorbed, in spite of the fact that none of it is going abroad. Pitch and creosote are in diminished demand, and very little in fact has been shipped of late. For other by-products the demand is extremely limited, and a portion of the plant of the chemical works is idle.

GAZETTE NEWS.

LIMITED COMPANIES.—Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions, Orders, and Official and Other Notices.

Abbey Chemical Company, Ltd., London, E.C.—J. Fabian, 27, Clements Lane, E.C., chartered accountant, appointed receiver July 11.

Boundary Chemical Company, Ltd.—Resolved June 23, confirmed July 9: That the company be wound up. H. Sadler, 31, North John Street, Liverpool, chartered accountant, liquidator.

Craven Lime Company, Ltd.—Resolved June 23, confirmed July 14: That the company be wound up with a view to its reconstruction. G. H. Archer, Burley Grange, Leeds, liquidator, who is authorised to consent to the registration of a new company.

New Cheshire Salt Company, Ltd.—Resolved June 18, confirmed July 16: That the company be wound up. E. Andrews, 13, Eastgate Row North, Chester, incorporated accountant, liquidator. Meeting of creditors at liquidator's, July 31.

Pusing Bharu Tin Mines, Ltd.—Resolved June 26, confirmed July 14: That the company be wound up. H. P. Hood, 65, London Wall, E.C., liquidator. Meeting of creditors at liquidator's, July 31.

Pusing Lama Tin Mines, Ltd.—Resolved June 26, confirmed July 14: That the company be wound up. H. P. Hood, 65, London Wall, E.C., liquidator. Meeting of creditors at liquidator's, July 31.

Siputeh Tin Mines, Ltd.—Resolved June 26, confirmed July 14: That the company be wound up. H. P. Hood, 65, London Wall, E.C., liquidator. Meeting of creditors at liquidator's, July 31.

Treburland Wolfram and Tin Company, Ltd., London, E.C.—Meeting of creditors registered office, 87, Bishopsgate, E.C., August 1, at 12 noon.

DISSOLUTIONS OF PARTNERSHIP.

(Note.—When two dates are given in the following announcements, the first is the date of the dissolution. The date in parentheses is that of the official advertisement.)

Bowley, S., and Son (Joseph Jno. Bowley and Joseph Plunkett Bowley), Wellington Works, Wellington Road, Battersea Bridge, oil importers and refiners. August 21, 1918. (July 18.)

Couch and Co. (Geo. Edwd. Hunt, Wm. Ernest Moist, Chas. Wright, and Francis Joseph Emblem), Berkley Metal Works, Berkley Street, Birmingham, metal refiners. June 30. Debts by G. E. Hunt and W. E. Moist at 6, Berkley Street, Birmingham. (July 15.)

NEW COMPANIES.

Associated Lead Manufacturers, Ltd.—Capital £1,500,000., in 1,000,000 preference and 500,000 ordinary shares of £1. each. Office: 70, Lombard Street, E.C.

Carbon Smokeless Fuel, Ltd.—Capital £75,000., £1. shares. Object: To acquire coal mines, coal, coke, coal gas, and chemical substances for the manufacture of benzole and sulphate of ammonia. Office: 5, Albany Court Yard, Piccadilly, W.

Forster's Glass Company, Ltd.—Capital £350,000., £1. shares (175,000 7½ per cent. cumulative preference). Registered office: Atlas Glass Works, St. Helens, Lancs.

Gwinear Tin Mines, Ltd.—Capital £60,000., 5s. shares. Office: 63-4, New Broad Street, E.C. 2.

Activated Sludge Company, Ltd.—Private company. Capital £30,000., £1. shares. Object: To acquire a process of sewage purification and of treatment of residual sewage known as the Activated Sludge Process, carried on by Jones and Attwood, Ltd., at the Titan Works, Stourbridge. Solicitors: Harward and Evers, High Street, Stourbridge.

Broughton Dye Manufactory, Ltd.—Private company. Capital £2,000., £1. shares. Object: To acquire the business of dye manufacturers carried on by Shinzo Yamaji and J. F. Gleave at Manchester. Solicitor: F. C. Webb, 26, Corporation Street, Manchester.

Cooper Metals (Coventry), Ltd.—Private company. Capital £3,000., £1. shares. Office: 42, Earl Street, Coventry.

ITEMS OF INTEREST.

SCIENTIFIC PRODUCTS EXHIBITION AT GLASGOW.—Glasgow Corporation has arranged for the British Science and Key Industries Exhibition to be held there from November 17 to November 29.

PATENTS AND TRADE MARK CONGRESS AT BRUSSELS.—An International Congress of Allies and Neutrals to discuss the question of Patents and Trade Marks is being organised to take place at Brussels in September.

FIRE.—Damage estimated at £20,000.. was caused by a fire at the basic slag works of Messrs. Bolckow, Vaughan and Co., between South Bank and Grangetown, near Middlesbrough, on Saturday night. The works were completely gutted, and much valuable plant and machinery were destroyed.

NEW INDUSTRY AT SELBY.—A new enterprise is reported from Selby (Yorks.). Several acres of land in the Holmes, near this market town, have been purchased for the erection thereon of a chemical works. It is stated to be for a firm of Swiss manufacturers, and one of the principal products will be eau-de-Cologne.

CHEMICAL WORKS FATALITY.—A fatal accident occurred at the United Alkali Co.'s works, Flint, on Wednesday. Two workmen, John Henry Martin and William Williams, were working in an acid still, when it collapsed. Martin was completely buried, and when rescued was found to be dead. Williams received serious injuries.

REPORTED SALE OF OLYMPIA OIL MILLS.—A Darlington newspaper last week announced that the Olympia Oil and Cake Mills at Selby, and the associated undertakings of the Selby Warehouse and Transport Company and Ardol, Ltd., were being transferred to other ownership, and mentioned the name of Jurgens, Ltd., margarine manufacturers.

REVISED FRENCH IMPORT REGULATIONS.—The *Board of Trade Journal* publishes a translation of the new French official decree, further relaxing the import restrictions, as from July 13. Import prohibitions in respect of the following, among other, articles are abolished: Potash, coal-tar dyes and intermediate coal-tar products, and perfumery.

OBITUARY.—Mr. George Thomas Barker, for many years manager at the Runcorn works of the United Alkali Co., Ltd., died suddenly on Friday of last week, at the age of 51 years.—The death is announced, at 67 years of age, of Professor Emil Fischer, professor of chemistry in the University of Berlin, foreign member of the Royal Society, and Nobel laureate in chemistry in 1902.

SILVER CHLORIDE.—An investigation of the vapour pressure of silver chloride is in progress at the Berkeley station of the U.S. Bureau of Mines. The method is not yet sufficiently standardised to yield thoroughly reliable results, but the work so far indicates that the vapour pressure of silver chloride is less than 5mm. at 1,000°C., and in the vicinity of 15mm. at 1,150°C. It is therefore much less volatile than lead chloride.

PERSONAL.—It is announced that Professor W. M. Gardner, Head of the Chemistry and Dyeing Department of Bradford Technical College since 1895, and Principal of the College since 1906, is retiring on account of ill-health.—Owing to continued ill-health, Mr. Cyril Haslam has been obliged to resign the chairmanship of Joseph Crosfield and Sons, Ltd., Warrington. The directors have elected Mr. Giles Hunt to be chairman in his place.

LIMESTONE RESOURCES OF NEW SOUTH WALES.—The great importance of the limestone industry to New South Wales is emphasised in a publication issued by the State Department of Mines. The value of the annual production of limestone and its products within the State has risen from an insignificant amount until now it exceeds £500,000, and ranks sixth in importance of the mineral industries of New South Wales. This marked growth is due primarily to the rapid increase in the output of Portland cement since the first modern plant, fitted with rotary kilns, was erected in 1901, the annual production having increased from about 10,000 tons in 1900 to approximately 130,000 tons in 1917. The numerous analyses given, except in specified cases, must, in view of the large areas represented by some of the samples, be taken only as indicative of the composition of the limestone in question. In the event of any of these deposits being commercially exploited for purposes where a uniform quality of limestone is imperative, more adequate bulk sampling, together with careful analytical tests of different bands or beds in the deposit, would, of course, be necessary.

NEW ISSUES.—Borax, Consolidated, Ltd., are issuing 250,000 deferred ordinary shares of £1. each at 37s. 6d. per share, ranking with the existing shares for dividend from October 1 last.—Formed with a capital of £250,000. in £1. ordinary shares, the Oilfields of England now invite subscriptions for 170,000 of these at par. The company has been granted a Government licence to bore for and produce petroleum oil within an area of about eight square miles, known as the Kelham Estate, situated near Newark, in the county of Nottingham.

NEW FRENCH CUSTOMS DUTIES.—By a French Presidential decree of July 8, the Customs duties leviable on a large number of manufactured goods on importation into France and Algeria were increased. For this purpose, for each category of goods specified in the tariff a "coefficient" or multiplier was fixed respecting the relation between the values of the goods in 1913 and in 1918 according to the official valuations laid down for those years by the Permanent Commission on Customs Values. The present rates of duty are therefore the specific rates contained in the pre-war tariff multiplied by the "coefficient" (varying from 1.1 to 3) attributed to the class of article concerned. In the case of "chemical products obtained from coal tar," for example, the "coefficient" is 2.5; and for "dyes derived from coal tar, picric acid, and other colouring matters," the "coefficient" is 3.

BUSINESS NOTICE.—We are informed that owing to the rapid extension of their business, the Deptford Steel and Ironworks, Ltd., incorporating the Homogeneous Lead Coating Co., have agreed to lease an extensive new factory in Bradley Mills Road, Huddersfield, in order to carry on their business of chemical plumbers and electro-platers, which was started at Deptford in 1915. The company's specialities are the homogeneous lead lining and coating of receivers, tanks and chemical plant of all description, electro-tinning, zincing, leading and coppering, also sherardising. The results obtained in practice by their special process of homogeneous lead lining have proved to be of utmost value to the chemical trade, especially those processes in which the vessels in use have to be subjected alternatively to pressure and vacuum. We understand that at the present time they have large orders in hand for electro-tinning vessels for holding the various oils used in the manufacture of margarine.

SOAP, OIL, AND CANDLE WORKERS' DEMANDS.—Dissatisfaction in the soap, candle, and oil refining industries was discussed at a gathering of workers in the Port Sunlight and Bromborough district on Sunday last. Recently a demand was made before the Court of Arbitration for 15s. per week advance for men and 7s. 6d. per week for youths and women, and it was refused. Reports from Leeds, Manchester, Birmingham, London, Glasgow, Bristol, and other places were submitted as to the feeling of the workers, and the Port Sunlight shop stewards committee during the week had passed a resolution requesting the Union Executive to take action within ten days. Mr. Jones, one of the organisers, said they had to meet the Industrial Council in the trade in order that the matter might first be discussed with the employers, and, should no result come of the effort, then the Executive would probably ask for more serious support. A resolution to defer further action until after the Industrial Council meeting was unanimously passed.

SELENIUM APPLICATIONS.—In an article on selenium and its applications, by L. Ancel (*Chimie et Industrie*), attention is drawn, among other things—mostly well known—to the use of selenium cells as smoke recorders in chimneys. A selenium cell is mounted on one side of a chimney or flue; on the opposite side is fixed a lamp. The amount of light falling upon the selenium and hence the resistance of the cell will depend upon the density of the smoke in the flue; the fire can therefore be controlled by the galvanometer records. Ancel describes the device very briefly; he mentions that the cell should admit of easy access, so that the smoke settling on the glass cover of the cell may be wiped off, and also that selenium cells are very sensitive to infra-red heat rays as well as to light. It is not settled yet, in fact, whether the light effect on selenium is not essentially a heat effect; that point would in a way militate against the reliability of the selenium cell to act as a smoke recorder. We should also like to hear more about the other novel application of selenium cells, mentioned by Ancel, for controlling the contact sulphuric acid process by the degree of the transparency of the gases in the reaction tube. Ancel, however, does not give any technical data.—*Engineering*.

PARLIAMENTARY NEWS.

Patents and Designs Bill

IN the House of Commons on Monday, Sir A. Geddes, President of the Board of Trade, moved the second reading of the Patents and Designs Bill. He said it was very urgent that we should have, now that we were looking forward to restoring trade, certain new powers and improvements in our patent laws. Broadly, the position of the bill was to improve the position of the inventor, and to make it easier for the man without capital who was an inventor to get the fruits of his invention to himself, and remove him from the position in which so many poor inventors were of having to part far below the real value of their inventions with their rights in them in order that they might be worked at all. That was provided for under Clause 2. Under Clause 1 they had a whole series of arrangements by which they hoped to prevent the abuse of patents, whereby in the case of certain foreign-owned patents the mere fact that this country gave patent protection was utilised by unscrupulous competitors to do damage to the country whose benefits they were receiving. In Clause 6 there was a very important provision with regard to the duration of protection which a patent conferred. The present duration of protection was 14 years. They proposed that it should be increased to 16 years. During the war it had been quite impossible to get many patents worked, and inventors had lost some years which might have been fruitful. It seemed an act of justice, therefore, that there should be an extra period of protection given. In addition to the automatic extension of two years they also had certain provisions which would enable on cause shown a further extension to be obtained by those who had suffered. By the combination of these two methods they hoped to meet the difficulty and also to give greater encouragement to the inventor. There were in Clause 18 provisions for dealing with the patent agent and transforming that calling into a profession.

Mr. Wallace directed attention to the position in the boot and shoe machinery trade, which, he said, was held as a monopoly in this country to the extent of 85 per cent. by an English company with headquarters at Leicester—the British United Shoe Machinery Company. Though it was registered in Leicester, it was really an American company in disguise. The American Company controlled the whole policy of the English company. In about twelve years they succeeded in eliminating all other competition in the United States. They bought up every possible patent, and in that period profits to the extent of 50,000,000 dollars had been amassed. At present the company controlled 98 per cent. of the whole trade in America. If a bootmaker wanted to buy boot and shoe machinery he found he could not buy it from the English company, but he could only lease it on certain onerous terms. Taking the case of a firm which wished to instal a machine or the British Machinery Company, it was leased under certain conditions over a term of years. At the same time the firm must bind itself that whenever any other machine would run out they would on no account buy from any other firm. If in the course of a year or two the firm had bought one or two other machines and leases were running out at different times, they discovered that once they were within the meshes of that company there was absolutely no escape. He thought that was an intolerable position for a great British industry. In the interest of freedom of trade and commerce, and from the point of view of encouraging legitimate competition and stimulating British invention, he hoped the President of the Board of Trade would seriously consider the effect of this position on the boot and shoe machinery trade in this country. He moved the rejection of the measure.

Sir E. Jones seconded, and expressed disappointment and astonishment that the President of the Board of Trade had not provided for dealing with this serious matter spoken of by Mr. Wallace. It was a monopoly which during the war had been found to be too powerful for the Government.

Sir G. Croydon Marks said that Clause 1 of the bill dealt very effectually with the very abuse of which hon. members had complained. It remedied it in a way the Americans could not get round. The moment the bill passed every American licence was nullified. He urged that patents ought to be extended beyond sixteen years. While there had been five years of war, and five years of taxes paid and Government fees received, the Government were now going to give only two years extension, and he thought in that respect the Government had not gone far enough.

Mr. W. Graham said that there was no desire on the part of the promoters of the motion to deter the progress of the bill,

but what they were concerned with was to make absolutely certain that the bill would meet a very difficult and a very trying set of circumstances of the highest importance to industry in this country. They would not press their motion for rejection but they urged that it must be strengthened to deal with the trust influences otherwise it would largely fail to attain the object it had in view.

Sir W. Pearce thought the House would be glad to hear that hon. members did not intend to press their motion for the rejection of the bill. They had made a very strong case, and if Clause 1 did not meet the case, perhaps the Government might be prepared to agree to Amendments in Committee. But there was no provision, so far as he could see, to meet what had happened during the war. During the war any application for a patent had been obliged to carry nationality, and there had been a good many restrictions which provided that everybody should know on whose behalf protection or a patent was required. He was not at all sure something of the same sort was not necessary in this bill, and he could see nothing of the kind to meet what had been instituted during the war. He welcomed the bill as a great improvement on the bill which was drafted in 1917. He was sure the Government had been wise in extending the term limiting the duration of patents from fourteen to sixteen years. They had not gone as far as industry and science desired, but they had gone some way. Not only during the war had it not been possible to work a patent, but during the present time it was difficult to get any plant to put a patent into operation, and therefore he was quite sure the Government had been wise in granting this extension. Clause II. was a great improvement, speaking for the chemical industry. The Clause, as now drafted, depended upon process rather than the actual substance itself, and in that, he thought the Government had taken the right view. He noticed that no difference had been made in the Court of Appeal. He knew that scientific industry would be very glad to see a different Court of Appeal. They would like a special Court with technical knowledge. It had been pressed upon the Government on many occasions, and he would like again to suggest to them that, when the bill got into Committee, they might be prepared to listen to suggestions of that kind. But in many respects the bill was a great improvement. It was a great addition to the law of 1907, and a great improvement on the Government's first attempt in 1917.

The Solicitor-General (Sir E. Pollock) said that within the proper limits of a Patent Bill he thought that his right hon. friend had gone as far as he ought to go. But in regard to those trusts and the restraint of trade, these must be dealt with in a trust bill, which, he understood, would be introduced in the autumn. The bill was read a second time.

Trade Marks Bill.

Sir Auckland Geddes in moving the second reading of the Trade Marks Bill, said that it fell naturally into three parts, the last part being a series of minor amendments of existing legislation. The first and second parts were of some importance. The first part of the bill proposed that there should be a second class of trade mark rather different from that with which we had been familiar. It was intended to have a list of trade marks which had a common law existence and could be protected. For that purpose it was proposed to have a Part B of the Register of Trade Marks, and it would be much easier for anyone who wished to register to get on to that part than on to Part A. The second part of the bill was of very considerable practical importance. There was a great abuse at the present time in connection with the use of words in trading, and it was to deal with that abuse that this second part of the bill was designed. For example, there was the case of drugs which in the past were patent drugs. During the course of their existence their name had become the one practical description of them, and when the name became a trade mark they had a permanent continuation of the patent protection. Aspirin was a case in point. It was to deal with these blocking names of other manufacturers of the same chemical substances that this bill was brought before the House. It was not an ambitious measure, but quite a modest one, and he thought that it would make a great improvement in our present legislation governing the use and protection of trade marks.

The bill was read a second time.

Alcohol Motor Fuel.

Mr. Manville asked the Prime Minister what action, if any, has been taken to give effect to recommendation No. 17 of the Interdepartmental Committee on Alcohol Motor Fuel, which Committee reported under date June 23 last (Command Paper

(Continued on page 125.)

PARLIAMENTARY NEWS.

(Continued from page 124.)

No. 218) that an official organisation, permanent in character and provided with the necessary funds, should be established forthwith by the Government to encourage and develop the production and utilisation of power alcohol within the Empire as a fuel alternative to petrol?

Mr. Bonar Law: The report has been referred to the Scientific and Industrial Research Department, with special reference to the Recommendation No. 17, and the question is at the moment under consideration.

Nitrogen Products Committee Report.

Captain W. Benn asked the Parliamentary Secretary to the Ministry of Munitions whether the report of the Nitrogen Products Committee is ready; if so, when will it be published; and whether other countries are already establishing factories and availing themselves of the investigations made by this Committee?

Mr. Hope: The report has been received and is under consideration, as is also the question of publication. I am not aware of action being taken in other countries such as that suggested in the question.

Woolwich Arsenal Cordite Fire.

Sir Kingsley Wood asked the Parliamentary Secretary to the Ministry of Munitions whether he can make any statement concerning the cordite fire which took place at Woolwich Arsenal on July 23.

Mr. Hope: The fire in question occurred during the breaking down of unserviceable small arms ammunition. During the operation of extracting the cordite one of the cartridges caught fire. It is surmised that some of the cap composition had broken loose and had got into the cartridge case, and that friction caused by the extraction of the cordite ignited it. The flame spread to other cartridges and caused a fire. This is the first instance that has occurred of any ignition of the charge, though the operation of breaking down small arms ammunition has been going on since 1917.

LEGAL INTELLIGENCE.

Starch Contract.

In the King's Bench Division on Monday, Mr. Justice Bailhache gave judgment in an action brought by Messrs. Joseph Cowden and Co., Liverpool, against the Corn Products Co., Ltd., London, for damages for alleged breach of contract in connection with a shipment of 770 tons of starch. The defendants relied upon the *force majeure* clause in the contract.

Mr. Justice Bailhache, in giving judgment, said the defendants had not succeeded in bringing their case within the protection of the *force majeure* clause. The defendants had failed to prove to his satisfaction that they made the necessary contracts for the shipping space required for the conveyance of the goods. His Lordship also saw no evidence at all to show that if such space was secured it was in fact commandeered by the British authorities. There must be judgment against the defendants.

His Lordship left the question of damages standing over to see if the parties could agree between themselves. It might be that business men could arrange it by some further contract. He would take the date of the breach as around the end of February or the beginning of March.

After counsel for the parties had consulted together, Mr. A. Neilson, K.C., for the defendants, announced that it was agreed that the price of starch should be based at 80s. instead of 100s. a cwt. He asked for a stay of execution as an enormous sum of money was involved. The claim was for upwards of £46,000., but by the agreement which he announced it might be reduced to somewhere in the neighbourhood of £20,000.

His Lordship granted a stay of execution provided the money was paid into court and an appeal entered within fourteen days.

Failure of a Chemical Engineer.

At the London Bankruptcy Court on Friday last week, before Mr. Francke, the public examination was appointed to be held of George Edward Heyl, described as a consulting chemical engineer, carrying on business at King's House, Kingsway, W.C., lately residing at 78a, Lexham Gardens,

Kensington. The statement of affairs filed by the debtor disclosed gross liabilities amounting to £77,760. 18s. 3d., of which £70,895 18s. 11d. was due to unsecured creditors. The assets consisted of trade fixtures, fittings, utensils, etc., valued at £100., and "consideration for sale of debtor's interest in processes, leases, buildings, plant, book debts, cash and stock at Barking and Corton, near Weymouth, to a company," which the debtor estimated to be worth £300,000., and one book debt for £20., making the total assets amount to £300,120., from which have to be deducted seven creditors for rent, etc., amounting to £313. 12s. 8d., leaving the net assets at £299,806. 7s. 4d., thus showing a surplus of assets over liabilities of £228,910. 8s. 5d.

Upon the debtor's name being called, he did not respond, and the Official Receiver stated that he understood the bankrupt had been granted a passport to go out to Esthonia. He asked that the examination might be adjourned *sine die*, and the learned Registrar said he would grant that application, but at the same time he thought the Official Receiver should write to the Foreign Office to the effect that by the debtor being granted a passport, the Order of the Bankruptcy Court was being set at defiance.

The debtor's solicitor promised to advise his client to surrender to the Court as soon as he returned, but the Official Receiver said he was going to apply for a warrant for the debtor's arrest.

Compensation for an Explosion.

Lord Justice Scrutton, sitting in the King's Bench Division on Wednesday, gave a considered judgment in a case that had been before him for some days arising out of an explosion in September, 1916, at the Rainham Chemical Company's works, when considerable loss of life and damage to property resulted. The plaintiffs, the Belvedere Fish Guano Company, Ltd., claimed to recover in respect of the damage to their works against the Chemical Company and Messrs. S. J. Feltham and R. W. Partridge.

Lord Justice Scrutton held that the plaintiffs were entitled to recover against all three defendants, and there would be a reference for the assessment of the damages.

In the second claim (by Messrs. Ind, Coope and Co.) he also gave judgment for the plaintiffs against the same defendants. Other defendants in that case were given judgment in their favour.

Sequel to a Deal in Soft Soap.

In the Lord Mayor's Court, on Monday, before the Recorder (Sir Forrest Fulton, K.C.), a claim was made by Mr. Frederick Archibald Roberts, trading as the Alliance Trade Extension Agency, general agents and merchants, of Camomile Street, E.C., against Mr. Arthur Bennett, Seeley Street, Tooting, for £35. in respect of the purchase of a ton of soft soap from the defendant which was not delivered.

Mr. Power, counsel for the plaintiff, said that on September 7 last plaintiff bought from the defendant one ton of soft soap at the price of £32. 10s. per ton. Defendant undertook to arrange for delivery. On September 12 defendant called upon the plaintiff and stated that the soap was ready for delivery. The plaintiff gave the defendant a cheque for the price of soap on the faith of the representations that the soap was ready for delivery. The plaintiff's cheque had been cleared, but he had never seen the soap. The defendant was written to on several occasions about the matter, and it was only when the matter was placed in the hands of the solicitor that a letter was written by the defendant, in which he alleged that the sale of the soft soap was made by a company and not by him (defendant). Plaintiff gave evidence in support of his claim, and said had the soap been delivered in accordance with the arrangements he could have resold it at a price of £58. per ton. In those proceedings he was claiming a nominal sum of £2. 10s. for loss of profit, which together with the return of the money paid for the soap made up the sum sued for. There was no truth in the suggestion that he had dealt with a company in the matter and not the defendant.

Cross-examined by the defendant, who conducted his case in person, plaintiff said the only receipt he had for his money was his cheque. He had no sale note.

The defendant, in his evidence, said that the deal in soft soap was made by him for the British Flour Co., Ltd. He had not had the benefit of the money paid him by the plaintiff; it went to the British Flour Co., Ltd.

The Recorder, after hearing the evidence, gave judgment for the plaintiff for the amount claimed, with costs.

REPORTS OF COMPANIES.

Mond Nickel Company, Ltd.

The annual general meeting was held in London on July 24; Mr. Robert Mond, J.P. (chairman of the company), presided.

The Chairman, in moving the adoption of the report and accounts, said that the board had placed the whole of the company's output of nickel at the disposal of the Government during the war, and, in spite of difficulties of labour and material, had doubled the output between 1914 and 1917. But for those difficulties the plant for trebling the pre-war output would have been completed. The make of their other main product—copper sulphate—had also doubled during the war. It was chiefly used for agricultural purposes, and as a result of lengthy chemical research the company had been able to elaborate a mixture called "Blighty," which only required dissolving in the requisite amount of water to form the best spraying mixture. They were satisfied with the progress that article had made on the market. In common with other manufacturing concerns, their cost of production had been immensely increased in the course of the war; but notwithstanding they had succeeded in selling their nickel to the Government at only comparatively slight advances, as they had realised much higher prices for their copper sulphate in the export markets. At home the Board of Agriculture had fixed a much lower price for copper sulphate than that ruling abroad, by which the farmers in this country had benefited. The platinum and palladium from the residues of the refining process had helped to supply the enormous war demand for these precious metals. Dealing with the accounts, the Chairman said that the issue of preference shares last December had been a great success. As regarded stocks, the figure of £2,200,741. showed a large increase, the fact being that, whereas the special war demand for their products had ceased when the armistice was signed, the peace demand did not revive during the financial year; but the directors felt confident, now that the peace treaty had been signed, the revival of trade would within a reasonable time bring those stocks down to a more normal level.

Sir Robert A. Hadfield, Bart., seconded the motion, and it was carried unanimously.

Nobel's Explosives Company, Ltd.

Sir Ralph W. Anstruther presided at the annual meeting held in Glasgow, and moved the adoption of the report, which stated that the net profit for 1918, after providing for depreciation, was £568,615., and £84,881. was brought in. The amount available for distribution, after payment of the preference dividend, was £603,496., and the directors recommend a dividend on the ordinary capital at the rate of 30 per cent., less tax, carrying forward £65,473. The Chairman spoke of the activities of the company during the war; but that was past, and they had to address themselves to problems unconnected with a state of war. Now that the nations of the world were striving to return to peaceful pursuits, the company's products in the industrial sense were amongst those for which the call was made. He was glad to tell them that they were already beginning to feel an increased demand for their commodities. Explosives Trades, Ltd., would be able to direct their activities.

The report was adopted.

Brimsdown Lead Company, Ltd.

Report for 1918 shows net profit of £5,599., after providing for depreciation and income tax. Since the armistice some of the difficulties occasioned by the war have disappeared, and the output has increased. In the early part of this year preference shareholders were invited to express their opinion on a scheme for funding the arrears of preference dividend. The opinion of the majority was in favour of the scheme, but a number of shareholders thought that the present state of the company warranted a somewhat more liberal treatment without greatly disturbing the financial position. The directors are desirous of meeting the wishes of all the shareholders to the utmost extent which the well-being of the company permits, and now suggest the following modification: Instead of their existing shares of 15s. each, the preference shareholders shall take one preference share of 10s. ranking for a non-cumulative dividend at the rate of 7 per cent. per annum from January 1, 1919, and two ordinary shares of 5s. each, all issued as fully paid. Half of the ordinary shares thus issued to preference shareholders will be by way of capital bonus out of undivided profits. Formal resolutions to carry out this object will be submitted.

(Advs. continued from page vii.)

Plant, Apparatus, and Materials
For Sale.—continued.

PARAPHENYLENEDIAMINE
(Ursol). Benzaldehyde.—English manufacturers solicit inquiries; home and export buyers; prompt deliveries; stock.—Box "8,899," Chemical Trade Journal Office, 265, Strand, London, W.C. 2.

SILICA Flour, of all grades, from 20 mesh to 200 mesh; also Extra Fine and Superfine (air-blown) Flour Silica; our 120 mesh grade contains not more than 0.5% residue on interwoven silk test sieve; fine grinding a speciality; grinding of chemicals and minerals undertaken for the trade.—The Star Quarries, Ltd., Cathedral Chambers, 5, St. Werburgh Street, Chester.

FOR Sale.—Best White American
Barvies; spot delivery.—Box "8,950," Chemical Trade Journal Office, 265, Strand, London, W.C. 2.

TWO Horizontal Mixers, by Christy and Norris, 7ft. 6in. long, 6ft. 9in. deep, by 4ft. 6in. wide, constructed of 3in. steel plate, with heavy mixing gears, fitted fast and loose pulleys, 5ft. by 6in. face; almost new.—Box "E.V.," Chemical Trade Journal Office, 265, Strand, London, W.C. 2.

BARIUM Chloride, 3½cwt.; Stearine, 1cwt.; Naphthalenic Acid, 3cwt. Box "8,902," Chemical Trade Journal Office, 265, Strand, London, W.C. 2.

FOR Sale. 10-20 tons Bleaching Powder, in hardwood casks; £12. 10s. per ton, immediate delivery. Particulars, Box No. "H. S. 8,914," Chemical Trade Journal Office, 265, Strand, London, W.C. 2.

Plant, Apparatus, and Materials
For Sale.—continued.

BELLADONNA Leaf.—Produce of about 100 good plants for sale (growing crop); also roots later.—Offers to Box "8,887," Chemical Trade Journal Office, 265, Strand, London, W.C. 2.

FOR Sale.—Three Moritz Mechanical Pyrites Burners, each having 8 shelves, giving a total burning area of about 1,200 sq. ft., and capable of treating about 8 tons of fines per diem; complete with driving gear, air-cooled shafts and arms, gas trunks, hoppers, inspection doors, drying floors, staging, and weigh machine, in sound condition; the burners are of strong construction, and have had very little wear, one being practically new. Four heavy cast-iron Acid Eggs, each about 40 cub. ft. capacity, flanged ends and four flanged services. Inspection and offers invited.—Apply Box No. "8,889," Chemical Trade Journal Office, 265, Strand, London, W.C. 2.

Miscellaneous.

GRINDING of every description of Chemical and other materials for the trade, with improved mills.—Thos. Hill-Jones, Ltd., "Invicta" Mills, Bow Common Lane, London. E. Telegrams: "Medikaster London." Telephone: 3635 East.

George Ellison FOR **ELECTRIC CONTROL GEAR**
BIRMINGHAM

Miscellaneous—continued

GRINDING of Chemicals and Minerals undertaken for the trade; new and up-to-date plant; fine grinding a speciality; complete patent processes carried out under bond of secrecy.—The Star Quarries, Ltd., Cathedral Chambers, 5, St. Werburgh Street, Chester.

WORK two hours daily in your own home. Several pounds weekly easily earned by simply following our valuable printed instructions, which are forwarded for 1s. P.O. also stamped addressed envelope enclosed; I guarantee that failure is impossible; genuine offer, suitable for all. This advertisement is not inserted to deceive the unwary, but to help you to earn an honest living without hard work.—Albert Feather, 95, White Abbey Road, Manningham, Bradford, Yorkshire.

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1/11

DAVIS BROS., 265, Strand, London, W.C.

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

The specifications of the following applications are not printed by the Patent Office until the complete specifications have been accepted.

July 21st to July 26th (inclusive).

- Continuous Distillation and Fractionation of Petroleum, etc. Allan, H. L. 18,405.
 Product for Manufacture of Paint. Barbe, A. L. 18,392.
 Ethylidene Diacetate and Acetic Anhydride. Boake, Roberts, and Co., A.; and Durraus, T. H. 18,116.
 Separation of Sulphur from Furnace Gases. Collins, C. G. 18,255.
 Distillation of Hydrocarbon Oils. Dalley, C. (Greenway). 18,151.
 Extraction of Tin from Tin-bearing Ores. Laurie, D. Northall-; and Osmosis Co. 18,340.
 Sulphate of Ammonia. Lessing, R. 18,358.
 Soap Powders. Nordiska Fabriker De-No-Fa Aktieselskap. 18,538.
 Polymerisation of Un-saturated Fatty Acids. Nordiska Fabriker De-No-Fa Aktieselskap. 18,541.
 Fertilisers Containing Nitrogen and Phosphoric Acid. Norsk Hydro-Electrisk Kvælstofaktieselskab. 18,536.
 Extraction of Gold. Ormandy, W. R.; and Osmosis Co. 18,341.
 Coating Iron, Steel, etc., with Aluminium, etc. Partridge, H. E.; and Thompson, J. and W. J. 18,498.
 Dehydrating, Reducing, Calcining, or Roasting Minerals, etc. Réol, J. 18,584.
 Distilling Petroleum. Wade, H. (Standard Oil Co.). 18,162 and 18,163.
 Reduction of Ores. Wiberg, F. M. 18,337.
 Continuous Analysis of Gases. Wollaston, T. R. 18,280.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 6d. in stamps to the Comptroller, Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane. W.C.

1915.

- Picric Acid. Heinemann. 11,005.
 1917.
 Recovery of Nickel from Its Sulphide or Oxide. Annable, H. W. C.; and Nickel Concentration, Ltd. 17,031. 129,667
 Nitrates. Adams, H. E. F. Goold-; Partington, J. K.; and Rideal, E. K. 17,670. 129,699
 Construction of Acid-resisting Tanks, Conduits, and the Like. Brookes Chemicals, Ltd.; and Brooke, N. 17,836. 129,709
 Treatment of Smoke and Fume or Other Dust-laden Gas. Gibbs, W. E.; Gilderson, R. J.; and Adams, H. E. F. Goold-. 18,179. 129,721

1918.

- Purification of Hydrogen. Rideal, E. K.; and Taylor, H. S. 4,532. 129,743
 Conducting High-temperature Reactions. Testrup, N.; and Techno-Chemical Laboratories, Ltd. 9,655 and 10,930. 129,758 and 129,771
 Apparatus for the Distillation or Treatment of Ammoniacal Liquors and the Like. Wyld, W. 10,162. 129,765
 Extraction of Lead from Its Ores. Elmore, F. E. 11,126. 129,773
 Ortho-oxy-azo-dyestuffs and Chromium Compounds Thereof. Imray, O. (Soc. of Chemical Industry in Basle). 11,458. 129,782
 Obtaining Nicotine, Potash, etc., from Tobacco, Tobacco Stalks, and Offal Tobacco. Jephcott, H. 11,637. 129,791
 Vulcanisation of Rubber. North British Rubber Co.; and Porritt, B. D. 11,686. 129,798
 Determining and Indicating Heat Losses in Furnaces. Chopin, M. 11,724. 129,804
 Toilet Soaps. Betjemann, J. G. 11,733. 129,807
 Obtaining Bromide Derivatives of Indigo and of Its Homologues. Soc. Chimique des Usines du Rhone. 13,618. 119,860
 Sulphate of Ammonia. Oakbank Oil Company; and Wishart, J. 13,842. 129,850
 Denturist for Rendering Alcohol Unfit for Human Consumption. Joseph, A. F. (Ray, W. N., and Symons, C. T.). 19,095. 129,904
 Continuous-pressure Filtering Process. McCaskell, J. A. 19,133. 129,905

1919.

- Copper Alloy. Berry, W. D. 10,358. 129,956
 Chromium Sulphate. Mooney, F. M. 11,216. 129,958

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Picric Acid. N. H. Graesser and E. Mather, Ruabon, Denbighshire. British Patent, 126,078, of 1916.

Picric acid is separated from liquors or solids containing it, such as the product of nitration, waste nitration liquor, picric acid washings, waste picric acid, etc., by adding benzene or other volatile organic solvent of picric acid, separating the picric acid solution so obtained, and evaporating the solvent therefrom. When treating the nitration product, this may be previously freed from excess of nitric acid and diluted to reduce the concentration of the sulphuric acid. If the liquors contain tarry or other matters soluble in benzene, the solution

may be cooled to crystallise out benzene picrate, which is then decomposed by heat.

Nitric Acid. E. B. Maxted and T. A. Smith, Walsall, Staffordshire. British Patent, 126,704, of 1917.

Nitric acid of high concentration is obtained by the reaction of water, excess of oxygen, and large excess of liquid nitrogen peroxide or trioxide at pressures not appreciably exceeding atmospheric, the excess of nitrogen oxide being subsequently expelled, for instance, by a current of air or by gently heating, but without separating the separate layers when such layers form. According to the Provisional Specification, water vapour, oxygen, and excess of a gaseous nitrogen oxide (including nitric oxide) may be employed, or water vapour, nitrogen oxide, and excess of oxygen.

Purifying Oils. J. L. Mantle, Merry Hill, near Wolverhampton. British Patent, 126,882, of 1918.

Barium chloride is used to desulphurise used lubricating oil from the sumps of internal-combustion engines, or in the course of manufacture. Heavy matters are first allowed to settle. The oil is drawn off, heated to about 100° C., and treated with crystals of barium chloride. The temperature is maintained until the surface is free from scum, when the oil is filtered.

Glycerine. G. T. Lemmens, Watlington, Kent. British Patent, 126,706, of 1917.

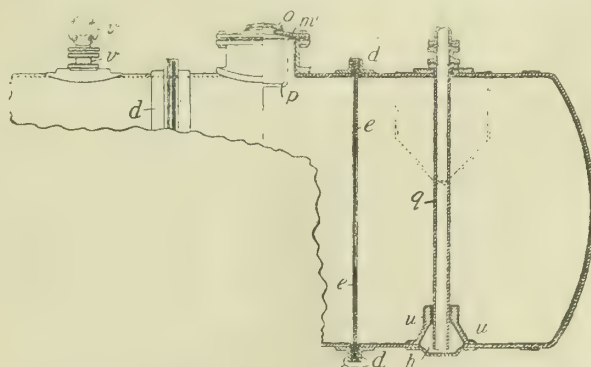
In the production of glycerine by heating oil or fat in an autoclave at a pressure of about 100lb. per sq. in. in the presence of zinc oxide, hydroxide, etc., the operation is carried out in two stages to increase the yield of glycerine. After heating for a period such as eight hours, the strong glycerine solution is drawn off and replaced by hot distilled water, and the heating is continued for a further period such as four hours. The relatively dilute solution of glycerine from the second stage of the process may be used instead of water for the initial treatment of the next charge of oil or fat.

Treating Waste Acid. British Dyes, Ltd., J. Turner, and H. Dean, Huddersfield. British Patent, 127,039, of 1917.

Waste acid liquors or wash-waters from the manufacture of explosives, such as picric acid and other nitro-bodies, are rendered innocuous by being treated with scrap iron in pits or tanks which may be provided with agitators. The nitro-bodies are reduced to amido-bodies. Waste alkali such as lime or soda, or waste sodium or calcium sulphite, may be added and the liquid filtered.

Acid Tanks. British Dyes, Ltd., J. Turner, and J. H. West, Huddersfield. British Patent, 124,997, of 1918.

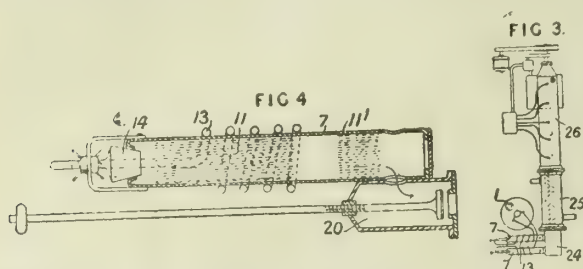
Tanks for transporting acids, etc., by road, rail, or water are formed of sections lined with ebonite, vulcanite, etc., vulcanised on, and all fittings liable to come into contact with the acid are similarly coated. The sections are connected by means of angle-irons *d*, with coated surfaces, and coated baffle-



plates *e* are provided, the joints being made tight by soft-rubber washers. A manhole cover *m* is provided with a stirrup *p* to indicate the height to which the tank is to be filled, and with a cover *o* for an inspection opening. A pipe *q* for filling and emptying depends into a sump *h*, its lower end being supported by a casting *u*, and a pipe *v* with baffles serves as a vent or for the introduction of compressed air.

Formaldehyde Manufacture. G. Calvert, Twickenham Park, Middlesex. British Patent, 126,479, of 1918.

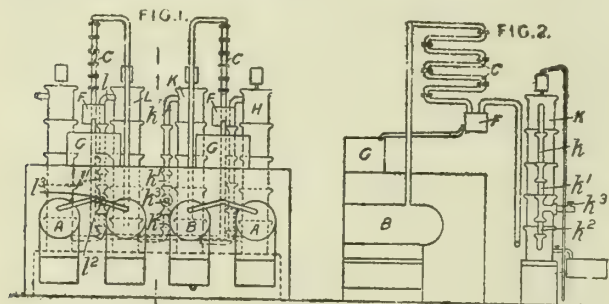
In apparatus for producing formaldehyde, wherein the vapour of methyl alcohol is mixed with a regulated supply of air at the entrance of the tube containing the catalyst (copper, silver, etc.), the alcohol vapours are preheated by passage through a coil of piping surrounding the catalyst tube before entering the tube. Figs. 3 and 4 show a large-scale



apparatus for producing formaldehyde solution; methyl alcohol vapour from boiler 1 passes through coils 13 surrounding the catalyst tubes 7, and thence to conical nozzles 14 adjustably mounted at the ends of the tubes 7; the air enters between the nozzle and tube, and the supply is regulated by screwing up the nozzle. The catalyst consists of copper gauze packed in two portions 11, 11'. The products of combustion pass through valve boxes 20 to a receiver 24 and a cooler 25, and thence to absorption apparatus 26, similar to that described in Specification 814/15.

Sodium Nitrite Manufacture. J. Grayson, Huddersfield. British Patent, 127,183, of 1918.

Sodium nitrite is obtained by reducing nitric acid to nitric oxide by means of sulphur di-oxide, purifying the nitric oxide by washing with water and then with dilute soda, and then adding air to produce approximately N_2O_4 , and absorbing in soda solution. Nitric acid is prepared in a retort B from sulphuric acid and sodium nitrate, and sulphur dioxide in a retort A. The sulphur dioxide is led into the retort B, and the mixed gases pass through a tube C, in which sulphuric



acid condenses and is collected in a trap F and tank G, which supplies the retort B. The gas is washed by water and soda in packed towers H, K respectively, and, from the tower K, passes by a pipe k having two sight-tubes k^1, k^2 , Fig. 2, with an air inlet k^3 between them. Air is admitted in the requisite quantity, and the gas then passes to the soda absorption tower L, the exit gases escaping by a pipe l having two sight-tubes l^1, l^2 , with an air inlet l^3 between them, Fig. 1. The admission of air by the inlet k^3 is controlled by testing the gas in the pipe l . If the correct amount of air has been added, there will be a small quantity of nitric oxide in the pipe l , which will be colourless in the tube l^1 , but, on admission of a little air by l^3 , will show a slight colour in l^2 . As the absorption proceeds, more soda-ash is added to the liquor in the tower L.

Sulphuretted Dyes. Brotherton and Co., Leeds; and E. F. Ehrhardt and W. W. Kay, Mersey Chemical Works, New Ferry, Cheshire. British Patent, 127,143, of 1918.

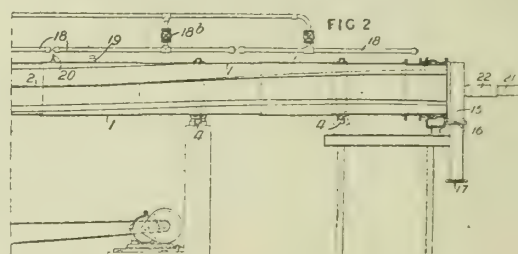
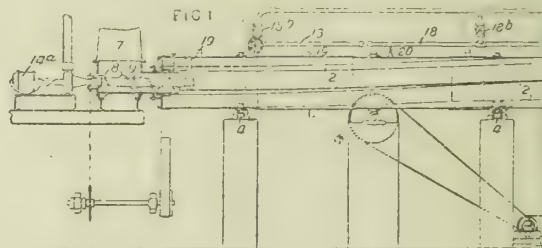
Sulphuretted dyes are obtained by heating with sulphur and sodium sulphide mixtures of an azo dye from diazotised picramic acid and phenol or a cresol or cresols with free phenol or a cresol or cresols. According to an example, a mixture of picramic acid-azo-*m*-cresol with meta-para-cresol is used.

Chlorhydrocarbons. V. J. Harding, Montreal, Canada. British Patent, 126,511, of 1918.

Olefine dichlorides are prepared by reaction of gaseous olefines (ethylene, propylene, etc.) with chlorine in presence of a contact substance (brick, pumice, sand, glass, coke, charcoal, ferric oxide, alumina, magnesia, etc.) in the absence of water or steam.

Treating Solids with Gases. A. Rudge and United Alkali Company, Ltd., Liverpool. British Patent, 126,773, of 1918.

Apparatus for treating solids with gases in counter-current—for instance, for making chloride of lime—consists of a long cylinder 1 provided with lifters 2 in the form of bars carried on the inside of the cylinder with about an inch of clearance between, and with cooling-means which may consist of water-sprays from a pipe 18 arranged over the whole or part of the tube. The lime is fed in from a hopper 7 by a conveyer 8



on a hollow shaft 9, through which the waste gas is withdrawn by a fan 14^a, and the product is withdrawn from a hopper 15 provided with double slides 16, 17, while the gas is admitted by a pipe 21, having a flexible connection 22 upon which is a clip to constrict or cut off the gas inlet. The cylinder is rotated upon rollers 4. The whole or any part of the water spray can be cut off by valves 18^a, 18^b. Openings 19 are provided for inspection or sampling or for the reception of thermometers as at 20.

Indigo Dyes. A. M. Hart, West Hampstead, London. British Patent, 126,754, of 1918.

Indigo is sulphonated by means of concentrated sulphuric acid, the solution is mixed with alum and the mass fused. The product, cooled and ground to powder, is soluble in hot water, and dyes wool blue shades in acid baths. Cream of tartar may be added in addition to alum; the indigo sulphonic acid solution may be neutralised with soda and crystallised before fusing with alum. Products giving navy-blue shades may be obtained by mixing the above-described preparations with a soluble or sulphonated cudbear product. The soluble cudbear products referred to may be obtained (1) by boiling cudbear with methylated spirit, filtering, and evaporating the solution to dryness; (2) extracting cudbear with strong ammonia, filtering, adding soda, neutralising with sulphuric acid, and crystallising. Sulphonated cudbear is obtained by treating cudbear with dilute sulphuric acid and neutralising and crystallising the product.

Separating Dust from Gases. Huntington, Heberlein and Co., and H. J. Bush, London; and H. A. Burns, Finchley, Middlesex. British Patent, 127,119, of 1918.

In separating suspended particles from gases, such as blast-furnace gases by electrical means, such as the means described in Specification 5969/08, dust of a conducting character, such as iron oxide, is mixed with the gases in order to yield on the surface of the electrodes a conducting deposit.

FERTILISER NEWS.

(SPECIALLY CONTRIBUTED.)

Superphosphate Prices in Spain.—The Spanish Ministry of supplies has issued a decree modifying the maximum prices of superphosphate of lime. The prices per 100 kilogrammes, without packing, in minimum parcels of 10 tons, on wagon at the factories on the coast (the cost of transport to be added for interior factories), will be as follows: Superphosphate, 18-20 per cent., 25 pesetas; 16-18 per cent., 20-25 pesetas; 15-17 per cent., 19 pesetas; and 13-15 per cent., 16 pesetas. The said prices will be applicable to all purchases made by agriculturists from July 1, and will be valid until the end of December.

Sulphate of Ammonia.—Trading in sulphate of ammonia is steady at the moment, and it is clear that the material is in continued high repute in agricultural circles here. Farmers have to pay, of course, more than last season, but this does not appear to be likely to affect their purchases materially. Recurrent fears about the position of the coal market tend to complicate the sulphate situation somewhat, as in this connection there might arise a shorter supply than anticipated. On the other hand, there is an expectation of imports of sulphate of ammonia from Germany in the near future. Diverse views are expressed with regard to this. Whilst some have it that Germany cannot possibly do much in this respect for some time to come, there are other people who expect big things. Some muriate of ammonia is also reported to have been offered lately at the high price of £55. per ton. Across the Channel the French Government recently reduced their official price of sulphate of ammonia by 10 per cent., but it must be remembered that conditions in the two countries with regard either to production or distribution are very different.

Superphosphates.—There appears to be no change with regard to this material. Prices for delivery during the period ending September are likely to be higher than those ruling for the same period last year, and that is as far as forecasts go at present. Farmers who are wise are acting upon this, and are purchasing and taking delivery early. Imports of phosphate of lime and rock phosphate into this country for the six months ended June this year were 205,135 tons, against 242,939 tons in the first half of last year, and 73,953 tons in the first six months of the year before.

Bones and Bone Meals.—Imported bones generally are in very short supply, the reason still being the lack of suitable shipping space. They come over only in small quantities, and under restricted conditions. The bone meal market is firm, with a fair demand at prices already given here. Sellers regard prices as by no means high in view of all conditions; but needy buyers are still asking when further shipments are to arrive, especially out of the big surplus stocks that are known to exist in India. According to the Board of Trade returns for the six months ended June, the imports into this country of bones for manure amounted to 2,172 tons, against 1,856 tons in the corresponding six months of last year, and 2,740 tons in the corresponding period of 1917.

Blood and Tankage.—Supplies of dried blood are short, with a fairly good demand at about 25s. per unit for ammonia.

Foreign tankage is in fair demand, but business appears to be almost impossible owing to freight difficulties. Prices may be given as at 25s. per unit for ammonia and 2s. for phosphate. Meat meal is very difficult to obtain, with prices as above, but no guarantee of quick delivery. Fish meal is also in demand, but here, again, the business is limited by the supply. Prices are said to be in the region of 27s. 6d. per unit of ammonia.

Potash.—There is not a great deal of business passing in any potash descriptions, and the latest statement is to the effect that the manures are still very scarce in England.

Basic Slag.—This material remains in good request at late rates. The cheaper kinds are especially going off well, 22 per cent. material selling readily at £3. 12s. to £3. 12s. 6d.

SOUTH WALES NOTES.

(SPECIALLY CONTRIBUTED.)

There is little or no change in the position of the tinplate industry. Manufacturers are declining to quote for any volume of orders, and only immediate wants are being attended to owing to the uncertainty of the fuel situation. The Americans are trying to force business at prices much below those of South Wales makers. The question of the demand for a 12½ per cent. advance was considered on Monday. The arbitrator (Mr. Marlay Samson, K.C.) will give his award at an early date. The "unofficial" ballot has been concluded, but as the proceedings were private the result is not known. It is extremely unlikely, however, that any stoppage will take place as the employees have had the position of the trade placed before them, the latest information being that a firm of English merchants has secured a contract with American makers, the plates being delivered at Liverpool at a price of 31s. per box, or about 2s. 6d. cheaper than Welsh quotations.

Supplies in the patent-fuel trade are falling short of the demands, and owing to restrictions difficulties are placed in the way of healthy expansion. The exports for the week were only moderate, the largest cargo of 2,400 tons going to Genoa from Swansea. Cardiff's foreign business went to Morlaix, Rouen, and St. Malo, whilst from Swansea shipments were sent to St. Brieux, Rouen, Dieppe, Rotterdam, and Havre. Newport makers despatched 1,800 tons to Port Said and a cargo left Port Talbot for Rouen.

The various copper works are practically inoperative owing to the scarcity of copper ore and the industrial unrest.

The coke-ovens are working well, and the production of by-products is being fairly well maintained. Sulphate of ammonia sells steadily. The position at Ebbw Vale through the damping down of the blast-furnaces is most serious, as unfortunately this procedure may affect many other industries hereabouts. There is a magnificent battery of by-product ovens, and it is feared that these may have to become inoperative. There are 150 operating and another 100 nearly completed.

A cargo of 2,494 tons of iron pyrites has arrived at Newport from Seville.

MARKET REPORTS.**LONDON METAL MARKET.**

THURSDAY.

Copper: Standard brands, £104. 10s. to £104. 15s., cash; £105. to £105. 5s., three months; electrolytic, £110. to £125. Tin: Standard, £268. to £268. 5s., cash; £266. to 266. 5s., three months; Straits, £270.; English, £263. to £265. Lead: Soft foreign, £24.; English, £25. Spelter, £41. 10s.; hard, £32. to £33. Antimony, English regulus, 90%, £40. Aluminium, £150. Nickel, £205., delivered, packages extra. Quicksilver, £23. to £23. 10s. Bismuth, 12s. 6d. Platinum, 442s. per oz. Wolfram, 30s. per unit.

TAR AND AMMONIA PRODUCTS

WEDNESDAY.

Benzole: London, 90%, 2s.; North, 1s. 10d. to 1s. 11d.; 50%, 1s. 10d.; North, 1s. 9½d., naked. Carbolic acid, crude, 60%, East and West Coast, nominally 1s. 5d. to 1s. 6d.; crystals, 30-40%, 6d. to 6½d., f.o.b. Crude tar, London, 45s. to 60s.; Midlands, 44s. to 46s.; North, 45s. per ton, ex works. Pitch, 72s. 6d. to 75s.; East Coast, 65s., f.o.b.; West Coast, 53s. to 55s., f.a.s. Solvent naphtha, naked, London, 90-100%, 2s. 5d.; North, 2s. 3d. to 2s. 4d.; 90-100%, naked,

London, 2s. 1d.; North, 1s. 10d. to 1s. 11d. Crude naphtha, naked, 30%, 9d.; North, 8d. Refined naphthaline, £18. to £22.; salts, £6. to £7. Toluol, naked, London, 2s. 6d.; North, 2s. 5d. Creosote, naked, London, 6½d.; North, 5½d. to 6d.; heavy oil, 6½d. to 7d. Anthracene, 40-45%, 6d. per unit. Cresylic acid, 95%, 2s. 7d. to 2s. 8d.; 97-99%, 2s. 9d. to 2s. 10d., ex works, London, and f.o.b. other ports. Sulphate of ammonia: Home trade, £19. 10s. per ton; basis 24½%. Nitrate of soda, £21. to £22.

MANCHESTER CHEMICAL MARKET.

THURSDAY.

Business generally is in an unsettled condition owing to the coal advance and labour troubles, but values all round remain fairly steady, and there are no material alterations in prices to record. 70% caustic soda continues easy at £18. for resale parcels. Refined bicarbonate of soda, bags, at £7. 5s. per ton, and 58% alkali at £6. 10s. per ton. Bleaching powder quiet at £15., softwoods, on rails; and £14. for hardwoods, f.o.b. Saltcake, in bulk, firm at 60s. per ton, carriage paid. Recovered rock sulphur easier at £18. per ton, on rails. The export position of copper sulphate is

unchanged, and price remains nominal at £45., f.o.b. Chlorate of soda weak at 7d. per lb. Potash, 1s. 1d. per lb. For bichromates, makers' quotations are unchanged at 1s. 6d. and 11d. per lb. for potash and soda respectively. Commercial hypo. soda dull at £16. 10s., on rails. Phosphate of soda steady at £25. per ton. Concentrated sodium sulphate in only small request at £20. per ton. Home supplies of arsenic continue scarce and quotations higher at £46. per ton. Yellow prussiate of potash and soda are steady and unaltered at recent rates. Lead salts are firm. White acetate at £83., and brown £75. Nitrate dull at £56. per ton. Acetate of soda a turn easier at £52. per ton. Acetic acid unchanged. English brown acetate of lime well maintained at £19. per ton. American grey firm at £19., c.i.f. Miscible and solvent wood naphtha are lower at 10s. per gallon. Green copperas is meeting with more inquiry, but prices still tend downwards. Oxalic acid is moving off fairly well at 1s. 2½d. per lb.

SWANSEA MARKET REPORT.

THURSDAY.

Quotations for tinplates are irregular and only small business is being transacted around 33s. per standard box f.o.b. Copper is better sought after and prices have an upward tendency. Some sales were made at £107. per ton prompt and £107. 10s. 0d. three months. Tin shows great activity at £268. prompt and £266. three months. Lead transactions are more numerous at £24. prompt and £24. 10s. three months. Spelter is less called for at £42. 15s. 0d. f.o.b., Silver 55½d. per ounce. Nickel prices have improved, and are £205. per ton including free delivery, London or equal. Aluminium, £150. Antimony, nominal, with English 90% regulus at £40. Quicksilver, quiet at £22. 5s. per bottle. Sulphate of copper, more active at £45. per ton for home purposes, and £47. 5s. 0d. export. Sulphate of ammonia, steady: United Kingdom, fine, £19. 10s. 0d. per ton; export prices, nominal. Nitrate of soda, quiet and steady, at £21. 10s. 0d. per ton. Turpentine, held firmly at 111s. per cwt. Arsenic in better demand and prices higher; white powdered in bags, £50. per ton f.o.b. Bone meal, 14s. 3d. per cwt. Pitch, in good demand, at 51s. 6d. per ton at ship. Oxalic acid, quiet at 1s. 3d. per lb. Zinc sheets, unchanged at £65. per ton f.o.b. at New York.

TURPENTINE MARKET REPORT.

Messrs. James Watt and Son, Ltd., of 101, Leadenhall Street, London, E.C.3, report that the stocks of turpentine on July 26 were: American, 33,471 barrels, compared with 3,395 barrels at the corresponding date of 1918; French 46 barrels (15 barrels); and Spanish 224 barrels (1,717 barrels.) Deliveries during the week ended July 26 were 2,367 barrels, against 472 barrels last year, and since January 1, 39,018 barrels, compared with 11,440 barrels in 1918. The price on Saturday last was 107s. 6d. per cwt. compared with 116s. at the corresponding date of last year. September-December delivery was quoted at 110s. and January-April (1920) 116s. 6s.

LIVERPOOL CHEMICAL MARKET.

THURSDAY.

Business in chemicals has kept up remarkably well in view of the interruptions of ship and railway transportation and of production in industries outside the Liverpool area. Inquiries on home-trade account have come in rather numerous, and on export account a very fair number have been received. Bleaching powder has been quiet. Prices are £14. 10s. to £15. per ton, free on rail or conveyance in buyers' packages, and £17. per ton for export. Chloride of calcium has been more in request, and is £8. to £11. per ton, in casks, f.o.r. Caustic soda has been well inquired for, and is £24. per ton for 76%, £22. per ton for 70 to 72%, and £19. per ton for 60 to 62%. Nitrate of soda has sold a little more freely, and is £20. 10s. to £21. 10s. per ton. Saltcake continues to meet with a fair inquiry, and is £6. 10s. per ton, in casks, f.o.b. Soda crystals have had a fairly active inquiry, and are £5. per ton, in 2cwt. bags, f.o.r. at works. Bicarbonate of soda has been in good request, and is £7. 5s. to £10. per ton, according to terms of delivery. Borax has been well inquired for, and is scarce. It is £42. per ton for ordinary, and £44. per ton for powdered, in bags. Ammonia alkali has sold rather freely, and is £6. to £6. 5s. per ton, f.o.r. at works. Hyposulphite of soda has been more in request, and is £19. to £20. per ton for ordinary crystals, in

2cwt. bags, and £25. per ton for pea crystals, in 1cwt. kegs. Sulphite has been in moderate request, and is £11. per ton for ordinary, and £18. to £19. per ton for pea crystals, in 1cwt. kegs. Bichromate of soda has been in fair inquiry, and is 9d. per lb. Phosphate of soda continues quiet, and is £25. per ton. Sulphide of sodium has been in quietly steady demand, and is £20. per ton, in casks, and £22. per ton, in drums. Chlorate of potash has been quiet, and is 1s. 1d. to 1s. 3d. per lb. Permanganate of potash has been rather more inquired for, and is 3s. 6d. per lb. Sulphate of potash has been inactive, and is £40. per ton. Carbonate of potash has again met with a very fair inquiry, and is £85. to £90. per ton for 80 to 85%. Caustic potash has been more in request, and is £90. to £100. per ton for 35° Bé. Nitrate of potash has been in very fair demand, and is £50. to £58. per ton for refined, and £40. per ton for ordinary. Canadian ashes have had a very limited sale, and are £200. to £220. per ton for first quality Montreal, and £190. to £210. per ton for second quality. Bichromate of potash has been in moderate request, and is 1s. 6d. to 1s. 7d. per lb. Yellow prussiate of potash has been quiet, and is 1s. 9d. to 1s. 10d. per lb. Sal ammoniac has been rather more in demand, and is £80. per ton for lump, £75. per ton for seconds, and £5. per ton extra for ground. Sulphate of ammonia has been in quietly steady request, and is £19. 10s. per ton, less traders' discount of 10s. per ton, free to nearest wharf or railway station, to September 30. Carbonate of ammonia has been in very fair inquiry, and is 6½d. per lb. Muriate has been but little called for, and is £50. to £60. per ton, according to quality. Magnesia has been rather more inquired for. Carbonate is £3. 10s. per ton, and sulphate £10. to £16. per ton, according to grade. Alum has been more in demand, and is £18. 10s. per ton for the home trade, and £18. 10s. to £19. 10s. per ton for export. Aluminoferric has been very quiet, and is £8. 10s. to £12. per ton according to quality. Sulphate of alumina has been but little in request, and is £12. to £18. per ton according to grade. Sulphur has been more in demand, and in very light supply. English kinds are: Flowers, £32. per ton; roll, £28. per ton; and rock, £22. per ton, in bags, f.o.r. Sicilian grades are: Flowers, £28. per ton; roll, £22. 10s. per ton; and third quality, £17. 15s. per ton. Cream of tartar has been more in demand, and is £11. 5s. to £11. 10s. per cwt. Tartaric acid has had a quietly steady sale, and is 3s. 1d. per lb. Boracic acid has been in good request, and is £72. per ton for crystals, and £74. per ton for powdered. Oxalic acid has again been quiet, and is 1s. 3d. per lb. White acetate of lead has had but a limited inquiry, and is £85. to £90. per ton. Arsenic has been more in request, and the price still keeps high. It may be given as from £45. to £50. per ton for white powdered. Sulphate of copper has received but little attention on home-trade account, but has been in moderate demand for export. For farm purposes in the United Kingdom it is £45. per ton, and for export £47. to £48. per ton, less 5%, in casks, f.o.b. at Liverpool.

TYNE CHEMICAL REPORT.

TUESDAY.

There is little change to report in the chemical market; the demand continues steady. Bleaching powder and caustic soda are in good demand, while sulphur continues scarce and firm.

The following prices are per ton, net: Bleaching powder, softs and hards, £15.; caustic soda, 74/77%, £23. 5s.; do., 70%, £22.; do., 60%, £20.; recovered sulphur, 2 cwt. bags, £23.; hyposulphite of soda, 5/7cwt. casks, £19.; do., 1cwt. kegs, £25.; sulphite of soda, 5/7cwt. casks, £12.; do., 1cwt. kegs, £20.; silicate of soda, 75° Tw., £9. 12s. 6d.; do., 100° Tw., £10.; do., 140° Tw., £10. 10s.; soda crystals, 2cwt. bags, £5.; sulphate of soda (salt cake), £3. 10s.; pure white sulphate of alumina, 14/15%, £19. 10s.; blanc fixe, £22.; chloride of barium, £27.; sulphide of sodium, crystals, £18.; do., refined concentrated solid, 60/62%, £25.; hydrate of barium, crystals, £56.

COALS.—There is no improvement in the position of affairs in the coal market, and the uncertainty as to the course the Yorkshire miners will take is accentuating the difficulties of the position. It is clear that the Americans are making huge efforts to capture the export trade of this country—and the increased production at the German mines is having its effect also. Quotations for the neutral markets are about as follows: Best Northumberland steam, 85s. to 90s. per ton; best Northumberland smalls, 45s. per ton; best Durham gas coal, 70s. to 72s. 6d.; seconds, do., 67s. 6d. to 70s.; bunkers, 60s.; foundry coke, 70s. to 75s.; gas coke, 78s. 6d.

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Wednesday.

Business is still to the slow side in the local chemical trade. During the past week many firms have really only been marking time until the more general resumption, and in consequence dealings have generally been small and unimportant. Prices remain more or less on the old footing, and may still be quoted as follows:—arsenic, £40. per ton, net, Glasgow; bicarbonate of soda, £8. 15s. and £10. per ton for 6-8 casks and 1cwt. kegs, Liverpool; boracic acid crystals, English refined, £72. for 2cwt. bags, and borax crystals, £39. for 2cwt. bags, carriage paid; caustic soda, white, 70-72%, £24. per ton, net, Glasgow; chlorate of potash, 1s. 3d. per lb., net, Glasgow;

chlorate of soda, 10d. per lb., net, Glasgow; citric acid, 4s. 4d. per lb., 5%, Glasgow; cream of tartar, 88%, £11. 5s. per cwt., net, Glasgow; salammmoniac, £80. and £75. per ton, net, any port, for first and second lump respectively; salammmoniac crystals £85. per ton, net, Glasgow; saltpetre, £3. 5s. per cwt., net, Glasgow; tartaric acid, 3s. 1d. per lb., 5%, Glasgow.

In the sea oil section the conditions are also unsettled with the prevailing holiday feeling in the air, and business during the past week has been of small compass. Whale oil is still coming on the market at about 80s. for brown, and 78s. for black, and most orders are put through close on these figures. Newfoundland cod has not had many important dealings, and the price is still at the old level of 75s.; while the market continues without either pale seal or Menhaden.

IMPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

BRISTOL.

Publication of Official Returns Suspended.

GLASGOW.

Week ending July 26.

ACETONE—
Baltimore, 154 drms.
DEXTRINE—
New York, 4,839 bgs.
DYESTUFFS—
Cutch
Rangoon, 1,100 bxs.
FISH OIL—
Philadelphia, 300 brls.
IRON PYRITES—
Huelva and Lisbon, 2,219 t.
LITHOPONE—
New York, 862 brls.
PLUMBAGO—
Genoa and Valencia, 382 bgs.
ROSIN—
Huelva and Lisbon, 64 brls.
SOAP—
New York, 565 brls.; Genoa
and Valencia, 300 bgs.
STEARINE—
Philadelphia, 110 bgs.
WAX—
New York, 2,400 brls.
WHITE LEAD—
New York, 725 cks.
ZINC OXIDE—
New York, 1,200 brls.

GOOLE.

Week ending July 26.

NIL.

GRANGEMOUTH.

Week ending July 26.

NIL.

GRIMSBY.

Week ending July 26.

HYDROSULPHITE—
Dieppe, 10 drms.
TAR—
Gothenburg, 20 brls.

HULL.

Week ending July 26.

ACETIC ACID—
New York, 142 brls.
LITHOPONE—
Rotterdam, 80 cks.
MAGNESIUM SULPHATE—
Alexandria, 100 brls.
MANGANESE ORE—
New York, 1,006 t.
POTASH—
New York, 30 cks.

SODA—
New York, 40 kgs.

TALLOW—
Halmstad, 303 cks.

TAR—
Alexandria, 10 brls.; New York,
45 brls.

WHITE LEAD—
New York, 24 brls.

LEITH.

Week ending July 26.

CAUSTIC POTASH—
Rotterdam, 36 t. 9 c., £3,645.
FORMIC ACID—
Rotterdam, 9 t. 19 c., £1,349.
POTASSIUM MURIATE—
Rotterdam, 59 t., £1,000.
ZINC WHITE—
Rotterdam, 194 t., £2,500.

LIVERPOOL.

Week ending July 26.

BARYTES—
Barcelona, 2,900 sks., 68 brls.;
Gandia, 300 pkgs.; New Orleans,
543 brls.
BEES WAX—
Calcutta, 70 cs.; W.C. Africa,
1 bg.
BICHRIMATE CRYSTALS—
New York, 65 cks.
BORIC ACID—
New York, 850 cks.
CALCIUM GLYCEROPHOSPHATE—
New York, 20 cs.
CREAM OF TARTAR—
Bordeaux, 14 cks.
DEXTRINE—
Kobe, 100 bgs.; New York,
160 bgs.
DYESTUFFS—
Myrobalan Extract
Calcutta, 1,800 bgs., 76 pkgs.
Myrobalans
Calcutta, 2,744 pockets, 5,575
pkts.
Tartar
Bordeaux, 28 brls.
MANGANESE ORE—
Calcutta, 500 t.
MINERAL WHITE—
Bordeaux, 450 cs.
OCIRE—
Bordeaux, 166 pkgs.; Kobe,
48 cks.
PARAFFIN SCALE—
New York, 1,420 brls., 55 bgs.
PARAFFIN WAX—
Calcutta, 267 bgs.
PHOSPHATE—
New York, 25 brls.

POTASSIUM BICHRIMATE—
New York, 6 cks.

ROSIN—
Bordeaux, 1,206 cks.; New
Orleans, 400 brls.; Savannah,
5,600 brls.

SOAP—
Antwerp, 6 cs.; New York,
768 bxs., 3 cs.

SODIUM BICARBONATE—
New York, 18 cks.

TALLOW—
Monte Video, 240 cks., 1,185 t.

TANNIC ACID—
New York, 2 brls.

TIN ORE—
W. C. Africa, 5,160 bgs.

TURPENTINE—
Savannah, 900 brls.

VEGETABLE WAX—
Kobe, 12 cs.

WAX—
Bordeaux, 2 cs.; New York,
2 cs., 219 bgs.

WHITE LEAD—
New York, 276 cks.

ZINC DUST—
Bordeaux, 20 cks.

ZINC OXIDE—
New York, 500 pkgs.

LONDON.

Week ending July 26.

ACETIC ACID—
U.S., 85 brls.
AMMONIUM BROMIDE—
U.S., 60 cs.
ARSENIC—
Portugal, 19 t.
BARYTES—
Spain, 3,500 bgs.
BEES WAX—
B.W.I., 5 brls., 2 tres.; Holland,
6 cs., 10 bgs.; Portugal, 274
bgs.; Pt. E. Africa, 21 bdls.,
167 cs., 263 bcks.
BISMUTH ORE—
Hong Kong, 1 t.
BORIC ACID—
France, 168 cks.
BUTYL ALCOHOL—
Canada, 85 drms.
CALCIUM LACTATE—
Canada, 1 brl.
CAMPHOR—
Spain, 2 cs.
CHEMICALS (otherwise undescribed)
Canada, 8 cs., 4 brls., 6 pkgs.;
Denmark, 8 cs.; France, 1 brl.,
3 pkgs.; Switzerland, 4 cs.;
U.S., 9 pkgs.
CITRATE OF LIME—
Japan, 3 pkgs.
CITRIC ACID—
N.S.W., 40 pkgs.; Victoria,
100 pkgs.
CREAM OF TARTAR—
France, 10 pkgs.

DYESTUFFS (otherwise undescribed)
Brit. India, 2 cks.; Natal,
50 t.; Switzerland, 478 pkgs.

DYESTUFFS—
Aniline Dye
U.S., 1 pkg.
Indigo
Br. India, 45 chts.
Logwood Extract
U.S., 25 t.
Mimosa
Natal, 50 t.
Mimosa Extract
Natal, 2,712 bgs.
Myrobalans
British India, 4,748 pkgs.
Sumac
Italy, 300 pkgs., 500 bgs.
Tanners' Bark
Cape, 10 t.; Natal, 216 t. 8 c.
Tartars
Spain, 113 pkgs.
Turmeric
Br. India, 39 pkgs.
Valonia
Brit. India, 63 t.; Italy, 65 t.
Wattle Bark
Natal, 4,840 t.

FISH OIL—
Azores, 57 brls.; Portugal,
123 cks.

FORMALDEHYDE—
U.S., 56 brls.

GELATINE—
Belgium, £138.; France, £515.;
Spain, £1,250.

GLUE—
France, £1,922.

IRON PYRITES—
Spain, 5,002 t.

MAGNESITE (CALCINED)—
Brit. India, £4,800.

MOLYBDENITE ORE—
N.S.W., 7 t.

OCIRE—
France, 31 pkgs., 78 cks.; Spain,
178 cks.

LITHOPONE—
U.S., 112 cks.

PARAFFIN SCALE—
U.S., 184 t. 4 c.

PARAFFIN WAX—
U.S., 74 t. 12 c.

PARISIAN BLUE—
Holland, 15 cks.

PHOSPHATE—
U.S., 100 kgs.

PLUMBAGO—
Japan, 322 cks.

POTASSIUM BROMIDE—
U.S., 66 cs.

POTASSIUM IODIDE—
Japan, 20 cs.

POTASSIUM NITRATE—
Brit. India, 50 bgs.

PYROGALLIC ACID—
Canada, 8 pkgs.

ROSIN—
France, 350 cks.; Portugal, 30 cks.

SOAP—
U.S., £17,402.

SODA—
U.S., 5 t. 1 c.

SODIUM BROMIDE—
U.S., 99 cs.

STEARINE—
Argentine Republic, 59 tacs.; U.S., 280 bgs.

TALLOW (UNREFINED)—
Argentine Republic, 731 t. 15 c.; China, 200 t.; N.S.W., 491 t. 11 c.; N.Z., 931 t. 15 c.; Victoria, 385 t. 18 c.

TANNIC ACID—
Canada, 20 pkgs.; Switzerland, 2 kgs.

TAR—
Denmark, 20 brls.; Sweden, 250 brls.

TARTAR CRYSTALS—
Italy, 21 cks.

TARTARIC ACID—
Italy, 160 pkgs.

WHITE LEAD—
U.S., 240 kgs., 23 brls.

WAX—
Morocco, 34 bgs.; Portugal, 615 pkgs.

ZINC OXIDE—
Holland, 220 cks.; U.S., 279 brls.

ZINC RESIDUE—
Natal, 11 t.

ZINC WHITE—
U.S., 67 brls.

MANCHESTER.

Week ending July 26.

ANTIMONY SALT—
Rouen, 7 cs.

BARYTES—
Philadelphia, 96 brls.

CARBIDE—
Quebec, 767 brls.

DEXTRINE—
Boston, 3,880 bgs.

DYESTUFFS—
Aniline Dye
Antwerp, 527 cks.

FERRO SILICON—
Philadelphia, 28 t.

GLUE—
Boston, 15 cks.

LITHOPONE—
Rotterdam, 400 cks.

OXALIC ACID—
Rotterdam, 20 cks.

PHOSPHATE OF LIME—
Boston, 95 brls.

SOAP—
Philadelphia, 1,000 bxs.

TARTAR EMETIC—
Rouen, 4 cks.

MIDDLESBROUGH.

Week ending July 26.

COPPER PRECIPITATE—
Seville, 568 t., £30,000.

PYRITES—
Seville, 2,556 t., £5,371.

NEWCASTLE-ON-TYNE

Week ending July 26.

COPPER PRECIPITATE—
Huelva, 445 t.

IRON PYRITES—
Huelva, 2,740 t.

TAR—
Gothenburg, 100 brls.

N. & S. SHIELDS.

Week ending July 26.

NIL.

STOCKTON-ON-TEES.

Week ending July 26.

NIL.

SWANSEA.

Week ending July 26.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

BRISTOL.

Publication of Official Returns Suspended.

GLASGOW.

Week ending July 26.

AMMONIUM CARBONATE—
Algoa Bay, 1 t.

CHEMICALS (otherwise undescribed)
Beira, 1 t.; Gothenburg, 167 pkgs.; Hong Kong, 20 t.; Kobe, 81 t. 10 c.; Rouen, 64 pkgs.; San Salvador, 1 t. 4 c.

COAL PRODUCTS (otherwise undes.)
Buenos Ayres, £155.; Gothenburg, 40 t.; Venice, £3,160.

DEXTRINE—
Rouen, 238 pkgs.

DISINFECTANTS (otherwise undes.)
Punta Arenas, £145.

GLUE—
Buenos Ayres, 4 c.; Shanghai, 2 t.

PARAFFIN—
Buenos Ayres, 2 cs.

PLUMBAGO—
Hong Kong, 15 c.

RED LEAD—
Buenos Ayres, 7 t. 5 c.; Punta Arenas, 10 c.; Tocopilla, 12 c.; Valparaiso, 9 t. 16 c.

SEALING WAX—
Shanghai, 2 t. 6 c.

SHEEP DIP—
Buenos Ayres, 125 t. 8 c.; Cape Town, 4 c.; Gallegos, 33 t. 4 c.; East London, 4 c.; Monte Video, 3 t. 10 c.; Pt. Stanley, 12 c.

SPERMACEETI WAX—
Rouen, £156.

GOOLE.

Week ending July 26.

NIL.

GRANGEMOUTH.

Week ending July 26.

ALUM—
Christiania, 13 t.

COAL PRODUCTS—
Creosote Oil
Christiania, 10,000 gals.

Pitch
Christiania, 4 t. 10 c.

DYESTUFFS (otherwise undescribed)
Christiania, 15 c.

PARAFFIN WAX—
Christiania, 33 t.

GRIMSBY.

Week ending July 26.

NIL.

HULL.

Week ending July 26.

CAUSTIC SODA—
Melbourne, 10 drms.; Wasa, 100 drms.

CHEMICALS (otherwise undescribed)
Antwerp, 10 cks.; Amsterdam, 6 cks.; Abo, 100 drms., 24 bgs., 35 cs., 2 kgs., 2 cks.; Bombay, 1,325 brls.; Christiania, 10 bgs., 120 kgs., 20 cks.; Constantinople, 2 cks., 12 cs.; Copenhagen, 7 kgs.; Dunkirk, 30 brls.; Gothenburg, 1 bx., 23 cs.; Mantyluoto, 11 cks.; New York, 40 cs., 4 drms.; Piraeus, 47 cks., 4 drms.; Rotterdam, 1 ck., 1 cs.; Valencia, 1 bg.

COAL PRODUCTS (otherwise undes.)
Antwerp, 2 cs., 100 cks.

DISINFECTANTS—
Antwerp, 1 dr.; Batoum, 50 cs., 100 drms.; Christiania, 400 drms.; Gothenburg, 300 drms.; Melbourne, 2 cks., 4 cs., 9 drms.

DYESTUFFS (otherwise undescribed)
Amsterdam, 20 cs.

GLUE—
Antwerp, 10 bgs.

PARAFFIN WAX—
Barcelona, 400 bgs.; Valencia, 400 bgs.

SALT—
Aalesund, 646 sks.; Barcelona, 95 cs.; Christiansund, 166 sks., 76 brls.

SOAP—
Antwerp, 6 cs.; Abo, 234 cs.; Batoum, 155 cs.; Dunkirk, 12,280 bxs., 25 brls.; Gothenburg, 14,299 cs.; Ghent, 10 cs.; Rotterdam, 10 cs.

WOOD PRESERVATIVE—
Dunkirk, 58 drms.

LEITH.

Week ending July 26.

AMMONIUM CARBONATE—
Gothenburg, 5 t. 11 c., £312.

BORAX—
Dieppe, 25 t., £975.; Dunkirk, 25 t., £912.

COAL PRODUCTS—
Creosote Oil
Gothenburg, £12.

COAL PRODUCTS—
Naphthalene
Dunkirk, 4 t. 17 c., £261.

PITCH—
Gothenburg, 18 t. 15 c., £88.

SODIUM BICROMATE—
Rouen, 134 t. 15 c., £7,313.

LIVERPOOL.

Week ending July 26.

ACETIC ACID—
Alexandria, 14 c., £60.; Melbourne, 2 c., £13.; Monrovia, 2 c., £20.; Mollendo, 2 c., £20.; Rotterdam, 19 c., £78.; Rangoon 1 t. 1 c., £92.; Secondee, 2 c., £9.

ALUM—
Buenos Ayres, 32 t. 4 c., £571.; Bordeaux, 4 t., £80.; Monte Video, 3 t. 13 c., £65.; Nantes, 5 t., £100.; Patras, 2 t. 9 c., £45.; Quittah, 4 c., £7.; Singapore, 1 t., £20.

ALUMINA SULPHATE—
Barcelona, 9 t. 11 c., £239.; Passages, 40 t., £493.

ALUMINO FERRIC—
Auckland, 14 t. 4 c., £172.; Buenos Ayres, 49 t. 16 c., £733.; Melbourne, 19 c., £13.

AMMONIA—
Alexandria, 1 c., £3.; Coquimbo, 1 c., £10.; Mollendo, 2 c., £15.

AMMONIUM CARBONATE—
Buenos Ayres, 5 t. 10 c., £349.; Cartagena, 10 c., £35.; Melbourne, 5 c., £17.; Monte Video, 2 t., £148.; Mollendo, 1 c., £5.; Santander, 1 t., £104.; Seville, 1 t., £65.; Trondhjem, 1 t., £65.

AMMONIUM CHLORIDE—
Arica, 1 c., £7.; Buenos, 2 t. 4 c., £132.; Mollendo, 1 c., £7.

AMMONIUM FLUORIDE—
Lisbon, 4 c., £62.

AMMONIUM MURIATE—
Alexandria, 30 t., £1,891.; Antofagasta, 10 c., £28.; Amsterdam, 1 t., £50.; Bombay, 1 t. 14 c., £94.; Bilbao, 19 c., £45.; Barcelona, 1 t. 10 c., £60.; Karachi, 27 t. 6 c., £1,574.; Madras, 2 t. 6 c., £136.; Naples, 11 c., £31.; Palermo, 1 t., £57.; Philadelphia, 49 t. 19 c., £2,277.; Perth, 19 c., £47.; Rosario, 1 t. 4 c., £68.; Rouen, 3 t., £191.; Shanghai, 6 c., £17.; Yokohama, 20 t., £1,084.

ARSENIC—
Barcelona, 2 t., £100.; Buenos Ayres, 10 t. 3 c., £360.; Monte Video, 25 t. 1 c., £920.; Valencia, 7 t. 6 c., £451.

ARSENIC ACID—
Adelaide, 1 t. 2 c., £119.

BARIUM CHLORATE—
Vigo, 5 c., £38.

BARIUM CHLORIDE—
Barcelona, 13 t. 15 c., £440.

BARIUM SULPHATE—
Stockholm, 10 t., £170.

BLEACHING POWDER—
Antwerp, 6 t. 15 c., £91.; Auckland, 5 t. 2 c., £89.; Bombay, 4 t. 19 c., £83.; Bilbao, 31 t. 12 c., £493.; Buenos Ayres, 112 t. 15 c., £1,759.; Cape Town, 9 c., £10.; Calcutta, 15 t. 9 c., £249.; Monte Video, 24 t. 17 c., £430.; Ottago, 2 t. 1 c., £32.; Pernambuco, 6 t. 5 c., £113.; Rouen, 29 t. 18 c., £407.; Santander, 6 t. 10 c., £130.; Seville, 1 t. 17 c., £73.; Valencia, 5 t., £80.; Wellington, 6 c., £14.

BORAX—
Antwerp, 25 t., £1,100.; Callao, 1 t. 1 c., £41.; Gijon, 1 t. 2 c., £42.; Pt. Said, 2 c., £4.; Patras, 1 t. 15 c., £77.; Rouen, 5 t., £200.; Shanghai, 5 t. 17 c., £239.; Valencia, 10 c., £20.; Valparaiso, 2 t. 9 c., £96.

BORIC ACID—
Antwerp, 5 t. 10 c., £160.; Antofagasta, 2 c., £15.; Coquimbo, 2 c., £15.; Barcelona, 2 t. 19 c., £219.; Gijon, 1 t. 17 c., £131.; Mollendo, 1 c., £10.; Seville, 8 t., £132.; Volo, 3 c., £16.

CALCIUM CARBIDE—
Accra, 6 c., £9.; Lagos, 10 c., £17.; Secondee, 2 c., £4.

CALCIUM CHLORIDE—
Alexandria, 5 t., £38.; Bilbao, 2 t. 4 c., £21.; Barcelona, 5 t., £43.; Melbourne, 6 t. 1 c., £43.; Palermo, 50 t. 2 c., £374.; Rouen, 30 t. 5 c., £211.; Sydney, 29 t. 17 c., £228.; Salisburg, 1 t. 1 c., £9.; Singapore, 9 t. 19 c., £98.

CARBONATE OF LIME—
Buenos Ayres, 5 t., £160.

CAUSTIC SODA—
Algoa Bay, 132 pkgs.; Barcelona 29 drms.; Bombay, 555 drms.; Calcutta, 90 drms.; Cape Town, 45 drms.; Delagoa Bay, 1,498 drms.; Durban, 3 drms., 5 pkgs.; Fremantle, 25 pkgs.; Galatz, 64 drms.; Gothenburg, 75 drms.; Gisborne, 32 pkgs.; Killindini, 6 drms.; Lytleton, 26 pkgs.; Maceio, 20 pkgs.; Maranham, 60 pkgs.; Melbourne, 500 pkgs.; Napier, 72 pkgs.; Natal, 16 pkgs.; Oporto, 31 drms.

CAUSTIC SODA—

Penang, 8 drms.; Piraeus, 965 drms.; Reval, 32 pkgs.; Rouen, 33 pkgs.; Rosario, 58 drms.; Shanghai, 543 drms.; Sydney, 144 drms.; Volo, 400 pkgs.; Wellington, 227 drms.; Zanzibar 27 pkgs.

CHEMICALS (otherwise undescribed)

Barcelona, 6 t. 2 c., £107.; Genoa, 1 t. 4 c. £555.; Gijon, 1 t.

CHLORIDE OF LIME—

Cartagena, 1 c., £1.

COAL PRODUCTS—**Carbolic Acid**

Gijon, 1 t. 3 c., £41.; Melbourne, 2 c., £17.; Montreal, 14 c., £40.; Monte Video, 15 t. 7 c., £537.; Rosario, 5 c., £11.; Seville, 2 c., £12.; Tloilo, 1 t. 8 c., £44.

Dyes

Bombay, 7 t. 8 c., £3,316.; Calcutta, 4 c., £90.; Dundee, 3 c., £109.; Genoa, 13 t., £7,789.; Montreal, 2 t. 7 c., £938.

Naphthalene

Alexandria, 5 t. 5 c., £100.; Opobo, 2 c., £8.; Patras, 3 c., £5.

Tar

Accra, 6 t. 5 c., £85.; Burutu, 5 c., £4.; Bathurst, 1 t., £14.; Grand Bassam, 8 c., £1.; Half Assinie, 8 c., £4.; Koko, 18 c., £9.; Lagos, 8 t. 12 c., £199.; Lome, 1 t., £11.; Lisbon, 12 c., £90.; Monrovia, 8 c., £8.; Pt. Gentil, 1 t., £8.; Sierra Leone, 2 t. 15 c., £36.; Seconde, 15 c., £11.; Sapele, 8 c., £4.; Saltpond, 8 c., £3.

COPPER SULPHATE—

Adelaide, 2 t., £87.; Alexandria, 5 t. 1 c., £243.; Antwerp, 3 t. 2 c., £141.; Casablanca, 1 t. 13 c., £78.; Funchal, 1 t. 2 c., £50.; Lyttleton, 1 t., £44.; Monte Video, 7 t. 8 c., £335.; Quittah, 3 t. 8 c.; Rosario, 2 c., £6.

CREAM OF TARTAR—

Adelaide, 3 t., £17.

CREOSOTE OIL—

Zanzibar, 20 drms.

INFECTANTS (otherwise undes.)

Accra, 1 c., £4.; Bombay, 10 t., £94.; Bathurst, 2 c., £3.; Bilbao, 2 c., £4.; Buenos Ayres, 9 t. 5 c., £159.; Cape Coast, 5 c., £11.; Calcutta, 5 c., £32.; Colombo, 2 t., £44.; Dakar, 16 c., £26.; Duala, 9 c., £26.; Freetown, 3 t., £90.; Grand Bassam, 4 c., £8.; Lagos, 10 c., £23.; Lyttleton, 1 c., £14.; Lisbon, 3 c., £5.; Larache, 4 c., £23.; Monrovia, 2 c., £3.; Mauritius, 6 c., £14.; Oporto, 5 c., £13.; Opobo, 1 t. 1 c., £19.; Puerto Barrios, 18 c., £55.; Puerto Cortez, 5 c., £18.; Pt. Harcourt, 4 c., £18.; Penang, 10 c., £22.; St. Nazaire, 4 c., £6.; Sierra Leone, 8 c., £37.; Seconde, 1 c., £5.; Sapele, 10 c., £5.; Sherbro, 7 c., £9.; St. John's, N.F., 5 c., £33.; Salonika, 16 c., £24.

DYESTUFFS (otherwise undescribed)

Rouen, 2 c., £55.

DYESTUFFS—

Aniline Dye
Bombay, 8 t. 6 c., £2,742.; Batavia, 1 t. 4 c., £924.; Calcutta, 5 c., £162.; Dunkirk, 7 c., £270.; Genoa, 1 t. 13 c., £683.; Lagos, 5 c., £160.; New York, 1 c., £57.; Patras, 5 c., £37.

Tanning Extract

Antwerp, 35 pkgs.

FATTY ACIDS—

Marseilles, 2,010 brls.

FERRO MANGANESE—

Baltimore, 100 t.

FORMIC ACID—

Pt. Swettenham, 1 t. 2 c., £167.

GLUE—

Perim, 10 pkgs.

GLUE, SIZE, AND GELATINE—

Bombay, 15 pkgs.; Havre, 8 pkgs.; Puerto Barrios, 4 pkgs.; Rangoon, 360 pkgs.

GLYCERINE—

Stockholm, 16 pkgs.

HYDROFLUORIC ACID—

Lisbon, 1 c., £5.

LACTIC ACID—

Barcelona, 1 t., £66.

LEAD ACETATE—

Salonika, 1 c., £6.

MAGNESIUM CHLORIDE—

Hong Kong, 15 c., £15.; Haiphong, 10 c., £12.; Valencia, 10 c., £12.

MAGNESIUM OXIDE -

Genoa, 126 pkgs.

MANGANESE PEROXIDE—

Lisbon, 2 c., £3.

NICKEL SULPHATE—

Bilbao, 1 t. 10 c., £105.; Barcelona, 14 c., £52.; Lyttleton, 5 c., £17.

PHOSPHO-CITRIC ACID -

Victoria, 5 c., £43.

PHOSPHORIC ACID -

Algiers, 3 t. 10 c., £242.; Pernambuco, 4 t. 18 c., £206.

PHOSPHORUS SESQUISULPHIDE

Barcelona, 1 t. 11 c., £210.

PITCH—

Alexandria, 10 t., £48.; Half Assinie, 4 c., £5.; Rouen, 55 t. 9 c., £1,303.; Sapele, 1 t. 5 c., £11.

POTASSIUM BICROMATE—

Alexandria, 2 t. 4 c., £348.; Oporto, 15 c., £132.; Piraeus, 8 c., £61.

POTASSIUM CHLORATE—

Madeira, 1 c., £10.

POTASSIUM METABISULPHITE

Palermo, 7 c., £76.

POTASSIUM NITRATE -

Seville, 6 c., £28.

POTASSIUM SULPHATE—

Las Palmas, 10 c., £20.; Orotava, 20 t., £810.

SALAMONNIAC—

Antwerp, 2 t., £139.; Buenos Ayres, 6 t. 14 c., £518.; Cape Town, 2 c., £7.; Calcutta, 2 t. 5 c., £159.; Cartagena, 1 t. 10 c., £106.; Famagusta, 3 c., £12.; Iquique, 2 c., £10.; Karachi, 2 t. 4 c., £156.; Las Palmas, 2 c., £7.; Limasoll, 4 c., £16.; Lisbon, 2 c., £8.; Melbourne, 5 c., £19.; Naples, 3 t. 2 c., £241.; Patras, 6 c., £22.; Rangoon, 1 t. 10 c., £106.; Sydney, 1 t., £77.; Santander, 1 t. 10 c., £194.

SALT—

Seville, 1 t.; Sierra Leone, 50 t.

SALTPETRE—

Bathurst, 2 c., £7.; Bilbao, 10 t., £550.; Corinto, 10 c., £37.; Madeira, 4 c., £15.; Pernambuco, 100 t., £6,300.; Sierra Leone, 2 c., £5.; Vigo, 5 t., £294.

SHEEP DIP—

Algoa Bay, 11 t. 12 c., £750.; Beira, 19 c., £57.; Barcelona, 3 t. 8 c., £300.; Buenos Ayres, 42 t. 15 c., £2,500.; Lyttleton, 19 t., £700.; Pernambuco, 1 t. 4 c., £52.; Wellington, 56 t. 16 c., £3,250.

SOAP—

Accra, 50 bxs.; Aden, 646 pkgs.; Alexandria, 50 pkgs.; Amboina, 500 pkgs.; Athens, 277 pkgs.; Balik Pappan, 50 bxs.; Banjoewangle, 50 bxs.; Bangkok, 13 pkgs., 550 bxs.; Barbados, 2 c.; Batavia, 160 bxs.; Bermuda, 85 pkgs.; Belawan, 1,611 bxs.; Bombay, 2,380 bxs.; Buenos Ayres, 134 drms., 38 bxs.; Burutu, 30 bxs.; Cape Town, 20 bxs.; Calcutta, 346 bxs.; Cape Coast Castle, 2 bxs.; Cape Palmas, 16 bxs.; Ceara, 6 bxs.; Constantinople, 376 bxs.; Constanza, 47 pkgs.; Conakry, 50 bxs.; Dairen, 55 pkgs.; Forcados, 1 pkgs.; Genoa, 5,525 bxs.; Hong Kong, 12 cks., 50 cs., 4,100 bxs.; Karachi, 364 bxs.; Kingston, Ja., 7 pkgs.,

OAP—

Lome, 5 pkgs.; Lagos, 1,033 bxs.; Lisbon, 1 bx.; Macassar, 623 pkgs.; Madras, 115 cs.; Marseilles, 6 bxs.; Mauritius, 4,000 bxs.; Mombasa, 2 pkgs.; Oporto, 47 pkgs., 25 cs.; Palembang, 50 pkgs.; Penang, 114 bxs.; Pt. Harcourt, 260 bxs.; Pt. Louis, 12 pkgs.; Piraeus, 14 bxs.; Pt. Said, 2,750 bxs.; Pt. Stanley, 4 pkgs.; Pt. Sudan, 2,255 pkgs.; Rangoon, 3,648 bxs.; Quittah, 3 pkgs.; St. John's N.F., 228 bxs.; Samarang, 100 bxs.; Sao Paulo, 2 cs.; Seconde, 125 bxs.; Shanghai, 4,500 bxs.; Singapore, 2,320 bxs.; Smyrna, 20 cs.; Soerabaya, 550 cs.; Sydney, 2 bxs.; Tientsin, 167 cs.; Timoe, Tilly, 100 cs.; Tripoli, 2 cs.; Tuticorin, 45 cs.; Warri, 36 bxs.; Wellington, 110 bxs.

SODA ASH—

Algoa Bay, 40 pkgs.; Amsterdam, 2,000 pkgs.; Bombay, 40 pkgs.; Calcutta, 10,351 pkgs.; Catania, 100 pkgs.; Dalny, 4,032 pkgs.; Durban, 10 pkgs.; Fremantle, 2,320 pkgs.; Karachi, 1,750 pkgs.; Kobe, 18,862 pkgs.; Leghorn, 200 pkgs.; Maranhham, 1,201 pkgs.; Naples, 200 bgs.; New Orleans, 2,000 bgs.; Oporto, 73 cks.; Penang, 30 pkgs.; Piraeus, 450 pkgs.; Skein, 18,906 bgs.; Tientsin, 9,800 bgs.; Volo, 100 pkgs.; Wellington, 398 pkgs.

SODA CRYSTALS—

Alexandria, 150 pkgs.; Bangkok, 67 brls.; Pt. Said, 100 pkgs.

SODIUM BICARBONATE—

Amsterdam, 60 pkgs.; Bagdad, 25 brls.; Bangkok, 40 pkgs.; Calcutta, 2,000 pkgs.; Catania, 30 pkgs.; Ceara, 20 pkgs.; East London, 30 pkgs.; Genoa, 225 pkgs.; Galatz, 40 pkgs.; Hong Kong, 302 pkgs.; Karachi, 1,215 pkgs.; Kingston, Ja., 20 pkgs.; Kobe, 1,077 pkgs.; Lisbon, 100 pkgs.; Moji, 215 pkgs.; Montreal, 150 pkgs.; Naples, 250 kgs.; Rangoon, 1,134 kgs.; Salonika, 20 kgs.; Soerabaya, 150 kgs.; Yokohama, 1,077 pkgs.

SODIUM CYANIDE—

Batavia, 15 cs.

SODIUM SILICATE—

Adelaide, 229 pkgs.; Auckland, 10 pkgs.; Algoa Bay, 140 pkgs.; Boston, 20 cks.; Buenos Ayres, 671 pkgs.; Dundee, 27 pkgs.; Genoa, 1,300 pkgs.; Leghorn, 33 pkgs.; Madras, 30 pkgs.; Maranhham, 50 pkgs.; Melbourne, 343 pkgs.; Natal, 16 pkgs.; Piraeus, 300 pkgs.; Shanghai, 384 pkgs.

SULPHUR—

Black River, 2 c., £11.; Dundee, 5 t. 2 c., £141.; Hong Kong, 3 t., £120.; Lagos, 5 t., £160.; Monrovia, 2 c., £5.; Pernambuco, 1 t. 19 c., £54.; Quittah, 3 c., £7.

SUPERPHOSPHATE (otherwise undescribed)—

Teneriffe, 68 t.

SUPERPHOSPHATE OF LIME—

Orotava, 10 t.

STEARINE—

La Libertad, 10 bgs.

TALLOW—

Marseilles, 465 pkgs.

TARTARIC ACID—

New York, 2 t., £638.

WOOD PRESERVATIVE—

Burutu, 1 t. 10 c., £7.; Cape Town, 1 t. 18 c., £65.; Grand Bassam, 1 c., £3.; Lome, 4 c., £7.; Monte Video, 6 t. 16 c., £183.; Pt. Gentil, 10 c., £20.; Tloilo, 3 c., £4.

ZINC CHLORIDE—

Alexandria, 3 t., £255.; Bombay, 3 t. 18 c., £235.

ZINC SULPHATE—

Bombay, 1 t., £23.

LONDON.

Week ending July 23.

ACETANILID—

Havre, 11 cks., £280.

ACETIC ACID—

Alexandria, 6 cs., £26.; Antwerp 3 brls., £51.; Auckland, 1 cs., £6.; Canton, 1 cs., 21 cs. (pt.), £29.; Christchurch, 25 cs., £74.; Jaffa, 1 cs., £5.; Lyttleton, 8 cs., £24.; Rio de Janeiro, 3 cs., £7.; Wellington, 1 kg., £8.

ACETO SALICYLIC ACID—

Athens (F.), 1 cs. (pt.), £8.; Penang, 1 cs. (pt.), £6.

ACETONE—

Rangoon, 2 drms., £21.

ALUM—

Cape Town, 5 c., £7.; Durban, 10 c., £11.; Rio de Janeiro, 6 c., £14.

AMMONIA—

Alexandria, 8 cs., £45.; Antwerp, 2 drms., £26.; Buenos Ayres, 15 drms., £192.; Canton, 1 cs. (pt.), £8.; Durban, 20 cs., £40.; Madras, 2 cs., £7.; Mombasa, 3 cs., £6.; Paris, 39 drms., £355.; Pt. Elizabeth, 6 cs., £23.; Rio de Janeiro, 10 cs., £48.; Soerabaya, 8 cs., £21.; Tokio, 4 cs., £15.; Wellington, 19 cs. (pt.), £14.

AMMONIUM BROMIDE—

Antwerp, 3 cs., £116.

AMMONIUM CARBONATE—

Calcutta, 4 c., £19.; Callao, 10 c., £50.; Hong Kong, 5 c., £22.; Mauritius, 2 c., £6.; Porto Alegre, 10 c., £90.; Rio de Janeiro, 3 t. 18 c., £389.; Santos, 17 c., £86.; Sao Paulo, 4 t. 4 c., £433.

AMMONIUM CHLORIDE—

Canton, 3 cs., £18.; Hong Kong, 1 ck., £6.

AMMONIUM MURIATE—

Athens, 2 c., £7.; Brussels, 1 t. 4 c., £60.; Bombay, 5 t. 2 c., £369.; Buenos Ayres, 1 t. 10 c., £106.; Hobart, 3 c., £18.; Rosario, 1 t. 1 c., £72.; Shanghai, 4 c., £18.

AMYL ACETATE—

Barcelona, 1 drms., £55.; Kobe, 10 drms., £110.

ANTIMONY REGULUS—

Amsterdam, 5 t.

ANTIMONY SULPHATE—

Abo, 1 ck., £56.; Buenos Ayres, 3 cs., £68.; Bordeaux, 4 cks., £223.; New York, 20 cks., £428.; Rotterdam, 12 cks., £400.; Trelleborg, 1 ck., £25.

ANTIMONY SULPHIDE—

Brussels, 2 cks., £24.

ANTIMONY TARTRATE—

Brussels, 2 cs., £33.; Sao Paulo, 1 cs. (pt.), £14.

ARSENIC—

Buenos Ayres, 20 t. 1 c., £700.; Calcutta, 6 t., £528.; Lisbon, 6 c., £15.; Valencia, 1 t. 4 c., £35.

BEES WAX—

Amsterdam, 1 t.

BENZOIC ACID—

Paris, 1 ck., £35.; Rangoon, 1 cs. (pt.), £7.

BISMUTH CARBONATE—

Corral, 1 cs. (pt.), £23.; Durban, 1 cs. (pt.), £22.; Hong Kong, 1 cs. (pt.), £22.; Stockholm, 1 cs. (pt.), £9.

BISMUTH CITRATE—

Durban, 1 cs. (pt.), £11.

BISMUTH METAL—

Osaka, 3 t.

BISMUTH SALICYLATE—

Corral, 1 cs. (pt.), £23.

BISMUTH SUBGALLATE—

Athens, 1 cs. (pt.), £20.; Alexandria, 1 cs. (pt.), £9.

BISMUTH SUBNITRATE—

Athens, 1 cs. (pt.), £18.; Alexandria, 1 cs. (pt.), £8.; Calcutta, 1 cs. (pt.), 1 cs., £10.

BISMUTH SUBNITRATE—

Corral, 1 cs. (pt.), £23.; Durban, 1 cs. (pt.), £5.; Sao Paulo, 1 cs., £8.; Stockholm, 1 cs. (pt.), £118.

BISMUTH SUBSALICYLATE—

Stockholm, 1 cs. (pt.), £77.

BORAX—

Antwerp, 59 t. 9 c., £1,911.; Hobart, 2 c., £5.; Hong Kong, 10 c., £25.; Kobe, 5 c., £10.; Madras, 12 c., £66.

BORIC ACID—

Calcutta, 12 c., £48.; Canton, 3 c., £14.; Colombo, 1 c., £5.; Mossel Bay, 10 c. (F.), £37.; Shanghai, 15 t., £1,110.; Smyrna 2 c., £11.

CABLE WAX—

Antwerp, 10 c.

CALCIUM CARBIDE

Batoum, 5 t. 18 c., £147.; Galatz, 10 c., £12.

CALCIUM CARBONATE—

Buenos Ayres, 2 cks., £11.

CALCIUM CHLORATE—

Brussels, 2 cs., £5.; Singapore, 1 c., £5.; Sydney, 1 t. 7 c., £54.

CALCIUM GLYCEROPHOSPHATE

Valparaiso, 1 cs. (pt.), £8.

CALCIUM IODIDE—

Stockholm, 4 cs., £375.

CALCIUM LACTATE—

Alexandria, 1 cs. (pt.), £6.

CARBON (RETORT)

Hoganas, 162 t., £1,020.

CARNAUBA WAX—

Italy, 1 t.

CAUSTIC SODA—

Galatz, 9 t. 18 c., £365.; Larache, 10 c., £12.; Penang, 13 c., £30.; Sydney, 18 c., £47.

CERESINE WAX—

Antwerp, 3 t. 4 c.

CHEMICALS (otherwise undescribed)

Alexandria, 3 cs. (pt.), £24.; Beyrout, 1 cs., £7.; Bombay, 12 cs., £147.; Buenos Ayres, 16 pks., £136.; Calcutta, 6 cs., £26.; Colombo, 4 cs., £62.; Durban, 2 cs., £45.; Durban, 20 pks. (F.), £110.; Foochow, 2 cs., £19.; Jaffa, 3 cs., £6.; Kilindini, 1 cs., £8.; Malta, 3 cs., £30.; Montreal, 2 cs., £71.; New York, 2 cs., £350.; Paris, 1 cs., £7.; Pt. Swettenham, 1 cs., £7.; Shanghai, 2 pks., £83.; Singapore, 2 cs., £27.; Smyrna, 5 kgs., £7.; Sydney, 3 cs. (pt.), £87.

CHINA CLAY—

Buenos Ayres, 10 t.

CINNAMIC ACID—

Paris, 1 cs., £30.

CITRIC ACID—

Alexandria, 2 c., £39.; Antwerp, 10 c. (F.), £236.; Amsterdam, 10 c. (F.), £230.; Barbados, 1 c., £25.; Beira, 2 c., £48.; Calcutta, 2 c., £50.; Cape Town, 1 cs., £11.; East London, 1 cs. (pt.), £9.; Pt. Elizabeth, 1 c., £31.

COAL PRODUCTS—

Aniline Colour
Singapore, 1 cs., £20.

Aniline Dye

Buenos Ayres, 1 cs., £86.; Genoa, 9 pks., £675.; Lisbon, 1 cs., £40.; Paris, 1 ck., £27.; Toronto, 1 ck., £50.

Benzonate

Beira, 50 drms., £100.

Benzonaphthol

Athens (F.), 1 cs. (pt.), £18.; Corral, 1 cs. (pt.), £23.

Carbolic Acid

Calcutta, 5 cs. (pt.), £27.; Kobe, 79 drms., £170.; Osaka, 131 drms., £340.; Sydney, 100 drms., £98.; Wei-Hai-Wei, 9 pks., £9.; Yokohama, 317 cks., £5,000.

Croosote

Buenos Ayres, 22 drms., £254.; Dordrecht, 18,804 gals., £505.; Canton, 1 ck., £6.; Paris, 120 cks., £397.; Shanghai, 26 pks., 10 cks., £104.; Singapore, 2 cks., £11.; Sourabaya, 50 drms., £150.; Trelleborg, 100 cks., £180.

COAL PRODUCTS—

Cresylic Acid
Casablanca, 20 brls., £124.

Mineral Black

Trinidad, 5 cks., £10.

Naphthalene

Alexandria, 2 pks., £9.; Colombo, 10 drms., £21.; Constantinople, 2 cks., £18.; Jaffa, 1 kg., £11.; Madras, 6 cs., £19.; Malta, 5 drms., £25.; Montreal, 25 cks., £85.; New York, 136 cks., £225.; Wellington, 10 drms., £15.

Pitch

Antwerp, 345 t., £1,207.

Tar

Santa Cruz (Arg.), 50 drms., £24.; Trelleborg, 300 cks., £170.

Tar Oil

Havre, 100 cks., £156.

Trioxymethylene

Brussels, 1 cs., £36.

Xylol

Paris, 3 drms., £39.

COPPER SALTS—

Dunedin, 1 dr., £15.

COPPER SUBOXIDE—

Rotterdam, 1 ck., £50.

COPPER SULPHATE—

Channel Islands, 37 bgs., £88.; Mossamedes, 9 c., £21.

CREAM OF TARTAR—

Amsterdam, 1 c., £20.; Broome, 2 c. (F.), £31.; Calcutta, 1 c., £21.; East London, 1 cs. (pt.) (F.), £14.; East London, 2 c., £31.; Hong Kong, 1 c. (F.), £31.; Limon, 2 c., £56.; Madras, 1 c. (F.), £10.; Osaka, 2 t., £500.; Pt. Elizabeth, 1 c. (F.), £12.; Shanghai, 3 cs. (F.), £13.; St. John, N.B., (transit), 1 t 6 c. (F.), £200.

DISINFECTANTS (otherwise notes.)

Alexandria, 1 c., £6.; Beira, 14 c., £47.; Bombay, 13 t. 6 c., £575.; Cape Town, 3 c., £17.; Cocos, 2 c., £5.; Colombo, 5 t. 12 c., £255.; Danzig, 5 t., £374.; Durban, 2 c., £15.; Hankow, 3 c., £8.; Hong Kong, 5 t., £287.; Jaffa, 1 c., £8.; Karachi, 4 t. 9 c., £192.; Kilindini, 1 t. 2 c., £54.; Madras, 3 t. 1 c., £26.; Monte Video, 1 t. 10 c., £95.; Paris, 4 t. 12 c., £120.; Paris, 1 t. (F.), £120.; Pt. Elizabeth, 5 c., £10.; Singapore, 2 t. 5 c., £73.; Zanzibar, 6 c., £16.

ETHER—

Alexandria, 1 cs. (pt.), £7.; Constantinople, 1 cs., £10.; Jaffa, 1 cs., £20.; Malta, 2 cs., £17.; Pt. Swettenham, 1 cs. (pt.), £7.

ETHER (ACETIC)—

Madras, 1 cs., £7.

ETHER (ANHYDROUS)—

Dunedin, 1 cs., £75.

ETHYL CHLORIDE—

Durban, 1 cs., £7.; Wellington, 8 cs. (pt.), £6.

FATTY ACIDS—

Bordeaux, 11 t.; Galatz, £850.; Nantes, £1,300.; Rotterdam, 15 t. 2 c.; Rouen, 9 t. 19 c.

FULLER'S EARTH—

Buenos Ayres, 46 t.

GALLIC ACID—

Brussels, 1 kg., £20.

GELATINE—

Shanghai, 10 c.

GLUE—

Kobe, 25 t.; Yokohama, 17 t. 10 c.

GLUE, SIZE, AND GELATINE—

Antwerp, 7 t. 12 c.; Auckland, 5 c.; Beira, 4 c.; Bilbao, 2 t. 10 c.; Bombay, 2 t. 13 c.; Bordeaux, 10 c.; Bundaberg, 1 c.; Calcutta, 2 c.; Christiania, 2 c.; Cape Town, 12 c.; Cologne, 17 t. 11 c.; Colombo, 1 t.; Dieppe, 1 t. 5 c.; Durban, 3 c.; Helsingfors, 5 t.; Lytleton, 1 c.; Lima, 10 c.; Melbourne, 6 c.; Montreal, 2 t.; Ostend, 1 c.; Singapore, 10 c.; Sydney, 1 c.; Wellington, 3 c.

GLYCERINE—

Alexandria, 12 c., £90.; Beira, 2 c., £12.; Calcutta, 1 c., £8.; Durban, 10 c., £61.; Hankow, 1 c., £10.; Hong Kong, 1 t., £126.; Kobe, 1 c., £79.; Malta, 1 c., £7.; New York (crude), 26 t. 18 c., £1,782.; Osaka, 4 c., £80.; Paris, 7 t. 5 c., £1,000.; Piraeus, 2 c., £13.; Rio de Janeiro, 8 c., £58.; Rouen, 1 t., £130.; Soerabaya, 12 c., £82.

GLYCEROPHOSPHATE OF LIME—

Athens (F.), 1 cs. (pt.), £13.

HYDROBROMIC ACID—

Wellington, 5 c., £24.

HYDROCHLORIC ACID—

Brussels, 2 t., £31.; Buenos Ayres, 2 c., £3.; Colombo, 2 c., £6.; Jaffa, 4 c., £15.; Rio de Janeiro, 3 c., £32.; Wellington, 12 c., £52.

HYDROCYANIC ACID—

Durban, 1 cs. (pt.), £5.

HYDROGEN PEROXIDE—

Alexandria, 18 pks. (pt.), 2 cs. (pt.), £46.; Cape Town, 1 cs., £12.; Cyprus, 2 cs., £9.; Durban, 1 cs., £6.; Paris, 5 cks., £40.

IODINE—

Genoa (F.), 7 cks., £3,600.; Shanghai, 1 cs. (pt.), £16.

IODINE (DISUBLIMED)—

Alexandria, 1 cs. (pt.), £10.; Genoa, 2 cs., £180.

IRON AND AMMONIUM CITRATE

Amsterdam (pt.), 1 cs., £26.; Brussels, 1 cs. (pt.), £9.; Buenos Ayres, 1 ck., £18.

IRON PERCHLORIDE—

Paris, 5 cks., £37.; Sydney, 19 cks., £100.

LACTIC ACID—

Alexandria, 1 cs. (pt.), £5.; Athens (F.), 1 cs., £18.; Paris, 10 cks., £145.

LEAD ACETATE—

Canton, 1 cs., £6.; Rio de Janeiro 1 cs., £13.

LEAD IODIDE—

Brussels, 1 cs., £37.

LITHIUM CITRATE—

Antwerp, 2 cs. (pt.), £6.

MAGNESIA (CALCINED)—

Bahia, 1 cs., £20.; Buenos Ayres, 1 cs., £30.; Callao, 1 cs. (pt.), £6.; Rio de Janeiro, 3 cs., £79.; Sao Paulo, 4 cs., £63.

MAGNESIUM CARBONATE—

Athens, 4 bgs., £15.; Boulogne, 40 bgs., £115.; Bahia, 2 bgs., £18.; Lytleton, 2 bgs., £9.; Maryborough, 1 cs., £6.; Rio de Janeiro, 27 cs., £235.; Sao Paulo, 4 cs., £63.

MAGNESIUM CITRATE—

Alexandria, 1 cs. (pt.), £11.; Barcelona, 10 cs., £69.; Monte Video, 5 cs., £23.

MAGNESIUM SULPHATE—

Casablanca, 4 c., £7.; East London, 10 c., £21.; Karachi, 4 c., £7.; Paris, 1 t., £48.; Pt. Elizabeth, 3 c., £7.; Porto Alegre, 14 c., £38.; Rio de Janeiro, 5 c., £7.; Rockhampton 1 t. 2 c., £45.; Townsville, 5 c., £10.

MANGANESE HYDRATE—

Rotterdam, 3 cks., £50.

MERCURY BICHLORIDE—

Amsterdam, 1 cs. (pt.), £17.

MERCURY CHLORIDE—

Amsterdam, 1 cs. (pt.), £7.

MERCURY OXIDATE—

Rotterdam, 2 cs., £106.

MERCURY OXIDE—

Sao Paulo, 1 cs. (pt.), £29.

MERCURY PERCHLORIDE—

Shanghai, 3 pks. (pt.), £7.

MERCURY PERSULPHATE—

Monte Video, 1 cs. (pt.), £3.

MERCURY SUBCHLORIDE—

Shanghai, 3 pks. (pt.), £7.

METHYL SALICYLATE—

Athens, 2 cs., £22.; Naples, 1 cs., £8.

MURIATIC ACID—

Rio de Janeiro, 3 c., £32.

NICKEL SALTS—

Rotterdam, 73 cks., £840.; Sydney, 10 cs., £28.

NITRIC ACID—

Auckland, 2 c., £9.; Colombo, 2 c., £7.; Ghent, 3 t. 15 c., £156.; Jaffa, 1 c., £8.; Rio de Janeiro, 6 c., £70.; Wellington, 7 c., £40.

NUCLEIC ACID—

Paris, 1 cs., £225.

OXALIC ACID—

Antwerp, 4 cks., £175.; Bordeaux (F.), 4 cks., £145.; Lisbon, 3 cks., £138.

PARAFFIN WAX—

Genoa, 19 c.

PERCHLORIC ACID—

Calcutta, 1 cs., £3.

PHOSPHORIC ACID—

Auckland, 8 cs., £45.; Durban, 13 pks., £33.; Genoa, 6 crbys., £92.; Paris, 2 cs., £18.; Wellington, 3 cs., £23.

PHOSPHORUS—

Auckland, 30 cs., £346.; Dunedin 30 cs., £346.; Lytleton, 20 cs., £225.; Otago, 15 cs., £200.; Wellington, 28 cs., £308.

PHOSPHORUS (AMORPHOUS)—

Bombay, 2 cs., £30.; Trinidad, 4 cs., £53.

PLUMBAGO—

Antwerp, 18 c.; Bangkok, 1 t.

POTASSIUM BICARBONATE—

Alexandria, 1 cs. (pt.), £6.; Brussels, 2 pks. (pt.), £17.

POTASSIUM BICHOIMATE—

Athens, 1 kg., £8.; Buenos Ayres, 2 cs., £26.

POTASSIUM BROMIDE—

Athens (F.), 1 cs. (pt.), £7.; Durban, 1 cs. (pt.), £15.; Sao Paulo, 2 cs. (pt.), £21.

POTASSIUM CARBONATE—

Alexandria, 2 cs. (pt.), £24.; Hong Kong, 1 cs. (pt.), £5.

POTASSIUM CHLORATE—

Auckland (F.), 12 c., £121.; Athens, 1 c., £21.; East London, 1 c., £8.; Hong Kong, 1 c., £11.; Wellington, 1 c., £15.

POTASSIUM CHLORIDE—

Sydney (F.), 2 c., £19.; Wellington, 8 cs. (pt.), £7.

POTASSIUM CITRATE—

Hong Kong, 1 cs. (pt.), £6.

POTASSIUM CYANIDE—

Brussels, 6 c., £67.; Buenos Ayres, 2 kgs., £76.; Dunedin, 1 dr., £14.; Melbourne, 1 cs. (pt.), £8.; Singapore, 5 cs., £43.

POTASSIUM FERRICYANIDE—

Rangoon, 1 cs. (pt.), £22.

POTASSIUM HYPOPHOSPHITE—

Osaka, 10 cs., £366.

POTASSIUM IODIDE—

Alexandria, 2 cs. (pt.), £22.; Bangkok, 2 cs., £125.; Calcutta, 2 cs., £120.; Leghorn, 6 cs., £460.; Perth, 1 cs., £80.; Shanghai, 1 cs., £78.

POTASSIUM METABISULPHATE

Caen, 2 kgs., £10.; Durban, 1 kg., £7.; Genoa, 5 brls., £110.; New Plymouth, 5 brls., £65.

POTASSIUM PRUSSATE—

Athens, 1 kg., £22.; Buenos Ayres, 3 pks., £64.; Lisbon, (F.), 1 ck., £69.

POTASSIUM SULPHATE—

Abo, 1 ck., £16.

POTASSIUM SULPHIDE—

Corral, 2 cs., £40.; Rio de Janeiro, 1 cs. (pt.), £5.; Talcahuano, 2 cs. (pt.), £30.

PYROGALLIC ACID—

Shanghai, 3 cs., £53.

QUININE—

Calcutta, 13,100 ozs.; Cape Town, 33 ozs.

SALAMMONIAC—

Singapore, 2 c., £8.

SALICYLIC ACID—

Amsterdam, 2 cks., £80.; Bordeaux, 5 cks., £210.; Hong Kong, 2 kgs., £11.; Paris, 6 cs., £66.

SALT—

Dunedin, 2 t.; Pt. Elizabeth, 1 t.; Rockhampton, 3 t.; Wellington, 1 t. 11 c.; Zanzibar, 11 c.

SALTCAKE—

Ghent, 235 t., £799.

SALTPETRE—

Auckland, 5 c., £14.; Bahia, 3 t. 19 c., £234.; Beira, 17 t., £620.; Bilbao, 2 t. 1 c., £120.; Delagoa Bay, 1 t. 5 c., £86.; East London, 12 c., £30.; Rio de Janeiro, 6 t. 17 c., £410.; Singapore, 2 c., £7.; Santiago (Spain), 1 t. 9 c., £83.; Vigo, 15 c., £42.; Wellington, 6 c., £20.

SHEEP DIP—

Buenos Ayres, 35 t. 18 c., £1,950.; Santa Cruz (Arg.), 10 t. 18 c., £940.

SILVER NITRATE—

Antwerp, 2 cs., £1,064.; Madras, 1 cs. (pt.), £23.

SILVER NUCLEINATE—

Athens (F.), 1 cs. (pt.), £6.

SOAP—

Aden, 3 c.; Adelaide, 1 c.; Alexandria, 8 c.; Amsterdam, 2 t. 19 c.; Antwerp, 385 t. 15 c.; Auckland, 2 c.; Bandoeng, 1 c.; Bangkok, 10 c.; Batavia, 11 c.; Barbados, 1 t. 1 c.; Beira, 3 t. 1 c., 48 lbs.; Bilbao, 2 c.; Bombay, 2 t. 10 c.; Bordeaux, 15 c.; Boulogne, 74 t. 9 c.; Boston, 2 t. 7 c.; Brisbane, 4 c.; Buenos Ayres, 1 t. 2 c.; Calcutta, 3 t. 14 c.; Canary Islands, 2 c.; Calicut, 12 c.; Cape Town, 9 c.; Casablanca, 7 c.; Christchurch, 5 c.; Colombo, 2 t. 9 c.; Cologne, 15 t. 1 c.; Constantinople, 1 c.; Copenhagen, 2 t. 10 c.; Durban, 13 c.; Dunkirk, 26 t. 5 c.; East London, 6 c.; Gibraltar, 13 c.; Havre, 84 t. 8 c.; Hobart, 4 c.; Hong Kong, 1 t. 10 c.; Italy, 5 c.; Karachi, 7 c.; Kobe, 1 c.; Lisbon, 6 c.; Malmo, 11 t. 18 c.; Madras, 1 t. 5 c.; Mazagan, 25 t. 14 c.; Mauritius, 1 t.; Medan, 2 c.; Melbourne, 12 c.; Mombasa, 1 c.; Monte Video, 8 c.; Napier, 2 c.; New York, 4 c.; Nevis, 1 c.; New Plymouth, 3 c.; Ostend, 3 t. 14 c.; Paris, 156 t. 9 c.; Penang, 4 c.; Perth, 10 c.; Piraeus, 6 c.; Pt. Alegre, 1 c.; Pt. Elizabeth, 8 c.; Pt. Swettenham, 1 t. 5 c.; Punta Arenas, 4 c.; Rangoon, 5 c.; Rio de Janeiro, 6 c.; Rotterdam, 63 t. 16 c.; St. Lucia, 1 c.; St. Helena, 5 c.; Salonika, 5 t.; Santander, 5 c.; Sekondi, 1 t.; Seremban, 1 c.; Shanghai, 15 c.; Smyrna, 3 c.; Sourabaya, 9 c.; Singapore, 10 c.; Sourabaya, 3 c.; Stockholm, 5 t. 5 c.; Sydney, 9 c.; Trinidad, 5 c.; Tientsin, 1 c.; Valencia, 2 t. 2 c.; Wellington, 1 c.; Zanzibar, 7 c.

SODA ASH—

Hobart, 1 t. 1 c., £9.

SODA CRYSTALS—

Pt. Elizabeth, 1 t., £23.

SODIUM ARSENITE—

Durban, 1 t. 18 c., £91.

SODIUM BENZOATE—

Alicante, 3 cs., £148.; Athens, 3 cs. (pt.), £93.; Athens (F.), 1 cs. (pt.), £18.; Calcutta, 6 cs. (pt.), £30.; Valparaiso (F.), 1 cs. (pt.), £16.; Wellington, 8 cs. (pt.), £11.

SODIUM BICARBONATE—

Antwerp, 25 t., £250.; Barbados, 1 c., £6.; Brussels, 10 c., £19.; Calcutta, 1 t. 4 c., £74.; Cologne, 57 t., £450.; Switzerland, via Dieppe, 11 t. 1 c., £151.; East London, 6 c., £9.; Tloilo, 3 c., £8.; Leghorn, 10 c., £11.

SODIUM BICARBONATE—

Singapore, 1 t., £20.; Tientsin, 3 c., £8.; Townsville, 12 c., £7.; Valencia, 10 c., £11.

SODIUM BICHRONATE—

Switzerland, 19 c., £90.

SODIUM BISULPHITE—

Pt. Swettenham, 2 t. 16 c., £79.

SODIUM BROMIDE—

Genoa, 1 cs., £8.

SODIUM CARBONATE—

Pt. Swettenham, 1 c., £10.; Soerabaya, 4 c., £12.

SODIUM GLYCEROPHOSPHATE—

Athens, 1 cs., £6.

SODIUM HYDROSULPHATE—

Stockholm, 1 t., £336.

SODIUM HYPHOSPHATE—

Brussels, 5 t., £103.

SODIUM HYPOSULPHATE—

Salonika, 10 c., £22.; Shanghai, 1 t., £26.

SODIUM HYPOSULPHITE—

Wellington, 5 c., £8.

SODIUM IODIDE—

Beyrout, 2 cs. (pt.), £7.; Stockholm, 2 cs., £165.

SODIUM PHOSPHATE—

Amsterdam, 1 cs., £6.; Rio de Janeiro, 1 ck. (pt.), £9.

SODIUM PYROPHOSPHATE—

Amsterdam, 1 cs., £6.; Leghorn, 19 c., £82.

SODIUM SALICYLATE—

Amsterdam, 7 cks., £500.; Athens 3 cs. (pt.), £23.; Penang, 1 cs. (pt.), £6.; Singapore, 4 cs. (pt.), £5.; Valparaiso, 1 cs. (pt.), £8.

SODIUM SILICATE—

Delagoa Bay, 1 drin., £15.; Hong Kong, 1 cs. (pt.), £9.; Larache, 13 c., £8.; Monte Video, 5 c., £12.; Paris, 1 cs., £32.; Upsala, 5 c., £7.

SODIUM SULPHATE—

Cape Town, 1 t., £13.; Pt. Swettenham, 1 c., £8.; Santos, 51 t. 19 c., £242.

SODIUM SULPHATE (GLAUBER

Paris, 10 t., £38.; Rio de Janeiro, 15 c., £10.

SODIUM SULPHIDE—

Cologne, 13 t. 10 c., £260.

SODIUM SULPHITE—

Bombay, 10 c., £20.; Melbourne, 10 c., £14.; Penang, 70 drms., £88.; Pt. Swettenham, 1 t. 8 c., £32.

STEARINE—

Galatz, 10 t.

SULPHUR—

Antwerp, 2 t., £60.; Amsterdam, 2 c., £10.

SULPHUR (FLOWERS)—

Durban, 5 c., £10.

SULPHURIC ACID—

Auckland, 2 c., £8.; Buenos Ayres, 2 c., £6.; Channel Islands, 18 c., £25.; Colonibo, 2 c., £6.; Malta, 3 c., £13.; Rio de Janeiro, 6 t., £44.; Singapore, 4 c., £22.; Wellington, 5 c., £30.; Zanzibar, 8 c., £15.

SUPERPHOSPHATE (otherwiseChannel, 135 t. *undescribed*)—**TALLOW—**

Havre, 15 t. 14 c.; Nantes, 20 t.

TANNIC ACID—

Alexandria (F.), 1 cs. (pt.), £11.

TAR (STOCKHOLM)—

Dunedin, 1 t. 5 c.; Tampico, £40.; Wellington, £40.

TARTARIC ACID—

Alexandria, 1 c., £20.; Bombay, 2 c., £45.; Buenos Ayres, 6 c., £102.; Calcutta, 1 c., £15.; Cape Town, 1 c., £16.; Durban, 1 c., £19.; East London, 2 c., £31.; Fremantle, 8 c., £123.; Limon, 2 c., £63.; Melbourne, 1 t. 10 c., £417.; Montreal, 10 c. (F.), £170.; Pt. Elizabeth, 6 c., £119.; Sydney, 10 c., £151.

TERPIN HYDRATE—

Brussels, 1 cs. (pt.), £9.

THEOBROMINE SODIUM

Abo 3 cs. (pt.), £500.

WAX—

Calais, £30.; Christchurch, £8.; Madras, 4 c.; Nantes, 10 c.

WHITE LEAD—

Alexandria, £29.; Antwerp, £752.; Bombay, £387.; Bordeaux, £538.; Cape Town, £29.; Durban, £10.; East London, £3,131.; Ghent, £180.; Lisbon, £240.; Rotterdam, £600.

WOOD PRESERVATIVE—

Batavia, 350 gals.

MANCHESTER.*Week ending July 26.***ALUM—**

Treport, 24 cs.

ALUM (CHROME)—

Gothenburg, 7 cks.

ALUMINA SULPHATE—

Antwerp, 20 bgs.

AMMONIUM CARBONATE—

Gothenburg, 260 pkgs.

ANILINE OIL—

Rotterdam, 5 drms.

BARIUM SULPHOCYANIDE—

Boston, 4 cks.

BONE ASH—

Treport, 16 cks.

CAUSTIC SODA—

Newcastle, 159 drms.; Gothenburg, 90 drms.

COAL PRODUCTS (otherwise *undes.*)

Alexandria, £1,925.; Bordeaux, £520.; Gothenburg, £756.; New York, £437.

COPPER SULPHATE—

New York, 111 pkgs.

DISINFECTANTS (otherwise *undes.*)

Bordeaux, 6 bris.; Dunkirk, 12 cks.

DYESTUFFS (otherwise *undescribed*)

Alexandria, 2 drms.

FERRO MANGANESE—

Bordeaux, 12 cks.

NICKEL SULPHATE—

Rotterdam, 87 cks.

POTASSIUM BICHRONATE—

Alexandria, 47 bris.; Dunkirk, 14 cks.

SALT—

Abonema, 750 bgs.; Accra, 2,157 bgs.; Bonny, 250 bgs.; Grand Bassam, 5,674 pkgs.; Gothenburg, 2,376 pkgs.; Opobo 500 bgs.; Pt. Harcourt, 750 bgs.; Sekondi, 20,394 bgs.; Sierra Leone, 5,386 sks.

SHEEP DIP—

New York, 20 drms.

SIZE—

Gothenburg, 2 cks.; Rouen, 3 bris.

SOAP—

Antwerp, 24 t. 13 c.; Gothenburg, 4 bris., 60 cs.; Pt. Harcourt, 1 cs.; Marseilles, 889 bris.; Rotterdam, 432 cs.

SODA ASH—

Gothenburg, 1,140 bgs.

SODIUM BICARBONATE—

Gothenburg, 200 bgs.

SODIUM SULPHIDE—

Bordeaux, 18 cks.

SULPHUR—

Dunkirk, 2 bgs.

SULPHUR (FLOWERS)—

Gothenburg, 35 bgs.; Treport, 100 bgs.

SULPHUR (ROLL)—

Antwerp, 364 bgs.

TALLOW—

Gothenburg, 60 cks.

WAX—

Rouen, 14 bris.

ZINC OXIDE—

Dunkirk, 30 bgs.

MIDDLESBROUGH.*Week ending July 26.***AMMONIUM SULPHATE—**

Kobe, 100 t., £1,714.; Yokohama, 400 t., £6,816.

CALCIUM CARBIDE—

Algou Bay, 1 t. 11 c., £40.

CAUSTIC SODA—

Finland, 5 t., £150.; Tokio, 24 t. 19 c., £449.

COAL PRODUCTS—Naphthalene
Dieppe, 17 t. 18 c., £603.; Shanghai, 10 t., £160.; Tientsin, 15 t., £240.**CREOSOTE OIL—**

Beira, 3 t. 19 c., £81.

MAGNESIA (CALCINED)—

Kobe, 3 t., £257.

MAGNESIUM CARBONATE—

Dieppe, 25 t., £976.

SALT—

Siglufjord, 300 t., £750.

SULPHUR—

Finland, 10 c., £15.

NEWCASTLE-ON-TYNE*Week ending July 26.***ACID—**

Bergen, 2 t. 3 c.

BLEACHING POWDER—

Christiania, 5 t.

CAUSTIC SODA—

Bergen, 8 t. 2 c.; Gothenburg, 2 t. 18 c.

CHLORIDE OF LIME—

Antwerp, 34 t. 15 c.

DYESTUFFS—Terobine Extract
Gothenburg, 18 c.**GELATINE—**

Bergen, 2 c.

GLUE—

Christiania, 2 t.

IRON SULPHIDE—

Antwerp, 10 c.

RED LEAD—

Antwerp, 5 t. 17 c.; Copenhagen, 2 t.

SOAP—

Antwerp, 238 lbs.; Gothenburg, 1 t.

SODIUM HYPHOSPHITE—

Gothenburg, 1 t.

SODIUM SULPHITE—

Gothenburg, 1 t.

SULPHUR—

Antwerp, 5 t.; Gothenburg 25 t.

WHITE LEAD—

Antwerp, 17 t. 15 c.

N. & S. SHIELDS.*Week ending July 26.***AMMONIUM CARBONATE—**

Stockholm, 1 t. 10 c.

ANTIMONY—

Montreal, 10 t.; Stockholm, 5 t.

BARIUM BINOXIDE—

Montreal, 3 t. 14 c.

CAUSTIC SODA—

Stockholm, 32 t. 10 c.

CHEMICALS—

Christiania, £383.

MAGNESIA—

Montreal, 2 t. 19 c.

RED LEAD—

Montreal, 22 t. 5 c.

STOCKTON-ON-TEES.*Week ending July 26.*

NIL.

SWANSEA.*Week ending July 26.***COBALT OXIDE—**

Shanghai, 8 t., £551.

PRICES CURRENT.

THURSDAY, July 31, 1919.

PREPARED BY MESSRS. HIGGINBOTTOM AND Co., 21, SPRING GARDENS, MANCHESTER.

The values stated are F.O.R. at makers' works, or at usual ports of shipment in U.K., unless otherwise specified
The prices in different localities may vary.

Acids:—				£	s.	d.					£	s.	d.
*Acetic	40% and 60%	...	per cwt.	31/-	&	47/-	Lead, Carbonate (White lead), pure	...	per ton	51	0	0	
"	Glacial	...	per ton	80	0	0	" Nitrate	...	"	56	10	0	
*Arsenic	S.G. 2,000°	...	per ton	50	0	0	Lime, Acetate (brown)	...	"	10	0	0	
Boric	Crystals	...	"	72	0	0	" (grey), 80% (ex ship)	...	"	19	0	0	
*Fluoric		...	per lb.	0	0	7	Magnesium Chloride	...	"	15	10	0	
*Muriatic (Tower Salts), 28 Tw.		...	per carboy	0	6	6	" Carbonate (light)	...	per cwt.	3	7	6	
*Nitric, 80° Tw.		...	per ton	31	0	0	" Calcined Magnesite	...	per ton	25	0	0	
Oxalic		...	per lb.	0	1	2½	" Sulphate (Epsom Salts) (coml.)	...	"	10	10	0	
Phosphoric, 1,750°		...	"	0	1	9	" (druggists)	...	"	16	0	0	
*Sulphuric (fuming, 70%)		...	per ton	—			Manganese, Sulphate	...	"	80	0	0	
" (Pyrites, 168°)		...	"	7	18	9	" Borate	...	"	100	0	0	
" (" 140°)		...	"	4	10	0	*Methylated Spirit, 64° (industrial)	...	per gal.	0	5	7	
" (free from arsenic, 144°)		...	"	5	7	4	*Naphtha (Wood), Solvent	...	"	0	10	0	
Tannic (commercial)		...	per lb.	0	2	9	" " Miscible, 60° p.	...	"	0	10	0	
Tartaric (crystals)		...	"	0	3	2	Oils:—						
*Acetone		...	per ton	80	0	0	*Cottonseed	...	per ton	135	0	0	
*Alum, loose lump (delivered)		...	"	17	0	0	*Linsed	...	"	135	0	0	
Alumina Sulphate (pure)		...	"	17	0	0	Stearine, 115-120° M.P.	...	"	95	0	0	
Aluminoferrous (in slabs)		...	"	8	10	0	Potassium, Bichromate	...	per lb.	0	1	6	
Aluminium (Ingot Metal, 98/99%)		...	per ton	150	0	0	" Carbonate, 80/82%	...	per to	85	0	0	
*Ammonia, Anhydrous		...	per lb.	0	1	10	" Chlorate	...	per lb.	0	1	1	
" 880		...	per ton	33	0	0	" Cyanide, 98%	...	"	—			
" 920		...	"	20	0	0	" Hydrate (Caustic Potash) 80%	...	per ton	160	0	0	
" Carbonate		...	per lb.	0	0	6½	" " 75%	...	"	140	0	0	
" Muriate (grey)		...	per ton	50	0	0	" Potash Hydrate Liquid, 38° B.	...	"	70	0	0	
" (sal ammoniac) 1st & 2nd, per cwt.		...	80/- & 75/-				" Nitrate (refined)	...	"	60	0	0	
" Nitrate		...	per ton	60	0	0	" Permanganate (B.P. crystals)	per lb.	0	3	6		
" Phosphate		...	"	114	0	0	" Prussiate (yellow)	...	"	0	1	9	
" Sulphate (grey), London, net		...	"	—			" (red)	...	"	0	5	6	
" " Hull		...	"	—			" Sulphate, 90% (ex ship)	...	per ton	40	0	0	
" " Manchester.		...	"	—			" Muriate, 80%	...	"	30	0	0	
*Aniline Oil (pure)		...	per lb.	0	1	2	Silver (metal)	...	per oz.	0	4	7½	
Aniline Salt		...	"	0	1	2	Sodium (metal)	...	per lb.	0	1	3	
Antimony		...	per ton	45	0	0	" Acetate	...	per ton	52	0	0	
" (tartar emetic), 43/44%		...	per lb.	0	3	4	" Arseniate, 45%	...	"	48	0	0	
" (golden sulphide)		...	"	0	1	3	" Borate (Borax), Crystals	...	"	39	0	0	
Arsenic, white powdered		...	per ton	46	0	0	" Bicarbonate (1 cwt. kegs)	...	"	9	10	0	
Barium Chloride (in casks)		...	"	24	0	0	" Bichromate	...	per lb.	0	0	11	
" Carbonate (native), 92/94%		...	"	11	10	0	" Carb. (Caustic Soda-ash), 48%	...	per ton	12	10	0	
" Sulphate (native levigated)		...	"	17 to 14			" (Alkali), 58% (bags)	f.o.r. {	6	0	0		
Baryta Chlorate		...	per lb.	0	1	3	" (Soda Crystals), (bags)	wks. {	4	2	6		
*Bisulphide of Carbon		...	per ton	55	0	0	" Chlorate	...	per lb.	0	0	7	
Bleaching Powder, 35%		...	"	15	0	0	" Cyanide (100% basis)	...	"	0	0	10	
" Liquor, 7%		...	"	6	0	0	" Hydrate (76% C. Soda) (f.o.r.)	...	per ton	24	0	0	
Casein (commercial)		...	"	82	0	0	" (74% C. Soda)	...	"	23	5	0	
Chromium Acetate (crystals)		...	per lb.	0	1	6	" (70% C. Soda)	...	"	22	0	0	
Calcium Chloride		...	per ton	8	0	0	" (60% C. Soda)	...	"	21	0	0	
China Clay (at Runcorn), in bulk		...	"	70/- to 90/-			" (pure liquid, 90° Tw.)	...	"	10	2	6	
Coal-tar Products and Dyes:—							" 77/78% Powdered (99%) Hydrate	...	"	24	10	0	
Alizarine (artificial), 20%		...	per lb.	0	2	0	" Hyposulphite (commercial)	...	"	16	10	0	
Magenta		...	18/- to 35/-				" Manganate, 25%	...	"	65	0	0	
Anthracene, 40/50% A, f.o.b., L'don, per unit,		...	6 to 7				" Nitrate, 96%, retd., f.o.r., L'pool	...	"	21	0	0	
Benzol, 90's (naked)		...	per gal.	0	2	0	" Nitrite, 100%	...	"	55	0	0	
" 50/90's		...	"	0	1	10	" Phosphate	...	"	25	10	0	
Carbolic Acid (crude, 60°)		...	"	0	1	5½	" Prussiate	...	per lb.	0	0	7½	
" (crystallised, 40°)		...	per lb.	0	0	6¼	" Silicate (glass) Alkaline	...	per ton	12	5	0	
" Acid (pale liquid, 97/98%)		...	per gal.	0	2	9	" (liquid, 100° Tw.)	...	"	9	10	0	
*Croosote (ordinary), naked		...	"	0	0	6½	" Sulphate (Saltcake), delivered	...	"	3	0	0	
*Crude Naphtha, 30% at 120°C.		...	"	0	0	9	" (Glauber's Salt)	...	"	3	0	0	
*Grease Oils, 18° Tw. (naked)		...	per ton	6	10	0	" Sulphide (conc.), 60/65% casks	...	"	50	0	0	
Pitch, f.o.b., Liverpool or Garston		...	"	2	14	0	" Sulphite	...	"	10	0	0	
*Solvent Naphtha, 90% at 160°		...	per gal.	0	2	1	Sulphocyanide, Ammonium, 95%	...	per lb.	0	2	1	
Copper		...	per ton	104	10	0	" Barium, 95%	...	"	0	1	4	
" Sulphate		...	"	45	0	0	" Potassium	...	"	0	2	4	
" Oxide (copper scales)		...	"	85	0	0	" Calcium, 70%	...	per lb.	0	1	4	
Dross Salts		...	"	39	0	0	Sulphur, (Flowers)	...	Sicilian per ton	23	0	0	
*Glycerine (crude), 80%		...	"	72	0	0	" (Roll Brimstone)	...	"	21	0	0	
" (industrial, S.G. 1,260)		...	"	110	0	0	" Brimstone (best thirds)	...	"	—			
*Iodine		...	per oz.	0	0	10½	" (ex ship)	...	"	14	10	0	
*Iron Nitrate, 80° Tw.		...	per ton	12	0	0	Tallow	...	"	100	0	0	
" Sulphate (copperas), delivered		...	"	4	10	0	Tin Crystals	...	per lb.	0	1	3	
" Sulphide		...	"	7	15	0	" English Ingots	...	per ton	264	0	0	
Lead (Foreign Pig)		...	"	24	5	0	Titanium, Potass. Oxalate	...	per lb.	0	1	6	
" Litharge Flake		...	"	45	0	0	Titanous Chloride	...	per cwt.	4	10	0	
" Acetate (white), (ex ship)		...	"	84	0	0	Zinc (Spelter)	...	per ton	41	15	0	
" (brown)		...	"	75	0	0	" Powder, 88/92%	...	"	70	0	0	
							" Chloride (solution, 102° Tw.)	...	"	23	0	0	
							" Sulphate, Crystal	...	"	22	0	0	

* Packages extra or returnable; otherwise, prices usually include packages.

THE CHEMICAL TRADE JOURNAL AND CHEMICAL ENGINEER.

No. 1681.

LONDON, SATURDAY, AUGUST 9, 1919.

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NEW ARRANGEMENTS.

The "Chemical Trade Journal" will be published in future a day earlier.

SUBSCRIBERS to whom the Journal is posted direct will therefore receive it each week on Friday.

THE TRADE will in future be able to secure their supplies from our London office, 265, Strand. at 10 a.m. on Fridays.

EDITORIAL NOTICES.

INDEX.

Copies of the Index to Volume LXIV. (January-June, 1919) of the "Chemical Trade Journal and Chemical Engineer," which is now available, will be forwarded to those readers who make early application to the Publishers.

Readers are invited to forward items of intelligence, company reports and balance-sheets, or cuttings from local newspapers of interest to the trades concerned.

Articles, reports, and correspondence on all matters of interest to the chemical and allied industries, home and foreign, are solicited. Correspondents should condense their matter as much as possible, write on one side only of the paper, and in all cases give their names and addresses, not necessarily for publication. Sketches should be sent on separate sheets.

Communications for the Editor, if intended for insertion in the current week's issue, should reach the office not later than Wednesday morning.

CURRENT TOPICS.

PSYCHOLOGY OF PRODUCTION.

IT is remarkable how little is heard outside a certain more or less circumscribed area of the work that is being done by our new school of psychological experts in applying the ancient science of psychology to the many problems presented by industry. Hitherto, of course, the study of psychology has largely been the prerogative of medical men, but attempts are now being made to establish industrial psychology as an experimental science, and with it the introduction of the professional psychologist. Indeed, we may say that this has now been accomplished. The fact that so much work had been and is being done to develop a definite status for industrial psychology renders it all the more surprising how little industrial circles really seem to know of what is going on. For instance, how many are familiar with the existence of psychological laboratories at Cambridge, Manchester, and elsewhere, or of the Industrial Section of the British Psychological Society, which was brought into being some time ago with an unobtrusiveness suggestive almost of nervousness? In the same way, how little attention was paid to the series of lectures given at the Imperial College of Science and Technology recently by Dr. Charles S. Myers, F.R.S., the director of the Cambridge Laboratory; yet employers of labour should be vitally interested in them, having regard to the need for applying every possible method to increasing production, and, as it has been shown already can be done, decreasing the fatigue of the worker simultaneously. The wider study of industrial psychology which is now being undertaken in this country can in a way be dated back to the time when Taylor, from America, expounded to a meeting of the Institution of Mechanical Engineers at Cambridge a year or two before the war the now familiar case of the application of the principles of motion study

to bricklaying, whereby through the elimination of various unnecessary actions on the part of the man engaged in the work, such as placing the bricks by his side at a suitable level, and so on, the number of bricks laid per day was appreciably increased. From that time onwards great developments have been made in the United States in the study of the many problems of a psychological nature which inevitably follow from this elementary beginning, and the result is that we find most of the literature on the subject emanates from across the Atlantic. The war, however, gave those who have taken it up on this side their great opportunity, and, to their credit be it said, advantage was taken of it to the full. The reduction of working hours in many munition factories—where at the beginning of the war workpeople were allowed to be at work all hours of the day and night, merely with the object of drawing as much pay as possible,—and an improvement in the output in consequence, was directly due to this study of industrial psychology, of which Dr. Myers is the leading exponent in this country. Fatigue, for instance, is now actually measured by an instrument known as the ergograph, by which the exhaustion of a single muscle is recorded, and that in itself has led to the elimination of cases of over-fatigue due to the many causes which occur in the working and domestic lives of the workpeople of the world. The extent to which industrial psychological investigation has now been carried may perhaps briefly be indicated by saying that much has been done in the direction of determining what is the best rest pause, such investigations, of course, being endless in variety, having regard to the multitude of occupations. The monotony of work, and the result of its effect upon output, needless standing and stooping, the proper selection of workers, and so on, have all been investigated, even in this country, with a thoroughness which few people here recognise, although most of the statistics of results obtained under actual practical conditions have still to be drawn from the United States. From a thousand and one causes it is evident from only a superficial study of the work that is being done that there is a vast amount of human energy wasted in industrial operations, which, properly conserved, could be turned to financial profit to the worker, to the employer, and to the nation at large. In the same category, of course, come the questions of scientific illumination and heating and ventilation, although these latter rest more with the employer than the employee. At the same time, they have been proved to have an enormous influence upon output and in the prevention of accidents. Probably the most noteworthy feature arising out of the study of industrial psychology is the large extent of saving which often arises from the most simple of changes in old methods, and it is for this reason that employers in general throughout the country are well advised to keep themselves in close touch with industrial psychological developments. These constitute a distinct branch of scientific management, which, however, can be regarded as apart from, although bearing upon, such questions as rates of pay, restriction of output, and similar matters usually associated with scientific management.

PROTECTION FOR AMERICAN DYE-STUFFS.—*Reuter's* Washington correspondent states that the Republican members of the House of Representatives Ways and Means Committee have decided to recommend a bill providing for a licensing board to control dye imports, and levying a high tariff on all foreign dyestuffs.

JAPANESE CHEMICAL INDUSTRIES.

A CORRESPONDENT at Osaka forwards some interesting particulars concerning the Japanese chemical industries, notably the manufacture of caustic soda, chlorate of potash, and paints.

Before the war there were only two firms manufacturing caustic soda, viz., the Nihon Seimi (the Japan Chemical Industry Co., Ltd), Osaka, and the Kwanto Sanso (the Eastern Japan Soda Manufacturing Co., Ltd.), Tokyo, both of them using the Leblanc process. The output, however, in 1913 was only 4,300 tons, while the total Japanese consumption was in the neighbourhood of 16,000 tons. The difficult situation caused by the drop in imports from the United Kingdom, as a result of the war, brought about the establishment of further soda factories, with a total output in 1918 of 20,530 tons. The demand, in consequence of the development of Japanese industries, had also increased, and in the same year was nearly 31,000 tons. Prices both of caustic soda and soda ash advanced rapidly, and manufacture proved profitable to the firms engaged in it. Not long after the signing of the Armistice, however, a reaction set in. With the prospect of resumed importation from the United Kingdom and America, the market was badly hit, and consumers who had entered into contracts with the makers at the higher prices, in numerous instances repudiated the agreements, the only buyers being hand-to-mouth users. From November, 1918, up to March of the present year the imports of caustic soda amounted to 3,565,000 kin, and of soda ash, 56,611,000 kin. Heavy manufacturing costs prevented manufacturers producing at a competitive price, and at the time of writing most of the plants were running at no more than one-third of their total capacity, and during the present year the attention of producers is being directed more to avoiding losses on operations than to the making of profits.

The Kwanto Sanso Company, one of the two principal producers of soda compounds, acids, fertilisers, etc., before the war, concentrated on the manufacture of soda compounds and other chemicals for which the market conditions were favourable. In 1917 the capital of the concern was largely increased and the electrolytic process was substituted for the Leblanc process. The new plant however was found to be so difficult to operate that its full capacity was not reached until after the signing of the Armistice. The dislocation of the market had a very serious effect upon the company, but owing to the fact that its products had many influential selling agents in various localities, and that there is a good market for bleaching powder, the company can be said to be in a tolerably favourable position.

The consumption of chlorate of potash prior to the war was 3,200 tons, most of which was imported from Germany. The domestic output was confined to that produced from the treatment of chloride of potash, a by-product from the manufacture of iodine. With the cutting off of the German goods, the price rapidly advanced until it was at least ten times the normal, thus furnishing sufficient incentive for developing manufacture in Japan. In 1917 the output reached 5,000 tons, and in 1918, 7,000 tons. In consequence the market price dropped considerably, and, notwithstanding the fact that a fair amount commenced to be exported, some of the producers were compelled to shut down their plant. The fall in price has been accentuated since the cessation of hostilities. Only a few of the firms continued to produce, and those only to a limited extent.

In the paint industry a similar state of affairs now exists. The export of paint from Japan in 1913 was only 70,000 yen, and in 1914, 660,000 yen. In the preceding years British paints of all kinds, for obvious reasons, practically disappeared from the Eastern markets, and in 1916 the Japanese exports had increased to 994,000 kin, valued at 236,000 yen; in 1917, 1,830,000 kin, valued at 504,000 yen; and in 1918, 11,365,000 kin, valued at 4,331,000 yen. Moreover, with the great developments that were taking place in the shipbuilding industries, the domestic demand had increased in a corresponding ratio. Since November last the change in the situation has been remarkable. From 1,411,000 kin, valued at 557,000 yen, in November, 1918, the exports of paint declined to 1,036,000 kin, valued at 466,000 yen, in December; 255,000 kin, valued at 115,000 yen, in January; and 183,000 kin, valued at 69,000 yen, in February of this year. Lessened activity in the shipbuilding industry considerably reduced the home demand, and a fall in the price of paints was experienced.

ALKALI INSPECTOR'S REPORT FOR 1918.

THE annual report for 1918 of the Chief Inspector of Alkali, etc., Works (Mr. W. S. Curphey) on the proceedings under the Alkali, etc., Works Regulation Act, 1906, has, as announced last week, now been issued. The following comments are made on the various classes of works under inspection.

Alkali and Copper (Wet Process) Works.

The general average escape of muriatic acid from the chimneys in these works was 0.076 grain per cubic foot of chimney gases. This figure is well within the limit of 0.20 grain fixed by the Act, and compares with 0.089 grain in 1917. The district averages varied between the maximum of 0.101 grain and the minimum of 0.030 grain per cubic foot. The percentage of muriatic acid condensed varied between 97.40 and 98.90, the average being 98.00, against 97.81 in 1917.

In no case was it deemed necessary to initiate proceedings to enforce the penalty incurred by emission of an undue proportion of muriatic acid, but in one case, where a temporary cessation of testing the chimney gases led to an undue escape being unknown to the management, warning was given as to the necessity of maintaining efficiency in this respect.

The management at one works gave information of a local complaint which had been received during a week of fogs and light winds, which atmospheric conditions are the most trying for this class of work. In the past this works has been the subject of repeated complaint, but with increased draught on the furnaces and better general conditions much improvement has been effected.

At one works a saltcake pot broke suddenly, causing its contents to fall into the fire flue, thus interfering seriously with the draught of the furnace. At the same moment a workman was engaged in the stokehole, and a blow back caused by the stoppage of the draught led to the man being so seriously burned that death ensued. This sad result was the consequence of an accident of a most unusual kind, but steps have been taken to avoid, as far as possible, its recurrence.

The development of electrolytic methods for producing alkali and chlorine was very considerable. Through the influence of the ammonia-soda and electrolytic processes the operation of the Leblanc process was materially curtailed towards the end of the year. The outlook is that this process, which has held the field for so many years, must, as regards the manufacture of alkali, yield to that combination of the two newer methods which will supply the market with the desired quantities of alkaline and acidic products. Already the change has been made in several alkali works in more than one centre of the industry, and is accompanied by working conditions much less liable to cause an emission of noxious gases, as the evolution of these in the course of manufacturing operations is very greatly lessened. The demand for hydrochloric acid and saltcake will still cause the decomposition of common salt with sulphuric acid, but to a much smaller degree, and distributed more widely throughout the country in works of smaller individual magnitude.

Cement Works.

The number of this class of works was one greater than in 1917. This industry, like most others, suffered from war conditions, and the output was much below the full capacity of the available plant. Repairs to machinery and general upkeep fell into arrears. Consequently, much requires to be done before a maximum output can be reached.

The question of potash recovery from kiln fume continued under consideration, but little definite progress of a practical character can be reported. During 1918, as in previous years, considerable quantities of the heavier particles were deposited in flues and were utilised for agricultural purposes, but much of the finer particles still escape. The question of potash recovery generally is under special attention, and much progress has been made in connection with industries other than cement manufacture which offer a more attractive field for effort.

Complaints were made by a local authority of excessive discharge of dust from one cement works which has been the subject of similar complaint in past years. The powers under the Act, the nature of the discharge complained of, and the local circumstances did not warrant coercive action.

Smelting Works

The number of this class of works was 83, an increase of seven over the total for 1917. This increase was largely due to new registrations in District VI., which includes the highly mineralised counties of Devon and Cornwall.

The general average acidity of the chimney gases discharged from smelting works (3.153 grains SO_2 per cubic foot) was slightly less than in 1917. This was due to a marked decrease in this acidity in all districts except VIA. and VII. In District VII. the number of such works is small, whilst the increase in acidity was not great. In District VIA., however, very different conditions existed, where the excessive proportion of sulphurous gases sent into the air from the roasting of ores containing sulphide of zinc materially affected the average of the whole country, and induced a district average (8.19 grains) in marked contrast to all the other district averages. This calcination of zinc sulphide ores, accompanied by discharge into the atmosphere of all the acid gases formed by the combustion of the large proportion of sulphur in these ores continued in far too many cases. The manufacture of sulphuric acid from the sulphurous acid obtained in a sufficiently concentrated form where these ores are calcined in furnaces of suitable design has an established standing in this country. It is undesirable that the calcination of these ores should be continued any longer than is absolutely necessary in those furnaces which, indeed, prepare the ores for the subsequent extraction of zinc, but disregard entirely the condensation and utilisation of the sulphur acids formed at the same time. This is a form of atmospheric pollution which is preventable by means which achieve other advantage than a diminution of discharge of noxious gases of great prejudice to the locality in which such operations are carried on.

The use of sulphide ores other than those of zinc was materially less during the year, owing to a more limited available supply. This was due in part to the development of methods for treating ores at mines in other countries, thus leaving less to be done in those works where ores were used imported in their natural condition.

The deposition of fumes continued to receive attention. Mechanical methods continued in successful operation, whilst electrical methods extended, both as regards the scale of operations in those works where these methods were previously in use, and as regards the number of works in which they have been adopted.

Sulphuric Acid Works.

The number of this class of works registered was 146, a decrease of one from 1917.

The general average escape of acid gases from the lead-chamber process (1.225 grain SO_2 per cubic foot) shows a decrease from that for 1917 (1.342 grain), in which year there was an increase over 1916. The reduction in acidity of discharged gases was very general; only in two districts was there a slight increase, but the variation was not of marked degree in any instance.

The year was one of anxiety to owners of this class of works. The large increase in productive capacity in works specially erected to meet the abnormal war requirements eased the heavy pressure which was in evidence previously, whilst the conclusion of the armistice profoundly affected the aggregate production of sulphuric acid. New plants erected on modern lines were not put into operation, several plants already in operation were stopped, and certain others ceased operation owing to destruction by fire. The easing of pressure for urgent delivery of acid from the older plants permitted of greater opportunity for temporary stoppage for repairs in many cases, but difficulties regarding labour and material were obstacles to rapid progress, causing much delay and hindering work which would otherwise have been undertaken. Still, extensive repairs were effected and improvements carried out in many works, so that the general condition of working plant throughout the country was materially improved. Certain works which previously were cause of anxiety were put into much better condition.

Although cases occurred where an amount of acid gases in excess of the statutory limit was discharged, these formed a very small proportion of the total tests made. In no case was it deemed necessary to take proceedings to exercise the powers

of the Act. In one works, where experimental work with iron contact towers under adverse working conditions led to much worry and irregularity in the chamber process, the exit gases were for a time abnormally high, otherwise the excessive escapes noticed were temporary.

The various types of plant for the "chamber" process continued in operation. Those of the newer designs calculated to work with limited chamber space continued to give satisfaction. There were also instances where a combination of the newer with the older type was in use. It is, however, open to discussion whether it is wise to combine two systems which differ in fundamental characteristics. In the report for 1917 reference was made to the wide variation in the time factor in an Opl plant as compared with a chamber plant, the figures being 12.3 minutes for the former, and 144 minutes for the latter. At the time the measurements of duration of reaction were made the chamber spaces were approximately $1\frac{1}{2}$ cubic foot and 16 cubic feet per lb. of sulphur burned per 24 hours, a ratio which is almost the same as that of the time observed.

In the Mills-Packard system the chamber space varies from 3.6 to 4.5 cubic feet, so that, if the direct relationship be general, the time required in this system for completion of the chamber reactions should be something of the order of 50 to 40 minutes.

One of the prime factors governing the speed of conversion of sulphurous into sulphuric acid in the chamber process is the ratio between the sulphurous and the nitrous gases in process; but a ratio which is suitable for a time period of 40 minutes is less suitable for a period of 120 minutes. It would seem that if the gas composition is adjusted to suit the small chamber space section of such a compound unit it will be too nitrous for the other section and more rapid corrosion of lead may be looked for. If, on the other hand, the gas composition is adapted to the large chamber space section the nitrous gases will be too low in proportion to ensure that rapid make and condensation of sulphuric acid which is the feature of the small chamber space section. An intermediate gas mixture is not calculated to elicit the best results from either section.

The more thorough system of control of the chamber process by a more complete examination of the composition of the gases in process at successive points of the plant did not come into use to any great extent. This is to be regretted, as it is only by careful study of detailed working results that higher standards of efficiency are to be hoped for or advance made in working methods.

The use of nitrous gases produced by the oxidation of ammonia by catalytic influence, in place of nitrous gases produced in the customary way by the decomposition of nitrate of soda with sulphuric acid, continued to give much satisfaction in those works where it was in operation. The operation of this method was considerably extended, both by its adoption on a larger scale where it had already been in use and by its introduction to many other works where the ordinary system had been alone relied upon. As experience is acquired its facility of control and uniformity of operation are the more recognised. It is also stated to be the less costly, but this aspect will be dependent upon the relative cost at the works of the raw materials used, whilst other factors will have an influence on the future comparative development of the two methods in vitriol chamber practice.

The preliminary oxide of iron contact towers erected between the burners and the Glover tower were under trial in several works, but did not give such good results as were anticipated. This disappointing experience was due to a variety of influences. In some works the device was attached to burners using spent oxide, but the dust accompanying the burner gases was too much, and the choking of the tower interfered with the draught necessary for effective working. At one works the movement of the chamber gases, induced by a chimney with feeble draught, was already at a minimum, so that the increased resistance of the additional tower likewise led to unsatisfactory working of the chamber process. At another works faulty construction caused failure for the time being. Less progress was thus made than was at one time expected. But there is no reason to anticipate that success will not reward persevering effort to overcome obstacles which, after all, are of a secondary character.

The trouble caused by dust carried forward with the burner gases continued as in past years to be prominent, and received much attention. Some of the difficulties just referred to in the trial of preliminary oxide of iron contact towers were associated with the hope that a simultaneous removal of this dust might be effected. A modification recently introduced continued to give satisfaction. It consists in removing part of the dust in depositing flues, in subsequently cooling,

washing, and filtering the burner gases for further removal of dust and for removal of other impurities somewhat after the procedure followed in preparing similar gases for use in contact processes, then by pre-heating the cooled purified gases in a heat interchange chamber by utilising hot gases leaving the burners, and by finally heating the gases by aid of fuel to cause the gases to enter the Glover tower at the desired temperature for the usual chamber practice. This entails a somewhat more elaborate plant and an increased fuel consumption, but the advantages secured by the production of a high-grade acid and more regular work are distinct.

At one works, where complaints have been frequent in the past, although the acidity of the discharged gases is usually considerably less than one-half of the maximum permitted by the Act, the addition of a section of different design to the plant previously in operation has, Dr. Fryer reports, made a marked improvement in the character of the escaping gases as judged by the senses, although the total acidity as measured by chemical methods has not undergone much reduction.

Zinc blende continued to be the source of sulphur used successfully in a small number of works for the manufacture of sulphuric acid by both the chamber and contact processes. The type of furnace in use varied in different works, mechanical as well as hand-worked types being in operation.

Mr. Sutton, in his report upon District VII., refers to a burner for spent oxide automatic in character but devoid of moving parts, in the following terms: "The furnace consists of a circular brick structure about 20 feet high with internal spiral flues, the inclination of which is adjusted at various points in such a way as to ensure a continuous and even flow of the oxide material by gravitation only. The oxide is fed in at the top continuously by chain feed. The experimental furnace had one flue only, and has worked (with stoppages to perfect the inclination of the spiral) for nearly two years. The furnace is now being reconstructed to have three internal flues, and it is expected to be capable of dealing with six to eight tons of oxide per diem."

Sulphuric Acid (Class II.) Works.

CONTACT PROCESSES.

The three types of this class of works, as referred to in past reports, continued in use. Pyrites and sulphide ores of zinc were the sources of sulphur utilised. The latter was of more recent introduction to contact process work in this country, and proved satisfactory for acid-making, whilst the calcined ore was suitable for the extraction of zinc.

The thorough purification of the impure acid gases derived from the burning of pyrites, so necessary for the maintenance of the activity of the contact material, was found to be most difficult of achievement in several cases. Despite the elaborate and costly plant provided for this purpose, much trouble, expense, and loss of time were incurred through inefficient conversion of SO_2 into SO_3 , causing a high escape of acid gases along with a low production of "oleum." These purification arrangements are being remodelled and improved.

At one factory, owing to pressure for munition requirements, a section of the plant continued at work long after it was in need of repair, and caused much anxiety from undue escape of acid gases. When relief came from a less urgent demand, this section was promptly laid off for attention.

CONCENTRATION PROCESSES.

There was a marked reduction in the number of exits tested—from 135 in 1917 to 99 in 1918,—and a further reduction in the acidity of the gases discharged compared with 1917 and 1916. The aerial pollution from this class of works was therefore materially lessened. This was due in part to improvement in design and better maintenance of plant, in part to the diminished pressure upon the plants at work owing to the increased capacity of production of high-strength acid by other methods.

One works was destroyed by fire and may not be rebuilt. In several works operations were carried on intermittently from lack of demand for strong acid.

Gaillard towers continued in use, but to a more limited extent. This type of plant was still characterised by emitting the discharged waste gases higher in acidity than the others. The modified form of the Kessler concentrator did highly satisfactory work, whilst the ordinary Kessler and its allied forms maintained their standard of efficiency. The cascade systems continued in operation with varied efficiency in different works. The Davis concentrator was used for bringing chamber acid up to about Glover tower strength,

and gave satisfaction. With this limited degree of concentration, the evolution of acid gases is not so prominent a feature as is the case with production of concentrated acid of the highest strengths, and the means provided secured a low acidity in the gases finally discharged.

The Calder-Fox scrubber referred to in the 54th annual report was further improved in the light of accumulated experience, and is an efficient remover of suspended liquid particles.

Although several unduly high discharges of acid gases were observed, these occurred in different works, and in no case was it deemed necessary to enforce the penal powers under the Act.

There was one fatality due to a man being gassed whilst cleaning out a tank used for storing concentrated sulphuric acid. The medical evidence showed that death was due to arsenical poisoning. It still seems necessary to call attention to the dangers of working in such tanks without proper ventilation, both prior to anyone entering and also throughout the period whilst anyone remains in them, and to the necessity for taking precautions against the existence or formation of arsenuretted hydrogen.

Nitric Acid Works.

The number of this class of works was 96, a decrease of five compared with 1917. There was further decreased activity in the works in operation as compared with the immediate past, so that there was a marked reduction in the production. This rendered more easy the attainment of conditions for satisfactory working, and condensation of the nitrous fumes developed was effected efficiently in all cases.

In the great majority of works the nitric acid was still manufactured by the decomposition of nitrate of soda, but a material proportion was obtained from the oxides of nitrogen resulting from the oxidation of ammonia and from the use of nitric acid in various processes of chemical manufacture.

The utilisation of nitre-cake continued to receive attention, and latterly use was found for all that was available.

Chlorine Works.

The number of this class of registered works was 32, an increase of two over 1917. This increase was due to the registration of works in which chlorine, received in the liquid form, was used in chemical processes. The production of liquid chlorine was effected on a large scale. The liquefaction was carried on most efficiently with a minimum loss of this noxious gas.

The electrolytic methods for production of chlorine came into much more extended use during the year, and led to the stoppage of several units of the long-established Leblanc alkali process to which reference has already been made.

Muriatic Acid Works.

The number of this class of registered works was 69, an increase of three over 1917. This increase was chiefly due to the production of muriatic acids in works using liquid chlorine for preparation of organic products by processes in which muriatic acid is formed as a secondary product. In all cases prevention of atmospheric pollution was efficiently carried out so far as the limited inspection possible permitted observation of working conditions to be made.

The wool carbonising industry was active throughout the year. Carbonising machines of improved type were brought into more extended use.

The tinplate works were restricted in their operations by limited supplies both of labour and material. This limitation of output influenced the quantity of tinplate flux to be dealt with in the furnaces, and lightened the work to be done by the means in use for preventing undue escape of muriatic acid. There was a reduction in the proportion of this gas which is allowed to escape from works of this class situated in Districts VI. and VIIA. There were, however, some cases in which improvement is still required. The use of nitre-cake for pickling the steel plates prior to tinning continued to be widely and successfully practised.

Sulphide Works.

The number of this class of works registered was 98, a reduction of three from 1917. There was, especially towards the end of the year, a contraction in the purification of sulphuric acid from arsenic by means of sulphuretted hydrogen. The "Trepex" plant designed for this purpose came into more extended use in the course of the year.

Three men were gassed, but fortunately without fatal effects, by an escape of sulphuretted hydrogen from a plant

for the dearsenication of sulphuric acid. The pipe for removal of the sulphuric acid, after being subjected to the action of the sulphuretted hydrogen, was sealed to a proper depth; but examination of the seal pipe proved it to be defective, so that an escape of gas occurred through an opening which was not sufficiently immersed in the sealing acid. This defect was at once remedied when recognised.

One group of works included in this class consists of works in which certain dyes are made by the interaction of a metallic sulphide with suitable organic substances. In such operations much sulphuretted hydrogen may be evolved. Similar dyes are made involving chemical action between sulphur and organic compounds, but in which no metallic sulphide is used. In such cases also much sulphuretted hydrogen may be evolved, but they do not come under the control of the Act.

The means in use for preventing escape of sulphuretted hydrogen in those works registered were satisfactorily operated and maintained. Improved conditions were brought about through the replacement of old manufacturing plant by new plant more efficient in design.

Alkali Waste Works.

The extent of operations in this class of works was greatly reduced. The production of alkali by electrolytic methods avoids the formation of alkali waste, so the further extension of those methods already referred to entailed a corresponding reduction in the quantity of waste available for treatment for recovery of sulphur. The number registered remained as in 1917, but the curtailment in operations will lead to fewer works of this class remaining in operation in the future. The various works were maintained in an efficient condition, and the prevention of undue escape of noxious gases was satisfactory. With the reduced scale of operations, there was therefore a diminution in the total quantity of offensive gases discharged into the air from these works.

Arsenic Works.

The number of this class of works registered was 52, an increase of seven over 1917. The attractive prices for white arsenic led to the starting of several new works, which might have been still more numerous had labour and material been more readily at command. In all those works registered the requirements of the Act were complied with.

Dr. Fryer, in his report on District VI., gives numerous results of his testings to note the efficiency of the condensing plants in these works and the character of the gases discharged from them. From his report the following figures have been extracted:—

	Per Cubic Foot of Chimney Gases.	
	Grains Arsenious Acid.	Grains Total Acidity.
Escaping from refinery furnaces:—		
Highest average in any one work	0.064	1.35
Lowest average in any one work	0.024	0.39
District average	0.042	0.72
Escaping from mechanical calciners:—		
Highest average in any one work	0.075	2.15
Lowest average in any one work	0.012	0.63
District average	0.038	1.28
Escaping from hand calciners and roasters:—		
Highest average in any one work	0.088	4.89
Lowest average in any one work	0.023	0.63
District average	0.043	1.82

As in previous years, dry filters proved more efficient than wash towers for arresting arsenious acid, although with both types the final escape was satisfactory. Dr. Fryer gives in his report the following average figures:—

Form of Condenser.	Arsenious Acid. Grains per Cubic Foot.		Condensed per cent.
	Before Condenser.	After Condenser.	
Dry filters	0.456	0.042	90.8
Wash tower	0.152	0.033	78.3

Bisulphide of Carbon Works.

The number of this small class of registered work was five, the same as in 1917. There was active manufacture, and the steps taken to prevent aerial pollution were increased in efficiency.

(To be continued.)

PATENTS IN RELATION TO INDUSTRY.

A CONFERENCE on the relation of patents to industry was held at the British Scientific Products Exhibition on Thursday, July 31, Lord Moulton presiding.

Sir Robert Hadfield, F.R.S., who opened the discussion, said that through the Federation of British Industries, and also the British Commonwealth Union, which did the Parliamentary side of the work, they would have a very good chance of getting the views of industry put before Parliament in a way which was not easily otherwise possible. The Federation was backing up the views that had been expressed by the conference of scientific and technical societies which had already gone into the question in regard to the new Patents Bill, and agreed that there should be a much longer term for the life of patents, that the file wrapper system should be adopted as was the case in America—the file wrapper system consisted in allowing an examination of the various remarks by the examiner on any particular application—the constitution of a special tribunal for dealing with patent actions, and an extension of the term of provisional protection from six months to two years.

Mr. Douglas Leechman said that under clauses 1 and 2 of the new Patents Bill the patentee might, voluntarily or involuntarily, find himself in the position that he had to grant licences to practically any person who liked to apply. If a patentee thought of having his patent endorsed "licences of right" because the Government offered him a bait in the shape of a reduction of his renewal fees, by 50 per cent., he would like to draw his very careful attention to these clauses. For instance, under clause 2, sub-section (d), the "licensee shall be entitled to call upon a patentee to take proceedings to prevent the infringement of the patent, and if the patentee refuses or neglects to do so within two months after being so called upon, the licensee may institute proceedings for the infringement in his own name as though he were patentee making the patentee a defendant." He would not trust himself to comment upon that sentence. The licensee could call upon the inventor to take an action against somebody whom the licensee thought was infringing, whether he was or not, and could force the inventor into litigation that might cost him hundreds or thousands of pounds when he had received royalties, perhaps, of £10 or £20. He therefore cautioned any patentee who thought he was going to save money on his renewal fees in this way that he would be putting his head into the noose if he accepted that clause. He thought it was the most foolish thing in the world for the Government to throw away a whole lot of good inventions as was being done in regard to the patents which could not be worked during the war. A number of objections had been raised to a moratorium for patents, the chief of which seemed to be that if they did this for patentees they would have to put everybody else in the same position that they were before the war, and that, said the Government, was impossible. He had heard no other serious objection but it was in the interests of industry that this should be done and he urged that a moratorium for patents should be made the subject of a Bill and passed through Parliament quickly.

Mr. James Swinburne, F.R.S., said that the monopolies that were granted to inventors were ridiculously small in proportion to what was wanted in the way of motive to make the country go ahead. One of the fundamental difficulties was the fallacious idea that anybody who made money was robbing the community. That was one reason why inventors were not encouraged properly. He believed that even industrial people had the idea that if inventors were encouraged by granting them monopolies, trade was hampered and that everything the inventor made was taken out of somebody else's pocket. He was afraid there would always be a strong prejudice against patents because people did not realise that a patentee's royalty was really a very small payment for a very big work, work upon which the prosperity of the nation depended.

Sir G. Croydon Marks, M.P., suggested that they should be fair to the Board of Trade in this matter and examine what it was that was proposed in the Patents Bill now before Parliament. The Bill lengthened the life of all patents by two years and that two years was added to the end of the first four years, so that renewal fees would not have to be paid for six years. At the same time he agreed that the Bill did not deal fairly with those patents which could not be worked during the war. The fact that such a large proportion of

patents fell out at the end of the initial period of four years showed that the fee charged for that period had not been detrimental to the patenting of inventions. It was the renewal fee that caused the trouble. Therefore by lengthening the period by two years before the renewal fee had to be paid, they were giving the inventor encouragement just at the most difficult period of his invention—at the beginning. Another encouragement was that if an inventor had not the means to work out his invention himself, he could have his patent endorsed "licences of right." That was an invitation to all the world to come to the man and take up the invention, and at the same time the inventor only had to pay half the renewal fees. He regarded that as a very great concession.

Lord Moulton in bringing the Conference to a close, said they had heard of the gifts that inventors had given to the country but there had not been a word to suggest that they were paid for by the country consenting to put itself under restrictions for 14 years from using ideas which might well occur to it. Therefore, if they wished to convince the public, inventors must show that they realised that, and must also show that their claims over-top that so much that more liberal terms ought to be given them. To do that, they must frankly confess one thing. When they heard of the tens of thousands of patents that were taken out, there was no man on his side of the table who did not know that 50 per cent. of them were rubbish and that most of the others were of very little value. Therefore, they must realise that the public was suspicious when these inventions were put before them by patents and it was found that so few of them were meritorious. The value of those that were meritorious could not be over-estimated but there were many trivial things that were made the subject of patents which did not justify them in speaking of the person who was the patentee as an inventor. The test of that was in the number of cases in which a man, by not renewing his patent, in effect said that it was not worth £10 to him to protect it any longer at the end of the first four years. Renewal fees, therefore, were a valuable test as to whether an invention was of substantial utility. Nobody esteemed the value of invention to industry more than he did, but such patents as those he had referred to restrained invention. A man took out a patent in which probably 50 improvements could be made but could not be developed because of the earlier patent. It was to remove that difficulty that the system of compulsory licences was introduced in the interests of the country and in the interests of invention. One of the things that had done the inventor so much harm in this country was that nothing was considered anticipation that could not be shown to have been published in England, whereas the invention might not be new. Patents came from America and Germany by way of communications, and according to English law the person who communicated them was called the inventor. One of the primary duties of an inventor in drawing up a patent was that he should frankly tell the public the best way he knew to work his invention. It must be drawn up in the utmost good faith between the inventor and the public in order that when the patent lapsed, the public might enjoy the full benefit of the practical use of the invention. But suppose it was communicated through a patent agent? The patent agent was the inventor. The duty applied to him only but he knew no more of the subject than was in the document itself. The man who really knew was either in America or Germany and he might have abundant knowledge which he ought to put into the specification and which he would have to put into the specification if he were an Englishman taking out a patent, but because he was abroad that basic duty of the patentee to give his best knowledge to the English nation in return for the monopoly granted him, became an absolute dead letter. If, in attempting to amend the patent law, these things which damaged the nation and the commerce of the nation, were put forward, he believed that patentees would get generous terms from the nation. He did not think that the nation was niggardly towards patentees at all. He believed, as Sir George Croydon Marks had said, that the new Bill was an attempt to give a new Charter to inventors. It lightened the burden on them in many ways, but one thing the country was determined upon was that the grant of a patent should help the trade of the country and not strangle it. During the last 30 or 40 years, the patent law of this country had been worked, mainly by people outside—very slightly, comparatively, by people who were Englishmen—solely for the purpose of keeping trade out of the country and strangling the trade of the country.

CHEMICAL INDUSTRIES OF INDIA.*

By DR. J. J. SUDBOROUGH AND DR. J. L. SIMONSEN.

IN any attempts to foster the development of chemical industries in India attention should be directed, in the first instance, to industries which make use of the Indian grown raw materials now exported to other countries, where they are worked up into various finished products. Included in these exports are (1) the raw materials from which important fixed oils and feeding cakes are manufactured (2) the raw materials from which valuable essential oils and medicinal drugs are prepared and (3) various mineral products such as chrome, manganese and zinc ores, wolfram and monazite sands, all of which are exported to Europe and are there worked up into important metallurgical or other technical products. The production in India of all the common salt consumed in the country, both high grade salt for edible purposes and lower grades for industrial purposes seems also well within the range of possibility.

The development of certain specific industries may be relatively simple. If India is practically the only producer of the raw material in question, the working up of the raw material and the export of the finished product may be comparatively easy, as competition from foreign countries is eliminated. In most cases, however, such as oil seeds, minerals, etc., India is not the only producer, and during the early stages of developing the industry keen competition with foreign countries must be expected. In fact it is possible that certain countries or foreign firms will be prepared to flood the Indian market with a product at less than cost price in order to destroy a struggling industry during the first years of its inception.

The whole problem is complicated by tariff questions. The desirability of introducing export duties on raw materials but of allowing free export of the corresponding manufactured products, to be considered. On the other hand, foreign countries will frequently allow Indian raw materials such as oil seeds or minerals to be imported free of duty but levy a relatively high tariff when attempts are made to import the finished products derived from these raw materials.

Mineral Acids.

Sulphuric acid may be regarded as the "key industry" for all chemical industries. As the acid is extremely cheap and also excessively corrosive, it follows that, as a rule, freight charges will be relatively heavy and hence it is usually necessary to manufacture in certain centres where large quantities are required.

The quantity imported into India in 1912-13 and 1913-14 varied from 2,000 to 3,000 tons a year and it is estimated that about 18,000 tons are actually manufactured in the country, so that in India this 'key' industry is quite in its infancy.

As large deposits of iron pyrites have not been met with in India, practically all the sulphuric acid is made by burning sulphur imported from Sicily or Japan. This yields a good quality acid, free from arsenic, but is much more expensive. The price of imported sulphur in India in 1913 was about £5.-£6. per ton and as 1 ton of sulphur yields about 3.4 tons of sulphuric acid, it is clear that, even if the factory costs are reduced to their minimum, the selling price of Indian-made sulphuric acid in Calcutta or Madras must be much higher than the ordinary pre-war price in London.

The future of the industry in India is promising, as it has been decided to work up at Singhbhum the Burmese zinc concentrates for the production of spelter. These concentrates consist largely of zinc sulphide, and when roasted produce sulphur dioxide, which can be used for the production of sulphuric acid in the ordinary lead chamber. As the sulphur dioxide is a by-product, its cost should be much less than sulphur dioxide produced by burning imported sulphur, and hence the cost of producing sulphuric acid in India should correspond more nearly with that of American or European acid.

Nitric acid is now made in India in quantity sufficient to meet the demand and we are given to understand that with the plant at present available any reasonable increase could be met although, of course, should the manufacture of dyes or explosives be undertaken considerable extensions would be required. The imports are small.

The acid is manufactured by heating sodium nitrate (Chili saltpetre) with sulphuric acid. The imported nitrate is pre-

ferred to Indian saltpetre (potassium nitrate), since it is cheaper and is less liable to contain chlorides, which must not be present if a good quality acid is required. The purification of the potassium nitrate presents no great difficulties and it is possible that with improved methods a pure saltpetre could be produced as cheaply as the material containing several per cent. of chlorides now put on the market. A further advantage which would result by the substitution of potassium for sodium nitrate is that the by-product from the manufacture, potassium hydrogen sulphate, is of much greater value than the corresponding sodium salt, as it can be used as a potash fertiliser after neutralisation with lime.

The question of replacing or supplementing the present method of manufacture by one of the processes now in use in other countries for utilising atmospheric nitrogen is one which requires careful consideration, if the manufacture in India of explosives and dyes is contemplated.

The price of commercial concentrated hydrochloric acid in 1914 was Rs. 300 per ton in Madras. With a supply of cheap sulphuric acid it will doubtless be possible to put hydrochloric acid on the Indian market at a price which will render its use in other industries more feasible. The Indian output at present is approximately 600 tons per annum, whilst comparatively little is imported.

Alkalies and Common Salt.

Second only to sulphuric acid in importance for the development of chemical industries are the alkalies, sodium carbonate and caustic soda, since little expansion of other industries can take place, unless these chemicals are available in large quantities at low rates. The following table indicates the magnitude of the imports into India.

IMPORTS OF SODIUM CARBONATE AND CAUSTIC SODA.

Year.	Sodium Carbonate.		Caustic Soda.	
	Quantity.	Value.	Quantity.	Value.
	Tons.	£	Tons.	£
1912-13	13,856	74,574	4,942	53,534
1913-14	21,157	106,172	4,910	58,379
1914-15	22,628	116,423	5,905	70,311
1915-16	27,639	157,117	4,395	64,845
1916-17	18,376	129,740	2,855	79,128
1917-18	35,014	288,194	5,855	222,861

Crude sodium carbonate, contaminated with varying amounts of common salt and sodium sulphate, is found as an efflorescence in certain districts during the hot weather. This alkaline earth or *reh* is collected and used by *dhobies* for washing purposes. The increase in the prices of sodium carbonate owing to the war led to further investigation of these alkaline earths, and fairly pure sodium carbonate was extracted in both the United Provinces and Mysore, the method adopted being somewhat similar to that used for extracting saltpetre from the soil in Behar and the Punjab. It is certain that such methods will not prove profitable when the price of the chemical falls.

In Sind, and especially in Khairpur State, larger quantities of sodium carbonate—also in most cases somewhat crude and mixed with chloride and sulphate—have been met with as deposits in the basins of certain lakes. In 1915-16, about 350 tons were produced in the Nawabhat District, and about 3,600 tons of this crude product were available in Khairpur State. These deposits are being examined in order to see if refining on a comparatively large scale would be profitable, but in any case it is very doubtful if the whole requirements of the country could be supplied from such sources.

The possibility of the manufacture of both these chemicals in India in sufficient quantities and at such rates that they could compete with the imported articles needs careful consideration. This manufacture may be regarded as a key industry, as sodium carbonate and caustic soda are essential for many industries, of which amongst the chief may be mentioned soap, glass, dye works, coal-tar and oil refining.

The manufacture of caustic soda is dependent to some extent on that of the carbonate, since it can be readily obtained from the latter, by digesting its aqueous solution with lime, filtering the product and evaporating the clear liquid. During the last few years, this method has been adopted in several districts in India, owing to the difficulty of obtaining the imported article. The bulk of the caustic soda now manufactured in America and Europe is produced electrolytically from aqueous solutions of common salt. For

* Indian Munitions Board Industrial Handbook, 1919.

the establishment of this industry in India cheap current is an essential and the cost of the main product, caustic soda, could only be reduced to a figure comparable with the selling price of the imported article by making use of the by-products. The hydrogen could find a market for the refining of oils by hydrogenation, whilst the chlorine could be used for the manufacture of bleaching powder, chloroform and halogenated solvents, such as chlorinated ethanes, used in solvent extraction plants.

Probably the most dangerous competitor which Indian alkali would have to meet is the sodium carbonate from Lake Magadi in East Africa. This is available in practically unlimited quantities and the sea carriage to India is short. If the manufacture of sodium carbonate and caustic soda is to be looked upon as a "key industry" then it may prove desirable to protect it, until such a time as the industry is thoroughly established.

Common salt is a substance of fundamental importance. In 1914, one and a half million tons were produced in India. About 60 per cent. of this was produced from sea water by solar evaporation in the Bombay and Madras Presidencies, about 16 per cent. from the Sambhar lake in Rajputana, 11 per cent. from the rock salt beds in the Punjab, one per cent. from the salt deposits of Sind, which are stated to be very extensive, and smaller quantities from the sub-soil water at Kharagoda in Gujarat, and also as a by-product in saltpetre refineries. The majority of saltpetre refiners, however, throw away the crude salt they recover, as they consider the purification would not repay the duty which is levied. The salt manufactured in India from sea water is usually not a high-grade article. A good deal of it is contaminated with earthy matter, and has a yellow or brownish colour and leaves a residue when dissolved in water. As a rule, it also contains appreciable amounts of magnesium chloride and thus tends to become damp in a moist climate. Undoubtedly the quality and quantity of salt manufacture could be improved.

Although very large quantities of salt are made in India, the output is not sufficient to meet the total demands of the country as shown in the following table:—

IMPORTS OF SALT INTO INDIA.

Year.	Quantity.		Value.
	Tons.	£	
1914-15	465,694	493,569	
1915-16	548,940	1,264,054	
1916-17	445,426	1,276,375	
1917-18	336,985	1,467,193	

Nearly the whole of this imported salt is of high-grade quality, and is used in Bengal where a fine-grained white salt is appreciated. Of the imports about one half come from the British Empire, mainly from Liverpool and Aden. The possibility of improving the quality of the bulk of salt manufactured in the Madras Presidency, of producing a high-grade table salt suitable for the Calcutta market and of increasing the total output of salt, so that India should be independent of the imported article, has recently received some attention. The production of a high-class fine-grained salt can be accomplished by re-crystallising the ordinary Indian salt and boiling the solution rapidly as the salt separates, or by taking greater care in the original manufacture and then grinding the product in a suitable type of plant.

Coal Tar.

The importance of coal tar in any development of the "fine chemical" industries is obvious, and the possibility of any such development in India depends on the amounts of coal tar available in the country, and also on the richness of Indian tars in the important constituents from which the valuable chemicals already enumerated are manufactured.

At the present time, the quantity of coke being made in India is approximately 520,000 tons per annum, yielding about 8,000 tons of tar*. Assuming that the content of benzene, toluene and phenol is the same as in European tar, this would yield approximately per annum twenty-two thousand gallons of crude benzole (benzene and toluene) and six thousand five hundred gallons of carbolic acid.

The introduction of scrubbing plant for recovering benzene and toluene from the coke oven gases might yield, in addition,

two million gallons of crude benzole. An examination of coal tar from Indian coals has further proved them to be relatively poor in phenols, so that the figures given above are probably too high.

A comparison of some of these figures with the corresponding figures for Great Britain and America are of interest. In Great Britain, in 1916, fourteen and a half million tons of coal were coked in by-product coking plants, and in America, in 1915, 20 million tons were coked in by-product ovens and 42 millions in beehive ovens. The output of benzole (crude benzene) in the United States of America in 1914 is stated to have been four and a half million gallons and this had risen by 1917 to forty million gallons.

It is quite clear that the amounts of tar available in India under present conditions are quite insufficient to start a large coal tar industry. It, therefore, appears that the only method by which the coal tar industry could be developed in India, would be to coke at the pit head all suitable Indian coal, and to send the tar and also the oils recovered from the oven gases to a central refinery. Such a scheme would have the advantage of diminishing the smoke nuisance caused by the burning of coal; but at present, this nuisance is not so prominent in India as in Western countries. Large quantities of combustible gas and of ammonia would also be produced. The former could probably be used for the generation of electric power on a large scale, and the ammonia would be converted into sulphate. In most countries, the ammonium sulphate thus obtained would be used as a fertiliser, but as India already exports 2,000 out of her 3,000 tons of ammonium sulphate now manufactured, the question of the disposal of much larger quantities of sulphate needs careful consideration.

Disinfectants and Antiseptics.

The manufacture of sodium permanganate should offer little difficulty, since manganese dioxide is obtainable in large quantities at a low price and the method of preparation is comparatively simple. The manufacture of the potassium salt at reasonably low cost may offer more difficulty, as, with the exception of saltpetre, potassium salts are not obtainable in India in appreciable quantities. The cost of permanganates will also be dependent on the price of sulphuric acid, which is required for their preparation.

The manufacture of bleaching powder in India on a large scale has not as yet been undertaken and cannot be, until a cheap source of supply of chlorine is available. Its manufacture will be subsidiary to the manufacture of caustic soda by electrolysis. As bleaching powder is unstable and does not keep well in hot climates,* it is essential that it should be manufactured in India. When mixed with boracic acid, itself a useful disinfectant, it forms a disinfectant, first used at Edinburgh University, known as "eupad," the aqueous solution of which is termed "eusol." Boracic acid is now being made locally from borax imported from Tibet.

Another valuable type of disinfectant which belongs to the organic group, but owes its properties to chlorine, and which has been recently introduced by Cohen and Dakin, is chloramine-T, a halogen derivative of toluene. The raw material required for the manufacture of this substance is obtained by treating toluene with sulphuric acid, and is a by-product in the manufacture of saccharine. Hence the manufacture of this disinfectant is dependent on the development of the coal tar industry.

The problem of the manufacture of carbolic acid disinfectants such as "phenyle," "lysol," etc., is complicated by the fact that Indian coal tars are extremely poor in acid constituents which are the basis of these disinfectants. They have, since the outbreak of war, been made on a small scale, but the industry is not likely to continue when conditions are once more normal, unless the coal tar industry is developed on a large scale.

(To be concluded.)

ADVANCE IN BURNING OIL.—The Scotch mineral oil companies have advanced the price of burning oil to the extent of 1d. per gallon in response to a similar increase announced by importers. The price is now 1s. 3d. per gallon in bulk and 1s. 5½d. in barrels for delivery in Scotland.

* All this tar is not manufactured in by-product recovery plants. If this were done approximately 16,000 tons of tar would become available, since 1,000 tons of Indian coal are said to yield about 21.4 tons of tar.

* Experiments in the stabilisation of bleaching powder for use in hot climates have been made by Dr. A. N. Muldum in Ahmedabad, and a preliminary note on these experiments will, it is hoped, shortly be published.

FRENCH CHEMICAL COMPANIES.

IMPORTANT SCHEME OF CO-OPERATION.

SOME time ago we drew attention to a suggestion made by a French contemporary in favour of the amalgamation of the *Compagnie Nationale de Matières Colorantes et de Produits Chimiques* and the *Société des Produits Chimiques et Colorantes Français*, which have ordinary share capitals of £1,600,000 and £1,240,000 respectively. In the meantime negotiations have been proceeding for the purpose of bringing about this union of interests, and at an extraordinary meeting of the *Compagnie Nationale* held recently the shareholders approved, in principle, an increase in the share capital to £2,840,000 and the absorption of the second company mentioned, subject to a definite decision being adopted at a future assembly. The special meeting was followed by the ordinary general meeting when the report and accounts were submitted for 1918. A few extracts from the report should be of interest.

The report recalls the futile steps taken in 1917 with the object of being placed in a position to utilise the equipment of the German dye works in France which had been placed under sequestration. These steps were continued in 1918 without obtaining any other results. A bill was recently laid before the Chamber however which, if adopted, would permit of the use of these works for the benefit of the whole of the French consumers of dyes. As the *Compagnie Nationale* had contributed largely to the preparation of the scheme, the directors had adopted measures in agreement with friendly groups for ensuring the prompt carrying out of the project on the promulgation of the law.

The report then referred to the clause in the Peace Treaty which concerns the requisition in Germany of dyes and chemical and pharmaceutical products up to 50 per cent. of the existing stocks and of 25 per cent. of the annual production subsequently for a period of five years. This requisition, which is reserved for the Allies, was optional and if sufficient quantities could be produced in France the amount of the requisition could be correspondingly reduced. These arrangements were intended to ensure supplies for consumers during the time necessary for the construction of the French works, the completion of their equipment and the education of the technical personnel. It was intended to devote the five years to rendering, as soon as possible and before their expiration, French consumers entirely independent of German manufacturers.

The installation of the company's large works for the production of synthetic indigo was continued during the year. It had been intended to start the works in June, 1918, but military events rendered necessary the removal and re-erection of the plant which was just brought into operation in June, 1919, the output having been demanded in advance. The manufacturing plant for dyes and intermediate products would be pressed forward as much as possible.

The report further states that the directors had laid the foundations of an understanding with the "great union of English producers"; various arrangements were being negotiated with the most powerful company in the United States; and they were also in agreement with the Italian producers. The directors had continued to recommend a general understanding between national manufacturers and even between the principal consumers of dyes. This policy had finally been accepted by the formation of the *Union des Producteurs et des Consommateurs pour le Développement de l'Industrie des Matières Colorantes en France*. It was to be the duty of this Union, with the support and under the control of the Ministers of Industrial Reconstruction and of Commerce, to obtain and distribute the products supplied by Germany in the best interests of French consumers.

The gross value of the sales in 1918, although still of a modest character, exceeded £200,000 of which more than half was derived from the temporary works at Landy which was equipped for war requirements. The net profits were approximately £9,000 and have been carried forward to the next account.

The Saint Denis Works.

The *Société Anonyme des Matières Colorantes et Produits Chimiques de Saint Denis*, reporting on the year 1918, states that the value of the turnover was approximately the same as in 1917, but the net profits declined owing to the increase in working expenses and the cost of raw materials. As to the future the directors do not hesitate to look forward favourably. In fact the financial charges which would rest on

Germany would re-establish equilibrium to French advantage and there was every reason for hoping that the French would be no longer crushed by German competition, especially if the customs duties were reconstructed in a judicious manner. On the other hand the English and American Governments had considered it to lie in their interests, even during the war, to favour the establishment of a powerful dye industry, and had thus created competition which was already conspicuous. It was hoped, however, to be able to meet the rivalry from these quarters.

Apart from the company's own projects the directors have subscribed £9,200 towards a company being formed with a capital of £80,000, of which one half was provided by manufacturers of chemical products and the other half by consumers. It was recognised to be unavoidably necessary to import for some years a certain quantity of foreign dyes since French makers could not at present satisfy the needs of consumers neither in quantity or in variety. In agreement with the Government it had been arranged that a company should be formed to undertake the imports, and the profits resulting from the re-sale of these dyes would be utilised to facilitate, either by the grant of subsidies or by the establishment of laboratories, the development of the dye industry in France. In addition "we have just constituted" the report states, a syndicate of manufacturers of dyes bearing the name of the *Union des Fabricants de Matières Colorantes*. The net profits in 1918 have permitted of the payment of a dividend at the rate of £2. 9s. 7d. on the old capital, and £2. 2s. 1d. on the new shares.

The Alais Works.

The report for 1918 of the *Société des Produits Chimiques d'Alais et de la Camargue* reviews at length the part taken in the production of many chemicals for war purposes since 1914 that had not previously been manufactured by the company. Strengthened by experience and the new manufactures embarked upon they could regard the future with confidence, but without concealing the serious difficulties which threatened the French industry owing to the increase in the cost of carrying out works, the rise in the price of coal and the dearth of labour. Other difficulties were specially applicable to the aluminium industry which played an important part in the company's activity. Monopolised by other military requirements the French hydro-electric works had been unable to keep pace with the development made by American producers of aluminium, and the part taken by France in the world's output had notably decreased. The situation was all the more serious as the principal market abroad for French aluminium had been Germany which would be found closed, at least for many years, to French exports owing to the construction of new works in that country and the depreciation of the mark. Notwithstanding this, confidence existed that the growing world consumption of aluminium would permit of compensation being obtained for the loss of certain markets.

The report, dealing with the various establishments, states that the work undertaken at the *Salin de Giraud* works in order to increase the production of sea salt had been stimulated in such a manner as to satisfy all the company's requirements. Favoured by exceptionally good atmospheric conditions the harvest of salt in 1918 was excellent, but the production had slackened owing to the shortage of labour. The important research work had been terminated which related to the synthesis of the derivatives of carbide of calcium and particularly of monochloroacetic acid which forms one of the important raw materials of indigo. The experiments were over and the erection of the works for actual manufacturing had been begun at Saint Auban. The aluminium works at Saint Auban were started in the autumn of 1918, although the finishing touches had yet to be completed. The net profits earned in 1918 were £260,000 and a dividend at the rate of £1 16s. per share has been declared.

The Kuhlmann Works.

The directors of the *Société Anonyme des Manufactures de Produits Chimiques du Nord (Etablissements Kuhlmann)*, reporting on the past year, state that a detailed examination shows that the damage caused by the Germans to the company's three works at Madeleine-lez-Lille, Loos-lez-Lille, and Roubaix in the North of France amounted to £560,000. In the case of the Rieme works in Belgium, which was started a few months before the war, the German efforts to completely destroy the buildings and plant on their retirement were not quite successful, and one half of the total value of £240,000 was rescued from the fire and explosions. Since the Armis-

tice the company had proceeded to re-erect the buildings destroyed and manufacturing on a small scale had been resumed. The works at Loos was about to recommence the production of chlorine and bleaching products and that at Roubaix the manufacture of sulphuric acid, but the Madeleine works had suffered the most and the production of superphosphate would only recommence next year.

After dealing with the production of articles for the purpose of national defence, agriculture, tanning and the refining of sugar, the report mentions that 1919 opened tolerably favourable for the company. The accounts submitted at the recent meeting covered the period from May 1, 1914 to December 31, 1918, and showed divisible net profits of £321,000. A dividend at the rate of 8s. per share had been paid when the share capital was £1,600,000 and a further distribution of 16s. per share has now been made on the present capital of £2,400,000.

SULPHUR ESTIMATION IN IRON AND STEEL

THE USE OF THE NEUTROSCOPE.

By MAURICE MOLYNEUX.

AT the suggestion of Mr. H. Joshua Phillips, whose original description of the apparatus appeared in the *Iron and Coal Trades Review* of January last, the writer has conducted a series of experiments with the neutroscope, using various absorption reagents, and comparing results with those obtained in various steels by the direct precipitation method with barium chloride.

In the original experiments a concentrated solution of sodium hydrate was used in the bulbs for the absorption of the H_2S evolved in the process. This was poured into a known volume of an acidulated standard solution of iodine in potassium iodide, and the free iodine remaining from the reactions titrated with standard thiosulphate of soda, using starch as indicator. It has now been found that the standard solution of iodine can be used in the bulbs, and the evolved H_2S absorbed direct without any appreciable escape of iodine, thus eliminating two reagents— $NaOH$ and the acid used for decomposing the Na_2S formed.

The following is the *modus operandi* of the direct absorption process, the reagents required being: Standard iodine solution, prepared by dissolving 3.98 grammes of pure iodine and 20 grammes of potassium iodide in distilled water and diluting to 1,000cc. (1cc. = 0.01 per cent. sulphur on five grammes); standard thiosulphate solution, prepared by dissolving 7.88 grammes of pure $Na_2S_2O_3 \cdot 5H_2O$ in water and diluting to 1,000cc. (this should be made chemically equivalent to the iodine solution by titration); starch solution, 1 gramme starch in 1,000cc. water; sulphuric acid, H_2SO_4 : 1. H_2O : 5.

In the accompanying sketch of the neutroscope an additional bulb B has been added to ensure condensation of any trace of iodine that tends to escape.

Five grammes of the steel turnings to be tested (if the sulphur is expected to be above 0.09 per cent., 2.5 grammes are weighed) are introduced into the 300cc. conical flask; 10cc. of the standard iodine solution is introduced from a graduated pipette or burette through the thistle funnel G into the bulbs C, D, E; 160cc. of the dilute H_2SO_4 are now introduced into the flask, and the rubber stopper containing the bulbs quickly fitted in. The flask is placed on the edge of a hot plate or wire gauze over a low Bunsen flame (a gentle heat below the boiling point is all that is necessary till the whole of the steel is dissolved). Soon the mixture of hydrogen, H_2S , and hydrocarbons, bubbles through the liquid, and any acid from the flask is prevented from being mechanically carried into the bulb by the device F. When the steel is seen to be all dissolved the flask is placed on to a hotter part of the plate or the temperature raised to incipient ebullition, after which it is removed and the bulbs carefully detached from the flask. During removal from the plate, the steam in the flask being condensed and producing a partial vacuum, the iodine solution is drawn into the bulb E and cannot be sucked back into the flask; and if allowed to cool gradually before detaching the bulbs all that happens is that a little



air will be sucked through the liquid into the flask. The iodine solution is poured into a 50cc. flask and the bulbs washed out two or three times with water. The standard thiosulphate solution is now gradually run in from a burette or graduated pipette until the iodine colour is nearly eliminated. A few drops of starch solution are now added, and the $Na_2S_2O_3$ run in drop by drop until the blue iodide or starch disappears. The volume thus required subtracted from 10 and multiplied by 0.01 equals per cent. S. in steel.

In addition to direct absorption with KI and I, cadmium acetate and sodium hydrate have been used, and the acidulated solutions titrated with $Na_2S_2O_3$; also bromine and HCl and $KClO_3$ and HCl ; and the sulphur precipitated as $BaSO_4$ and estimated gravimetrically, with results sufficiently accurate for steel-works practice, the direct absorption with I and KI being, however, the quickest and cheapest. The following table gives comparative results obtained with three different absorbants compared with the direct precipitation method from the iron chloride solution with $BaCl_2$ —

Steel.	Standard Iodine in Potassium Iodide	Cadmium Acetate and Ammonia.	Bromine and HCl Precipitating with $BaCl_2$.	Direct Gravimetric with $BaCl_2$.
	S. %	S. %	S. %	S. %
Semi-Steel	0.179	0.190	0.175	0.185
Electric Mild	0.021	0.020	0.018	0.024
H. C.	0.031	0.032	0.029	0.034
Mild Steel, No. 1 ..	0.057	0.054	0.053	0.059
" No. 2 ..	0.050	0.052	0.047	0.053

At first sight the apparatus appears somewhat complicated, but with a little practice it is easily manipulated, and a sulphur determination by direct titration can be accomplished within half an hour.

The makers of the neutroscope are Messrs. Wood Bros. Glass Company, of Barnsley.

ITALIAN CHEMICAL INDUSTRIES.

ACCORDING to a pamphlet on "The Economic Revival of Italy," issued by the Italian State Railways (London Office: 12, Waterloo Place, Regent Street, S.W.), the demand for chemicals in Italy before the war was very largely met by German manufacturers. The value of the imports of these products from Germany amounted to 200,000,000 lire per annum. In consequence of the cutting off of German manufactures from the Italian market as a result of the war, notable developments in the manufacture of chemicals in Italy have been made. A vast soda factory (Società Solway) has arisen at Castiglioncello in Tuscany, and a new factory for the production of caustic and electrolytic soda has been started at Piedimulera in Val d'Ossola. At Cengio, gathered round the modest nucleus of the explosives works already in existence, there is now an immense factory for the preparation of carbolic acid and various organic and explosive products. The distillation of tar has a foothold everywhere, together with the production of benzole and toluol and of coal-tar derivatives. Various Italian factories have commenced the manufacture of artificial colours, formerly imported from Germany. The output of some of the principal products of the Italian chemical industry in 1915 was as follows: Sulphuric acid, 6,259,439 quintals; phosphates and various fertilisers, 9,122,462; carbide of calcium, 491,892; calcium cyanide, 252,920; sulphate of copper, 412,720; nitric acid, 158,058; hydrochloric acid, 180,590; sulphate of ammonia, 146,989; and sulphate of soda, 141,474.

One product in which Italy holds a monopoly in Europe is Sicilian sulphur. About 400,000 tons used to be extracted before the war; but since the outbreak of hostilities, owing to shortage of labour, the estimated output in 1918 had been reduced to less than 180,000 tons. American competition, already pronounced before the war, will certainly now become more acute through the opening of new mines in Texas, which, it is affirmed, will bring the total output of the United States up to a million tons. The sulphur mines of Japan have a much more restricted importance, and the production does not surpass 50,000 tons per annum.

DUTCH EXCISE DUTY ON SALT.—By a Dutch Royal Decree, dated May 23, salt for use in factories and workshops in the preparation of fish meal intended to be used for cattle food is exempted from Excise duty.

ITEMS OF INTEREST.

IODINE.—The price of iodine was advanced on Saturday last to 1s. per oz., usual terms.

GUNCOTTON EXPLOSION.—An explosion of guncotton took place on Wednesday at Bullpoint, near Saltash, and resulted in two workmen being killed.

IMPORT RESTRICTIONS.—A revised consolidated list of import restrictions was issued as a supplement to the *Board of Trade Journal* for July 31.

OBITUARY.—Mr. Walter Valentiné Youel, for many years connected with the Carbonic Acid Gas Company, Manchester, died recently at Cheadle, Cheshire.

STRIKE OF LEAD MINERS.—A strike has taken place at Mill Close lead mines, Derbyshire, which produce about a third of the lead of the British Isles. The owners have issued notices of their intention to close down altogether unless the strikers return.

GLASS AND GLASSWARE CONTROL SUSPENDED.—The Ministry of Munitions announces that the Glass Control (Consolidated) Order, 1917 (dated September 10, 1917), and the Glass Control (Consolidation) Amendment Order, 1918 (dated May 7, 1918), have been suspended as from August 1.

ANILINE DYE INDUSTRY FOR EBBW VALE.—Mr. Fred Mills, managing director of the Ebbw Vale Company, addressing a meeting last week said that new developments were to be instituted by the Ebbw Vale Company as soon as plant was available for the manufacture of aniline dyes.

NEW ISSUES.—In view of the size of the issue, and of the unsatisfactory labour conditions prevalent while the lists were open, the offer of shares by the British Dyestuffs Corporation seems to have had a very fair reception.—Messrs. George Clare and Company announce that the issue of 250,000 deferred shares of Borax Consolidated, Ltd., has been oversubscribed.

GERMAN POTASH FOR ENGLAND.—*Reuter's* Berlin correspondent, in a message dated August 5, says: The Anglo-German potash agreement has been ratified by the respective Governments; 22,500 tons of pure potash will go to England in the next few months. The negotiations of the Potash Syndicate with the United States have not yet yielded any result.

FIRES.—Slight damage was caused by fire which broke out on Monday morning at the old works of Messrs. Levinstein, Ltd., Blackley, Manchester.—A spark from a steam wagon containing about 60 carboys of vitriol, the property of Messrs. Ormerod, Taylor and Son, Ltd., Walsden, Lancashire, set fire to the straw with which the carboys were packed, and 37 of them burst, the contents being lost.

EXPORTS TO POLAND.—The Comptroller-General of the Department of Overseas Trade desires to announce that it has been ascertained from a semi-official source that permission is not required from the Polish Government for the import of the following among other goods, chemical articles: printing and lithographic dyes, aniline dyes. Raw materials: ordinary chalk and whiting, kaolin, sand, potash, borax and raw celluloid.

CHEMISTRY AND INDUSTRY.—The report of the General Purposes Committee of the Institute of Chemistry, presented at the last meeting of the Council, states that further application has been made to the Minister of Labour to receive a few representatives for a brief conference on the problem of devising means whereby the importance of chemical science to industry may become better realised by both employers and employees and the interests of chemists themselves may be safeguarded. Representatives of the Institute have since been received by Mr. Wardle, M.P., on behalf of Sir Robert Horne, and the matter is proceeding.

TREATMENT OF MUSTARD GAS BURNS.—The free application of hydrogen peroxide to the affected parts, according to E. Rousseau and L. Devaux (*J. Méd. de Bordeaux*), quickly relieves the intense pain occasioned by contact with dichlorethylsulphide, "mustard gas" or "yperite." In half an hour the copious use of hydrogen peroxide greatly lessens the pain, and completely suppresses it in less than ten hours. The oedema shows improvement in a few hours, and disappears in six days. Since fats dissolve the mustard gas, and protect it from the action of the nascent oxygen, no ointments or oily dressings should be applied to the lesions.

THE SCOTTISH OIL COMBINE.—We understand that approximately 80 to 90 per cent. of the shareholders of the Scottish oil companies have accepted the Anglo-Persian Company's offer, but at the request of the directors of the various companies the Anglo-Persian has consented to extend the offer to August 14, so that any shareholders who have been unavoidably prevented from sending in their acceptances may still have an opportunity of doing so.

ZINC AND ZINC DUST PRICES.—No change has taken place in the quotation for Australian high grade zinc dust (88/92% metallic zinc purity) and the quotation remains at £70. per ton, f.o.r. Inquiries on this basis have been brisk, and small parcels have been sold to the continent. The price of Australian electrolytic zinc (99/95% metallic zinc) remains at £42. per ton f.o.r. Australian for direct shipment to New Zealand, India, South Africa and the Far East.

RUSTING OF STEEL.—The results of an investigation into the speed of rusting of steel containing small proportions of copper are given by Mr. D. M. Buck in a paper read before the American Society for Testing Materials. This research has determined that the principal protective effect is exerted by proportions of copper so small that most analysts would report them only as traces. Increasing the copper content from 0.01 per cent. to 0.03 per cent. decreases the corrosion by 30 to 40 per cent. With a normal sulphur content of about 0.05 per cent. a copper content of 0.12 per cent. gave virtually as complete protection as larger amounts. A copper percentage of 0.15 per cent. is considered sufficient to protect steel even with considerable excess of sulphur.

CONTROL OF POTASH COMPOUNDS SUSPENDED.—The Ministry of Munitions has issued the following announcement, dated July 31: (1) The operation of the Potassium Compounds Order, 1917, as modified by the Potassium Compounds (Partial Suspension) Order, 1919, is hereby suspended on and after August 1, 1919, until further notice. (2) Such suspension shall not affect the previous operation of the said Order or the validity of any action taken thereunder or the liability to any penalty or punishment in respect of any contravention or failure to comply with the said Order prior to such suspension or any proceeding or remedy in respect of such penalty or punishment. (3) This Order may be cited as the Potassium Compounds (Complete Suspension) Order, 1919.

COOPERAGE INDUSTRY.—The recommendations of a special sub-committee appointed by the Interim Industrial Reconstruction Committee for the Cooperage Industry to consider the question of Standardisation of Wages, etc., have been adopted by the Interim Committee to apply to the whole industry throughout the United Kingdom. Regarding wages, it is recommended: (a) That the basic rate be 1s. 9d. per hour; (b) that the towns of Glasgow, Greenock, Liverpool, Belfast, and Manchester receive 1d. per hour above such rate—viz., 1s. 10d. per hour; (c) that London and district receive 2d. per hour above such rate—viz., 1s. 11d. per hour; (d) that the weekly rate be based upon the hour rate for a maximum working week of 47 hours. The Committee therefore recommend that the trade unions confer with employers, as soon as possible, with a view to the formulation of a national piece work list of prices; and meanwhile decide that an advance of 100 per cent. be allowed on pre-war rates.

JAPANESE GLASS INDUSTRY AND RAW MATERIALS.—The Japanese glass industry has not been developed to such an extent that it is independent as regards raw materials. During the war large quantities of soda ash and other chemicals were imported from the United States, although the production of caustic soda in Japan has made rapid strides in recent years. In 1913 the production was 9,535,621 lb., valued at 465,557 yen (£46,500.), while in 1916 it was 14,852,735 lb., valued at 1,650,551 yen (£165,000.). The importation of crude caustic soda was valued at 1,310,000 yen (£131,000.) for 1913, and rose to 2,930,000 yen (£293,000.) in 1916. There are a number of factories engaged in the production of caustic soda at present, and an effort is being made to reduce the price of salt in order to enable these factories to compete with the factories of other countries. Special studies are in progress to increase the chlorine and hydrogen content of the product. With ample supplies of well-trained, cheap labour, coal, sodium silicate, and the other necessary raw materials easily accessible, the glass industry of Japan bids fair to remain prosperous and to be able to compete to advantage with the industries of other countries.

ALUMINATES OF LIME AS CEMENT MATERIAL.—The aluminates of lime, even when they contain such amounts of impurities as 16 per cent. silica and 3 per cent. iron oxide, constitute a material which the *Contract Record* claims to be a very valuable cementing medium when gauged with water. This particular value lies in the high early strengths which they develop. The greater the amount of the alumina present as an aluminate of lime, the greater will be the early strength. Under certain conditions of curing there is a marked increase of strength with age, but it does not extend over a very long period of time. It also appears that if the concrete is subjected to an excess of water during curing there will be a decrease in strength. Such amounts of moisture as are usually present in the air do not materially affect the strength. It appears, therefore, that these cements might be of considerable value for certain special uses, where the principal requisite would be quick hardening.

BENZOLE ADVISORY COMMITTEE.—An Advisory Committee has been constituted of Mr. E. S. Shrapnell-Smith, C.B.E. (chairman), Mr. D. Citroen, Mr. B. Coathupe, Major Stenson Cooke, Mr. A. W. Torkington, Mr. Walter Wolsey, and Mr. Horace Wyatt, to "advise in respect of any general matters the National Benzole Company, Ltd., may refer for assistance and suggestion; to make suggestions to the company in respect of any proposals to popularise the use of benzole by motorists and increase the consumption; and to watch the development of other home produced motor spirits and to advise the Board as to co-operation in any or all of these developments." The setting up of this Advisory Committee has been effected by the National Benzole Association acting in co-operation with the Motor Fuels Joint Committee. All communications intended for the committee should be addressed to Mr. P. G. Somerville, at the offices of the National Benzole Association, 84, Horseferry Road, London, S.W.1.

PERSONAL.—Dr. Samuel Smiles, Assistant Professor of Organic Chemistry at University College, University of London, and Honorary Secretary of the Chemical Society, has been appointed to the newly created Chair of Organic Chemistry at Armstrong College, Newcastle. His publications include "Relations between Physical Properties and Chemical Constitution" and various papers contained in the transactions of the Chemical Society and foreign societies, some dealing with organic compounds of sulphur.—The Senate of the Queen's University of Belfast have appointed Dr. A. W. Stewart to their Chair of Chemistry in succession to Professor E. A. Letts. Dr. Stewart is a graduate of Glasgow University and a son of Emeritus Professor Stewart. After studying abroad, he spent some years in research work in Sir William Ramsay's laboratory, under Professor Norman Collie, F.R.S., and was appointed Lecturer on Stereochemistry in University College, London. On the foundation of the Queen's University of Belfast, he became Lecturer on Organic Chemistry there; and in 1914 he succeeded Professor Soddy, F.R.S., in the Lectureship on Physical Chemistry in Glasgow University.

INSTITUTE OF METALS.

THE autumn meeting of the Institute of Metals is to be held at Sheffield on Wednesday and Thursday, September 24 and 25. The following is a list of the communications that are expected to be submitted: Professor P. G. H. Boswell, O.B.E. (Liverpool), on "Moulding Sands for Non-Ferrous Foundry Work"; Professor C. H. Desch, D.Sc., Ph.D. (Glasgow), Second Beilby Report on "The Solidification of Metals from the Liquid State"; Miss H. E. Fry (Teddington) and Dr. W. Rosenhain, F.R.S., vice-president (Teddington), on "Observations on a Typical Bearing Metal"; Dr. W. H. Hatfield and Captain G. L. Thirkell, B.Sc. (Sheffield), on "Season Cracking of Brass"; R. E. Leader, B.A. (Sheffield), on "The Early History of Electro-Silver Plating"; E. A. Smith and H. Turner (Sheffield), on "The Properties of Standard or Sterling Silver, with Notes on its Manufacture"; Dr. J. E. Stead, F.R.S. (Middlesbrough), on "The Ternary Alloys of Tin—Antimony—Arsenic"; Dr. F. C. Thompson, B.Sc. (Sheffield), Note on "Graphite and Oxide Inclusions in Nickel Silver"; Dr. F. C. Thompson, B.Sc., and F. Orme, M.Met. (Sheffield), on "Some Notes on the Constitution and Metallurgy of Britannia Metal."

LABORATORY CHEMICALS.

A PAPER on "The Organised Preparation of Laboratory Chemicals," by Dr. M. O. Forster, F.R.S., which was on the agenda at the recent annual meeting of the Society of Chemical Industry, was taken as read. The author's remarks, in part, were as follows:—

The resumption of normal activities by the universities and colleges will bring into prominence the pressing need of some organisation fulfilling the functions of Kahlbaum, Schuchardt, Merck, and Schimmel. Laudable attempts to meet the need are being made by certain manufacturers in this country, but they require to be amplified and co-ordinated. The field is too vast to be covered immediately by any one enterprise, or perhaps it would be more accurate to say that, as a commercial speculation, it offers too little profit and requires too much detailed organisation to attract a manufacturing company large enough to cover it. Nevertheless, it is just such a company, with an ample technical staff, and capital resources sufficiently generous to justify foregoing a satisfactory profit on this department for some years, which would best be fitted to correlate and complete the work of others.

Schuchardt's list comprised upwards of 7,000 separate items, and Kahlbaum's about 5,000. No other commercial unit is approaching this, or could approach it in ten years, but I can imagine Explosives Trades, Limited, or the British Dyestuffs Corporation establishing a branch of their organisation to deal with the subject on lines which may be roughly sketched as follows.

A census would first be made of those materials which are being produced already by separate firms, with whom arrangements would be made for their continuance, as affiliated members of the organisation, to manufacture those products, and others allied to them, for which they were best fitted by their particular resources. This would reveal the deficit, dividing itself roughly into two classes: (i.) Bulk materials obtainable from different factories in commercial form but requiring purification before distribution, and (ii.) materials not made systematically in this country. The former would be purchased from the factories in question, and would frequently constitute the starting-materials for members of class (ii.). The latter would be prepared by the staff of the Central Organisation, or, better, be divided between that staff and the university laboratories under an arrangement by which advanced students, directed by the teaching staff, would convert specified raw materials into products required by the organisation.

It is undeniable that such an enterprise would be unremunerative at first, because it involves the skilled manipulation of a very large number of very small quantities, and because a considerable proportion of capital would be locked up in stock for uncertain periods, often very protracted. It is therefore necessary to indicate the commercially compensating factors. I believe that these would develop in several directions. In the first place, successive generations of newly trained chemists would grow accustomed to inquiring for British products, and, let us hope, to satisfying their needs from domestic sources of supply. At the same time, at least a proportion of the advanced students, while still at college, would be faced with the necessity of working economically, and would gain that regard for material, time, and apparatus which they often lack on entering a factory, being in this respect a source of loss instead of profit to their employers. Then it would sometimes happen that a by-product in the bulk preparation of a commercial article could be utilised for the purpose of the retail enterprise, and a demand for this by-product would have the effect of diminishing the cost of the article itself, or of improving the methods of purification. Finally, the least easily measurable, but probably the most valuable result commercially, would be the cultivation of ideas preserved from destruction following malnutrition. This cannot fail to bring profit ultimately to the chemical manufacturer, who, when enlightened, regards ideas as one of his raw materials.

OUR BOOK SHELF.

VAN NOSTRAND'S CHEMICAL ANNUAL. Fourth Issue, 1918.

Edited by John C. Olsen, A.M., Ph.D. London: Constable and Co. 15s. net.

This excellent annual maintains its high reputation. Careful revision of all tables has been made. It is remarkable how well it keeps pace with new data. Forty-eight new tables have been added.

REPORTS OF COMPANIES.

Chemical and Metallurgical Corporation, Ltd.

The statutory meeting was held in London on July 31, Mr. Herbert Guedalla presiding.

The Chairman said: The contract with Mr. Frank Elmore has now been completed, and the corporation has acquired for the sum of £25,000, in cash and the amount of £1,000,000, paid in ordinary shares the world rights of Mr. Elmore's patented invention for the separation by an economical and efficient chemical process of the lead and zinc contents of zinc, lead ores, and concentrates. In conjunction with other parties, we are now arranging to establish a plant in this country for the purpose of the actual treatment of middlings and concentrates; and whilst we have arranged a contract for the supply of middlings from Australia—which, according to our managing director, should prove to be very profitable,—we are also in negotiation for a constant supply of the requisite raw material to keep the new works going on a proper commercial basis. As regards what I may term the foreign situation of the patents, we may roughly at present divide the geographical position into seven parts. In the first place, the Burma Corporation have an option to call for a licence in Burma and India on certain terms. This option extends to May, 1920. The option with regard to the United States of America and Canada has been exercised, and this calls for the formation of a company with a capital of £400,000., of which your corporation will receive £200,000. in fully paid shares. The option with regard to Mexico and Central America has also been exercised, and your corporation will receive 115,000 fully paid shares in a company with a nominal capital of £200,000. Another group have exercised the option with regard to Russia, Norway, and Sweden, and in this case your company will receive £150,000. fully paid shares in a company with a capital of £300,000., but it is possible that we may agree to a certain part of this capital being put up in the form of preference shares. We are completing an agreement for the establishment of a trial plant to demonstrate the process in Australia in connection with the chief mining companies there; and an agreement is almost completed with most important mining interests in France for the acquisition of the patents for France, North Africa, Spain, Portugal, etc. The option with regard to Southern Africa has not yet been exercised.

W. and H. M. Goulding, Ltd.

The net profits for the year to June 30 last, after providing for excess profits duty, and including dividends from subsidiary companies, amount to £76,915., out of which it is proposed to set aside £7,000. to cover estimated discounts on realisation of outstanding debts. This, with £4,077. from last account, leaves £73,992. available for distribution. After providing for the usual debenture interest and the dividend on the preference shares, the directors recommend a dividend of 7 per cent., with a bonus of 3s. per share, on the ordinary shares for the year, of which 3s. 6d. per share with the bonus of 3s. is payable forthwith, and the second 3s. 6d. per share at December 31 next, less tax. They further recommend that a special bonus of £500. be paid to the directors, that £5,100. (6,000 4 per cent. Victory Bonds) be set aside for the creation of a staff provident fund, that £5,000. be carried to depreciation account and £25,000. to reserve, bringing that account up to £75,000.; carried forward, £4,517.

An extraordinary general meeting will be held on August 15 for the purpose of considering and, if thought fit, of passing the following resolution: "That the capital of the company be increased to £500,000. by the creation of 30,000 ordinary shares of £5. each, ranking for dividend and in all respects *pari passu* with the existing ordinary shares in the company, and that the directors be directed to allot or otherwise dispose of the same to such persons on such terms and conditions and at such times as the directors may think fit."

British Coalite Company, Ltd., and Coalite, Ltd.

Meetings of British Coalite Company, Ltd., and of Coalite, Ltd., were held in London on Wednesday, when the resolutions for amalgamation with Low Temperature Carbonisation, Ltd., were unanimously confirmed, Mr. Henry Bacon and Mr. James Henderson Macaulay being appointed liquidators.

New Paccha and Jazpampa Nitrate Company, Ltd.

The directors have decided to offer 11,450 shares of £1. to proprietors in the proportion of one new share for every five now held, at £2. per share.

DIVIDENDS.

PRICE'S PATENT CANDLE CO., LTD.—Interim dividend of 15s. per share for half year ended June 30 and bonus of 5s. per share, less tax.

UNITED ALKALI COMPANY, LTD.—Interim dividend of 1s. per share on ordinary and 7s. per share on preference, both less tax.

PARLIAMENTARY NEWS.

Chemical Imports Committee.

In the House of Commons, Mr. Cautley asked the President of the Board of Trade whether a Committee representing the chemical industry has been appointed to advise the Board of Trade on the question of prohibition of the importation of chemicals; when such Committee was appointed and by whom; will he give the names of the members of this Committee; and whether the Proclamation issued on June 25 prohibiting the importation of chemicals of all kinds was issued under the Defence of the Realm Act?

Mr. Bridgeman: The Committee was appointed by the Board of Trade to advise the Department of Import Restrictions as to the issue of licences for the importation of chemicals, and held its first meeting on July 7. In addition to official representatives of the Board of Trade and the Ministry of Health, the following are members of the Committee: Mr. T. D. Morson and Mr. R. H. Bewick, of the Association of British Chemical Manufacturers; Mr. W. F. Reid, of the Society of Chemical Industry; Mr. E. White, of the Pharmaceutical Society; Mr. T. E. Lescher, of the Drug Club; and Mr. W. Mann, of the British Chemical Trades Association. The Proclamation, like other Prohibition of Import Proclamations, was issued under Section 43 of the Customs Consolidation Act.

Control of Water Power Resources.

Sir Robert Thomas asked the President of the Board of Trade whether he is yet in a position to state if it is his intention to introduce a Suspensory Act to prevent industrial concerns, at the expense of the community, obtaining control of the water resources of Wales until the whole question can be carefully considered and brought in under the reconstruction scheme which the Government have in view to develop the water resources of the country generally; and whether the Aluminium Corporation, Ltd., have still the power to dam up Lake Cowlyd, which authority was given to them in order to increase the output of aluminium for the purposes of the war?

Sir A. Geddes: I am considering the question of introducing legislation of an interim character providing for the control of water-power developments. The answer to the latter part of the question is that the Aluminium Corporation have applied to the Board of Trade for an Order, under the Special Acts (Extension of Time) Act, 1915, to extend for one year the period of three years fixed by the Conway and Colwyn Bay Joint Water Supply Board Act, 1916, for the completion of the dam of Lake Cowlyd. Notice of this application has been advertised, and objections to it should have been sent to the Board of Trade on or before August 2.

Pembrey Factory.

Mr. Wignall asked the Parliamentary Secretary to the Ministry of Munitions whether he has received the report of Mr. Charles Doughty, dated June 23, 1919, relative to the difficulties at the National Filling Factory, Pembrey; and what steps he has taken to secure the carrying out of the recommendations made therein?

Mr. Kellaway: This report has been under consideration by the Ministry of Labour, at whose suggestion the inquiry at Pembrey was held. The position has been complicated by other questions concerning general male labour which have arisen since the date of the Conference. The agreement regarding shift-workers has been ratified, and the factory management have been authorised by wire to make retrospective payment to the men concerned. Regarding the settlement reached in the case of Mr. John Bevan, instructions to the factory to carry out the terms of Mr. Doughty's report have been despatched.

Utilisation of Peat.

Mr. Macpherson, in reply to Sir Maurice Dockrell, said: The Irish Peat Inquiry Committee appointed by the Fuel Research Board to inquire into the problem of the utilisation of peat have presented their report, which is now under consideration by the Government. There is no evidence as to the existence in Ireland of natural oil in paying quantity.

Chemists' Salaries.

Mr. Sitch, on Tuesday, asked the Parliamentary Secretary to the Ministry of Munitions whether he is aware that a request was made to the Department to sanction an increase of salary to the chemists employed in His Majesty's factory, Oldbury; whether this request was refused; and, if so, will he state the reason?

Mr. J. Hope: I am informed that the request was refused on the ground that the chemists employed at His Majesty's factory, Oldbury, were at least as well paid as chemists employed at other Government factories, and that it was impossible to consider the case of a single factory apart from the general question of the salaries paid to all chemists and other technical officers in the employment of the Government.

Mr. R. Young asked the Parliamentary Secretary to the Ministry of Munitions whether he is aware that amongst the chemists employed in explosive factories who signed the memorial praying for a revision of salary there were at least 100 associates and fellows of the Institute of Chemistry; whether the work done by these chemists in developing and maintaining the output of some of the most indispensable munitions of war has been recognised; whether he is aware that the memorialists were informed that the question of principle raised in the memorial could not be admitted by the Ministry, that the salary of the chemists could not be compared with the earnings of tradesmen, and that the Ministry objected to meetings being held by any section of the staff of factories under their control to pass resolutions asking for a revision of salaries and appointing deputations to wait upon the superintendent in respect thereof; whether this statement was made with his sanction; and, if so, will he state the reason?

Mr. Hope: I see no reason to doubt the suggestion in the first part of the question. I fully recognise the admirable work done by chemists in developing and maintaining the output of munitions. The statement mentioned in the third and fourth parts of the question were made by an officer of the Department, but must not be taken to express the considered view of the Ministry. I hope to make a more complete statement on this subject on Thursday in answer to the hon. member's question.

Cellulose Inquiry.

Mr. Raper asked the Prime Minister when Lord Sumner's report on the cellulose inquiry will be forthcoming?

Mr. Bonar Law: It is hoped that the report will be in the hands of my right hon. friend the Chancellor of the Exchequer in the course of a few days.

Mr. Lambert: Will the report be in the hands of members as well as the Chancellor of the Exchequer?

Mr. Bonar Law: Oh, yes.

British Dyestuffs Corporation.

Sir Philip Magnus, on Wednesday, asked the President of the Board of Trade whether the £850,000. of 7 per cent. preference shares and £850,000. of 8 per cent. preferred ordinary shares in the British Dyestuffs Corporation subscribed by His Majesty's Government represented new money, or whether they had been allocated in consideration of the £1,142,000. loaned by the Government at 4 per cent. to British Dyes, Ltd., one of the amalgamated companies.

Sir Auckland Geddes said: His Majesty's Government were under obligation to advance to British Dyes, Ltd., on certain conditions a maximum sum of £1,700,000. secured by debenture bearing interest at 4 per cent. per annum. The amount advanced under that obligation had been repaid, and His Majesty's Government had subscribed instead for £850,000. 7 per cent. preference shares and £850,000. preferred ordinary shares in British Dyestuffs Corporation, Ltd., which had been formed to amalgamate the undertakings of British Dyes, Ltd., and Levinstein, Ltd.

Anglo-Persian Oil Company.

Mr. Lambert asked the First Lord of the Admiralty what amount the Government invested in the Anglo-Persian oil-field, and what was the market value of that investment to-day?

Mr. Long said the Government held ordinary shares £2,000,000.; participating preference shares £1,000.; debenture stock £199,000. It was not possible to give any accurate estimate of the present value of the investment, as there was no Stock Exchange quotation for the ordinary shares. It was, however, undeniable that their value had considerably appreciated, and could not be judged merely by the dividend at present paid.

NEW COMPANIES.

Crepin and Doumin, Ltd.—Private company. Capital £5,000., £1. shares. Wholesale and retail manufacturers of essences, perfumes, oils and light fluids of all kinds, perfumers, chemists, druggists, dyersalters, oil and colourmen, importers, manufacturers of pharmaceutical, medicinal, chemical, industrial, and other preparations, etc. Registered office: 15, Cooper's Row, E.C.

Edward G. Annelly and Co., Ltd.—Private company. Capital £5,000., in 4,500 $\frac{1}{2}$ per cent. cumulative part preference shares of £1. each and 2,000 ordinary shares of 5s. each. Dyersalters, oil and colourmen, and manufacturers of and dealers in chemical, industrial, and other preparations. Registered office: Trafalgar Lane, Sheffield.

Este Syndicate, Ltd.—Private company. Capital £1,200., in 1,185 ordinary shares of £1. and 300 founders' shares of 1s. each. Object: To search for petroleum and other minerals, oils, etc. Office: Talbot House, 9, Arundel Street, W.C., 2.

Excel Products Company (Cardiff), Ltd.—Private company. Capital £5,000., £1. shares. Neatsfoot oil manufacturers, soap and fat boilers, etc. Registered office: 2, Church Street, Cardiff.

Fred Chester's Fertiliser Company, Ltd.—Private company. Capital £500., £1. shares. Office: 13, Hamilton Square, Birkenhead.

Grove Metal Refining Works, Ltd.—Private company. Capital £2,000., £1. shares. Registered office: 5, Fen Court, E.C.

George Lillington and Co., Ltd.—Capital £50,000., £1. shares. Object: To take over the business of George Lillington and Co., Ltd., within the United Kingdom only, as manufacturers of "metallic liquids" or any preservatives for stone, cement, wood and other materials, etc. Registered office: 40, Holborn Viaduct, E.C. 1.

Associated Nigerian Tin Mines, Ltd.—Private company. Capital £275,000., 5s. shares. Solicitors: Hays, Roughton and Dunn, 11-12, Clements Lane, E.C.

Blackmore, Howard and Motherell, Ltd.—Private company. Capital £20,000., £1. shares. Gold, silver, and platinum refiners and assayers. Registered office: 6, Bishopsgate, E.C.

British Dominions Oil Corporation, Ltd.—Private company. Capital £100., £1. shares. Solicitors: Ashurst, Morris, Crisp and Co., 17, Throgmorton Avenue, E.C. 2.

British Mexican Petroleum Company, Ltd.—Private company. Capital £2,000,000., in 1,000,000 ordinary series "A" and 1,000 ordinary "B" shares of £1. each. Agreement with the Huasteca Petroleum Company. Solicitors: Norton, Rose and Co., 57 $\frac{1}{2}$, Old Broad Street, E.C.

Craven Lime Company, Ltd.—Private company. Capital £42,000., £1. shares. Object: To take over the business carried on by the Craven Lime Company, Ltd. (in liquidation), at Ingelton, Ribbleshead and Langcliffe, near Settle, Yorks. Registered office: Langcliffe, Settle.

Mawson Co., Ltd.—Private company. Capital £20,000., £1. shares (10,000 preference). Manufacturers of and dealers in all kinds of photographic dry plates, films and papers, photographic chemicals, collodions, collodion emulsions and varnishes, etc. Registered office: 81, Northumberland Street, Newcastle-on-Tyne.

Middlesbrough Metal Company, Ltd.—Capital £10,000., £1. shares. Registered office: James Street, North Armesby, Middlesbrough.

Peak Mining and Mineral Company, Ltd.—Private company. Capital £2,000., £1. shares. Registered office: Mountain View, Smedley St. East, Matlock.

J. C. Bottomley and Emerson, Ltd.—Private company. Capital £30,000., £1. shares. Manufacturers of chemical, coal tar dyestuffs, intermediates and products, tar distillers, etc. Office: Brookfoot Works, Brighouse.

Quebec Graphite Company, Ltd.—Private company. Capital £40,000., £1. shares. Object: To take over the business of the New Graphite Company, Ltd. (in liquidation). Solicitors: Bristows, Cooke and Carpmal, 1, Copthall Buildings, E.C.

S. Bowley and Son, Ltd.—Private company. Capital £50,000., £1. shares (20,000 preference, 24,000 "A" ordinary, and 6,000 "B" ordinary). Oil importers, refiners, etc. Office: Wellington Works, Wellington Road, Battersea, S.W.

South Phoenix Tin Mine, Ltd.—Private company. Capital £20,000., 10s. shares. Registered office: 27, Old Jewry, E.C.

Clydesdale Chemical Company, Ltd.—Private company. Capital £8,000., £1. shares. Registered office: 36, East Nelson Street, Glasgow.

THE PATENT LIST.

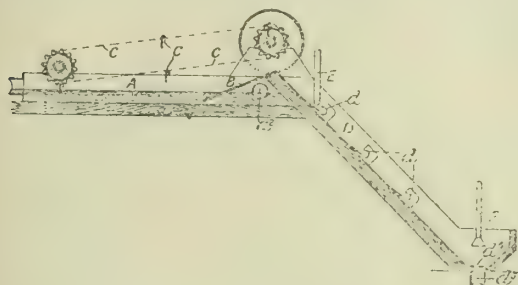
ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Devulcanising Waste Rubber. D. Spence, Norwalk, Connecticut, U.S.A. British Patent, 126,397, of 1917.

Rubber is devulcanised by treatment with a vulcanising accelerator in the presence of a reagent capable of removing the sulphur as it is liberated; this reagent may be in excess of the accelerator. Preferably, uncombined sulphur is first removed; the rubber should be in a finely divided state—for example, in solution,—and no moisture should be present. A temperature of 170 to 180° C. is preferable. According to an example, the rubber may be dissolved together with metallic sodium or potassium in aniline, heated for several hours, and the aniline, etc., removed; or the rubber may be dissolved in xylol and treated with anhydrous caustic alkali. Other examples of vulcanising accelerator mentioned are piperidine, paramido-dimethyl-aniline.

Dearsenication of Sulphuric Acid. A. E. Waring and United Alkali Company, Ltd., Liverpool. British Patent, 126,714, of 1917.

Sulphuric acid is freed from arsenic by treating with sulphuretted hydrogen, and the arsenious sulphide is separated by agitating with a liquid hydrocarbon such as paraffin oil to form a scum, separating the scum, washing it till free from sulphuric acid, dissolving the arsenious sulphide in sodium hydrate, carbonate, or sulphide, and separating the hydrocarbon from the thio-arsenite solution. The mixture of



acid, sulphide, and oil is passed from a mixer into a trough A, the scum being removed by combs C on endless chains e, and carried up an inclined shelf B to an inclined trough D having baffles d in the form of lateral troughs. The outlet a² for the purified acid is below the shelf B; the scum is washed by water sprays E, F, the latter being over a perforated plate d¹ covering the outlet d². The washed scum, separated from the washing-water, is treated as above described for the recovery of the oil and the production of thio-arsenite.

Permanganates. H. C. Jenkins and H. Woolner, London. British Patent, 126,756, of 1918.

Manganese dioxide, or manganese oxide recovered from the process, is fused with excess of soda with or without an oxidising-agent such as sodium chlorate and with or without some potash. The melt is dissolved in water or mother-liquor from the process and filtered, preferably through biscuit porcelain—or, according to the Provisional Specification, through asbestos,—and the filtered solution is electrolysed to obtain permanganate, nickel anodes, iron cathodes, a voltage of 4 volts, and a temperature of 20-30° C. being mentioned. A potassium compound, such as caustic potash or potassium carbonate or chloride, is then added to cause the separation of potassium permanganate. The mother-liquor is concentrated to cause some sodium chloride to separate, and may be evaporated to dryness, the residue being used in a fresh melt.

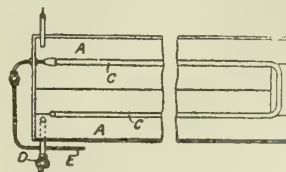
Ammonium Nitrate. F. A. Freeth, Great Crosby, Lancashire; and H. E. Cocksedge, Herne Hill, London. British Patent, 126,678, of 1917.

Ammonium nitrate is obtained by preparing a solution saturated with ammonium nitrate, sodium nitrate, and sodium sulphate at a selected temperature, adding enough water to keep the sodium salts in solution at a selected lower temperature, and then cooling the diluted solution to that temperature when ammonium nitrate separates out. The mother-liquor is then concentrated until the added water has

been removed, and quantities of ammonium sulphate and sodium nitrate equivalent to the separated ammonium nitrate are then added; the whole being maintained at a temperature not lower than the original selected temperature. Sodium sulphate separates and is removed, and the whole series of operations can then be repeated indefinitely.

Evaporating Liquids. J. J. Hampson, Leyton, London. British Patent, 127,073, of 1918.

An apparatus for evaporating easily-decomposable solutions, such as sugar and various chemicals, comprises a series of narrow troughs A open to the atmosphere, and heating-pipes C laid loosely therein with flexible or detachable connections to the outside of the troughs so as to be capable of being lifted completely clear of the liquor in the troughs for cleaning purposes. Steam is passed through the pipes C in the opposite direction to the flow of liquor



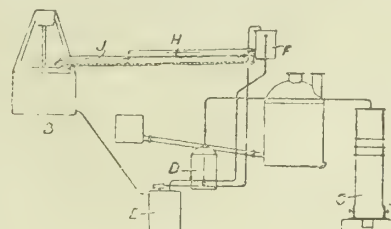
through the troughs A. Pairs of troughs and their steam-pipes may be coupled together, as by pipes D, E respectively.

Nitric Acid. E. B. Maxted, Walsall, Staffordshire. British Patent, 127,343, of 1917.

The gaseous product of the oxidation of ammonia is treated by fractional condensation, the first being at temperatures of 50-100° C., for instance 60° C., and the subsequent condensations at temperatures below 0°, for instance -10° C. The condensates are separately concentrated by evaporation as far as possible, the constant boiling-point acid obtained by evaporation being strengthened by liquid nitrogen oxides in the known manner.

Neutral Sulphate of Ammonia. N. Wilson, London. British Patent, 127,398, of 1918.

Neutral sulphate of ammonia is obtained by directly neutralising the acid present in the crude crystals by treatment with a cold ammoniacal solution of sulphate of ammonia, saturated or practically saturated with this salt, the degree of alkalinity of the solution being sufficient to neutralise the acid in the crystals and not substantially below 1 per cent. of free ammonia. A suitable apparatus for carrying out the process comprises an ammonia generator C, collectors D for pure ammonia solution, a drying apparatus B—for example, a centrifugal,—a tank E in which the ammoniacal sulphate of ammonia solution is prepared, and a second tank F into which the liquid from the tank E is pumped and from which



it flows by a pipe H and rubber hose J to the dryer B. The ammoniacal sulphate of ammonia solution is prepared by placing acid sulphate of ammonia—for example, drainings from sulphate of ammonia plant—in the tank E, and running in pure ammonia solution from the vessels D. In a modified form of apparatus, the dryer B and tanks E, F are mounted on a vehicle, and a prime-mover—for example, a steam-engine—is provided which may be connected to the wheels of the vehicle or to the dryer; the vehicle also carries a tank containing pure ammonia solution for use in preparing the ammoniacal sulphate of ammonia solution. The neutral sulphate is discharged from the dryer into a sack carried by a weighing-machine, which cuts off the discharge when the sack contains a predetermined amount.

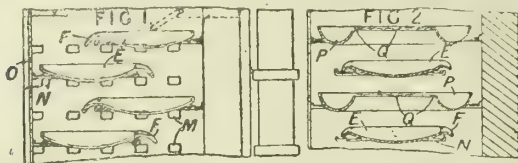
Sulphuric Acid. G. Taylor, Rotherham; and E. K. Scott, Farningham, Kent. British Patent, 127,047, of 1917.

In the chamber process of making sulphuric acid, air-borne nitrogen oxides are employed, such as those produced by passing air through flame arcs or a Kilburn-Scott three-phase alternating-current electric furnace, or, according to the Pro-

visional Specification, the gases produced by oxidising ammonia, diluted with large volumes of air, or the air-borne oxides of nitrogen produced by ozonising. The gases may be admitted to the pyrites burners to form part of the combustion air, or to the gases coming from the burners, or to the gases leaving the last sulphuric-acid chamber.

Concentrating Sulphuric Acid. J. S. Morgan, Freshfield, Lancs. British Patent, 127,652, of 1917.

Apparatus for concentrating sulphuric acid and other liquids consists of a tower or chamber containing basins E, Fig. 1, provided with lips F, and so arranged that the acid drips from basin to basin, and is at the same time exposed to the action of products of combustion or hot air or other gases passing up the tower. The basins act as baffles causing the gases to take a circuitous path, and are mounted on skeleton



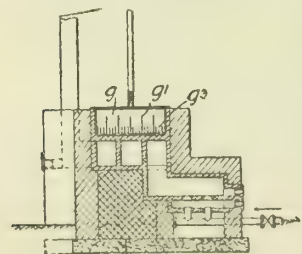
supports M, N so that the hot gases can pass below the basins and up all round them. In order to obtain access to the interior of the tower, one or more of the sides O is formed of plates which are fixed but removable, consisting, for example, of slabs or cast-iron plates cemented in position. In a modified apparatus, Fig. 2, alternate basins P are annular in form, the basins E being centrally mounted, and each of the pans is formed with a number of lips Q.

Hydrogen. J. Harger, Liverpool; and H. Terry, Bishops Waltham, Hampshire. British Patent, 127,609, of 1917.

In separating carbon monoxide from hydrogen or gases containing hydrogen, oxygen or air is added, and the mixture is passed over a catalyst at a comparatively low temperature (100-300° C.) so that the carbon monoxide is oxidised, but not the hydrogen. Suitable catalysts are metals such as copper or nickel, or oxides of copper, iron, chromium, aluminium, nickel, lead, mercury, bismuth, cerium, thorium, manganese, cobalt, or zinc. Mixtures of oxides may be used and may be obtained by mixing the hydroxides or salts, such as nitrates, oxalates, etc., distributing the mixture on a combustible or other base, and igniting. In the case of gases containing carbon dioxide, steam is preferably added before the reaction. Sulphuretted hydrogen is preferably removed. Oxygen for addition to the gaseous mixture may be obtained by electrolysis, and added alone or together with the electrolytic hydrogen.

Tar Distillation. J. Archer, Stockton-on-Tees. British Patent, 123,880, of 1918.

A still for wet tar consists of a shallow flat-bottomed chamber *g* having fins *g'* conducting heat from the bottom of the still into the body of the tar, and partitions *g''* which impart a zig-zag path to the tar flowing through the still. The depth of the tar in the still is 4 in. to 6 in. The crude tar is lifted to a storage tank heated by a steam coil, and is preheated on its way to the still by the pitch discharged from the still. The pipe conveying the tar from the storage tank to the preheater is warmed by an internal pipe through which the water from the steam coil in the storage tank is led.



The vapours are led to a condenser; the gases that escape condensation are conveyed to the furnace which heats the still.

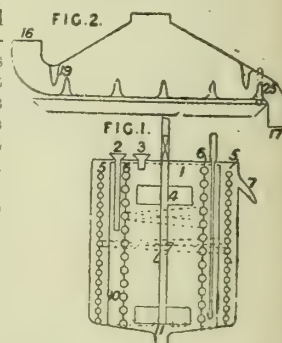
Extracting Lead and Zinc. F. E. Elmore, Boxmoor, Hertfordshire. British Patent, 127,641, of 1917.

Lead and zinc are extracted and separated from ores, concentrates, and the like, in which these metals occur together as sulphides, by heating with an acid agent which converts the lead into a soluble compound, whilst the zinc sulphide remains substantially unattacked. The acid agents used are sulphuric acid alone, or a solution of a suitable salt to which has been added either sulphuric acid, hydrochloric acid, or

an alkali bisulphate. Suitable salts are sodium chloride, ammonium chloride, or other halogen salt, other than that of a heavy metal, capable of acting in solution as a solvent of lead sulphate or chloride. When sulphuric acid is used alone, the product is treated with a hot strong solution of sodium chloride or other suitable halogen salt, which, on cooling, deposits lead salts. In all cases the solution, after deposition of lead salts, may be reheated and used again. To avoid the evolution of sulphur dioxide or sulphuretted hydrogen during the process, separate batches of ore, etc., may be treated with strong and somewhat weaker sulphuric acid, the sulphur dioxide from the strong-acid batch being led into the weak-acid batch, when sulphur is precipitated. When lead chloride is produced, it may be converted into sulphate by heating with strong sulphuric acid, the hydrochloric acid evolved being absorbed in water or brine for reuse. The lead sulphate produced may be smelted with lead sulphide in known manner, the lead sulphide being produced by utilising the sulphuretted hydrogen evolved from the treatment of the ore with hydrochloric acid and a salt solution. According to Provisional Specification 11348/17, hydrochloric acid alone may be used as the acid agent, the lead chloride being extracted by boiling with water or brine.

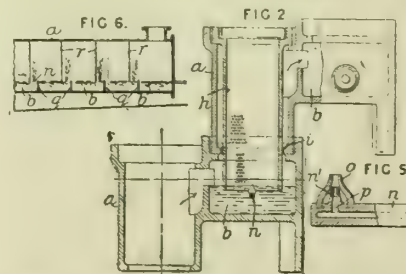
Nitro Compounds. J. G. Baxter, Gravesend, Kent. British Patent, 125,160, of 1916.

Picric acid is prepared in a continuous manner by nitrating phenol or its sulphonic acid by means of mixed acid in the apparatus shown. The vessel 1, Fig. 1, is provided with cooling-coils 5, 6, and an agitator 4, and is divided into two compartments by an annular wall 10; the vessel is partly filled with mixed acid and phenol sulphonic acid, and the two liquids are then continuously run in at suitable rates through funnels 2, 3; the reaction mixture flows through the inner compartment through passages 11 in the bottom of the annular wall 10 into the outer compartment. From here they flow away by a spurt 7 to the vessel shown in Fig. 2, entering by the opening 16 and flowing under and over obstructions 19 . . . 25, and flowing out by the exit 17. The vessel shown in Fig. 2 may be heated or cooled by running hot or cold water over it, and may be suitably tilted to vary the rate of flow of the reaction mixture through it. Cresol or toluene—or, according to the Provisional Specification, benzene—may be nitrated in a similar way.



Treating Gases with Liquids. T. W. S. Hutchins, Electro Bleach and By-Products, Ltd., Middlewich, Cheshire. British Patent, 124,045, of 1918.

Relates to drying or absorbing a gas by liquid flowing in the opposite direction. In the apparatus shown in Fig. 6, the gas flows horizontally through a chamber *a* over a series of baths *b* separated by weirs *q* and perforated partitions *r*. The liquid is sprayed up in front of each partition by a portion of the gas distributed to transverse pipes *n* carrying immersed nozzles. Shown larger in Fig. 5, a nozzle is seen to consist

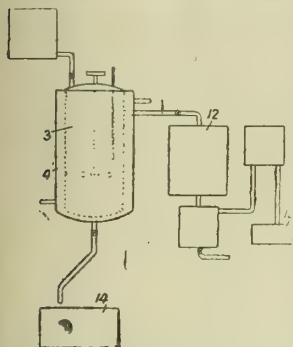


of a blast nipple *n*¹ within a cone *o* to which the liquid has access through an aperture *p*. Fig. 2 shows two of a series of baths *b* which are arranged stepwise. A conduit *h* fitting the junction *i* just dips into the lower bath and leaves an annular space above and below the junction. The gas passes from the lower annular space over the liquid to the upper annular space through perforations, and an immersed nozzle *n* throws up sprays within the conduit. The sprayer is supplied with a portion of the gas treated.

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Sulphonic Acid. Barrett Company, New York, U.S.A. British Patent, 126,943. Convention date, May 13, 1918.

Mixtures of sulphonic acids and sulphuric acid, obtained by sulphonating aromatic hydrocarbons, etc., are separated by distilling off the sulphuric acid under high vacuum, the temperature being kept below that at which the sulphonic acid decomposes. The process may be applied to benzene disulphonic acid, the sulphuric acid being distilled therefrom at a pressure of lin. or less and a temperature of about 260° C. Using the apparatus shown, the mixture of acids is run into a still 3, in which a high vacuum is maintained by the pump 10; the still is heated by a jacket 4. The sulphuric acid distills off to a condenser 12, and the sulphonic acid is then drawn off into the tank 14 and neutralised with soda, etc. The process may be employed in conjunction with that described in Specification 122,169, the water produced in the sulphonation process being distilled off *in vacuo*, and then a higher vacuum applied to distil off the sulphuric acid.

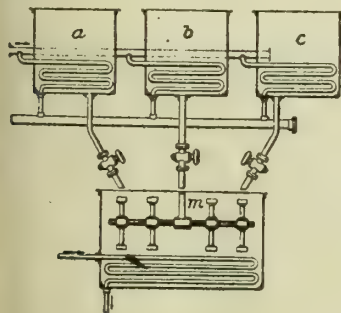


Alkali Compounds from Silicates. E. Bergve, Nottoden, Norway. British Patent, 127,566. Convention date, May 27, 1918.

Alkali aluminosilicates—for example, potash feldspar—are decomposed by treating at a high temperature with sulphur vapour or with sulphur vapour mixed with sulphur dioxide. Products termed oxy-sulpho-silicates and sulpho-silicates are stated to be formed by the successive replacement of the oxygen of the potash, alumina, and silica by sulphur as the temperature is raised. These products may be decomposed by water under pressure and at a high temperature to give solutions of alkali, or they may be decomposed at ordinary temperature and pressure by weak acids.

Lithopone. P. Desachy, Paris. British Patent, 126,626. Convention date, October 19, 1917.

A mixture of barium sulphate and zinc sulphide is prepared by mixing together a solution of zinc sulphate and a solution of an alkali or such salt of an alkali metal as will produce an insoluble zinc salt, such as a sulphite, and then acting upon the resulting zinc hydroxide or zinc sulphite concurrently



with its formation by a solution of barium sulphide, from which a portion of the barium has been previously separated in the form of carbonate by treatment with carbonic acid. The zinc sulphate and alkali or sulphite solutions are brought to boiling-point in the tanks *a* and *b* respectively, and discharged into the mixing-tank *m* with continued heating. As soon as precipitation begins, the

barium sulphide solution is run in from the tank *c*, tests being made on the mixed liquor with lead carbonate paper to avoid employing excess of sulphide. The mixed precipitate of zinc sulphide and barium sulphate is preferably dried at 100° C., and calcined at about 850° to 900° C.

Hydrogen Manufacture. Compagnie Générale d'Electro-Chimie de Bozel, Paris. British Patent, 127,018. Convention date, November 17, 1915.

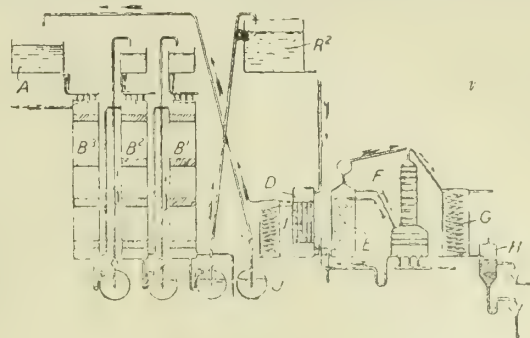
Hydrogen is prepared by reacting upon silicon or aluminium or compounds of these elements, with water containing an alkaline-earth base such as lime or baryta, and a small proportion of alkali, or alkali salt such as carbonate, acid or neutral sulphate, phosphate, sulphite, or hyposulphite.

Treating Mercury. G. B. Perez, Alicante, Spain. British Patent, 126,961. Convention date, May 15, 1918.

It is stated that gold and radium are obtained by the decomposition of mercury in Crookes's tubes by the action of radio-activity.

Recovering Volatile Solvents. A. Daniel and J. H. Bregeat, Paris. British Patent, 127,309. Convention date, July 8, 1916.

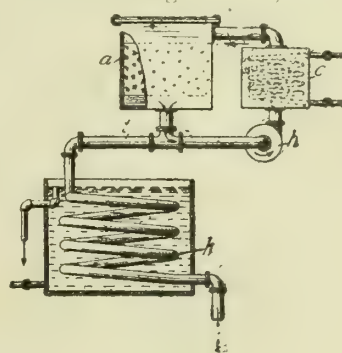
Alcohol, ether, or acetone are recovered from gaseous mixtures containing them—for example, in the manufacture of artificial silk, explosives, or artificial leather—by absorption in phenol or its homologues—*e.g.*, crude cresols,—and subsequent distillation and condensation. Using the apparatus shown, the vapours are washed by a counter-current of cresols



in washers *B*¹, *B*², *B*³; the cresol charged with alcohol, etc., is pumped to a reservoir *R*², and passes through a heat-exchanger *D* to a steam heater *E* and still *F*; the vapours liberated in the vessels *E*, *F* are condensed in the condenser *G* and flow to a separator *H*; the cresol returns through the heat-exchanger *D*, cooler *I*, and vessel *J* to the tank *A* for reuse. Instead of cresols, mixtures containing them may be used.

Recovering Volatile Solvents. F. I. du Pont, Wilmington, U.S.A. British Patent, 126,682. Convention date, January 4, 1917.

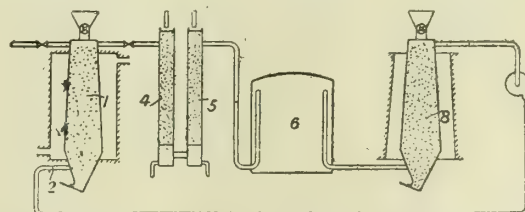
In recovering solvent, such as alcohol and ether,



from smokeless powder, etc., the powder is heated by air or vapour passed in a circuit comprising a container *a* for the powder, a pump *b*, and a heater *c*. Vapours evolved from the heated material escape through a side tube *i* to a condenser *k*. The circulating air or vapour is kept preferably at a temperature between the boiling-points of ether and alcohol,

Extraction of Metals. Norsk Hydro-Elektrisk Kvaestofaktieselskab, Christiania, Norway. British Patent, 126,951. Convention date, May 15, 1918.

Ores are reduced by carbonic acid which is obtained from carbon dioxide by interaction with a metallic sulphide according to the equation: $\text{FeS} + 3\text{CO}_2 = \text{FeO} + 3\text{CO} + \text{SO}_2$. The sulphide is heated in a container 1, and carbon dioxide



is blown in from a pipe 2 connected with the reduction chamber 8. The sulphur dioxide is removed in scrubbers 4, 5, and the carbonic acid enters a holder 6, from whence it flows to the reduction chamber.

FERTILISER NEWS.

(SPECIALLY CONTRIBUTED.)

Nitrate of soda.—Full particulars of the July shipments from Chili are not available at the time of writing, but as only 7,400 tons were exported in the first half of the month the total will not have been large; a few steamers having been chartered at high rates for early loading, an increase in shipments will probably be seen this month, with a further considerable expansion towards the end of the year when British tonnage is released for the nitrate trade. There is nothing doing on this side in the fertiliser, as it will not be wanted for application to the land until next spring, but chemical manufacturers are required to pay high prices in the open market; they might well be supplied on reasonable terms by the Ministry of Munitions in return for the great services rendered during the war. Some business is passing in Chili, chiefly by German sellers to American buyers, the prices varying from 8s. 7d. per quintal, f.o.b., for ordinary nitrate early delivery to 9s. for refined, 1920 shipments. These figures are far below those fixed by the Producers' Association referred to in our last issue.

French Synthetic Ammonia Departure.—A company called the Société d'Etudes de l'Azote has just been formed with a capital of 1,500,000 francs for the purpose of acquiring patents, licenses and processes for the production of synthetic ammonia. The offices are in Paris, at the Rue de Miromesnil, 16. The list of promoters of this company embraces some of the best known names in French industry.

Italian Fertiliser Prices.—Prices for fertilisers in Italy are as follows:—Mineral superphosphates, 14-16 per cent., 137 lire; bone superphosphate, 1-1½ per cent. nitrogen, from 3 to 3.40 lire per unit on wagon at Genoa; basic slag, 12-14 per cent. phosphoric anhydride, 30 lire; nitrate of soda, prompt, 94 lire; sulphate of ammonia, 20-21 per cent., 138 lire; degelatinised bones in powder, 16-16.50 lire, all per quintal.

Dutch East Indian Nitrogen Prospects.—An extensive search has been made in the Dutch East Indies for water power for electrical purposes. The result to date has been very encouraging, whilst the search continues. It is anticipated that by the end of the year about 2,000,000 H.P. will have been added to the known motive power of the Dutch East Indies, so that, as a Dutch journal observes, as far as water power is concerned, the possibility of establishing great nitrogen fertiliser concerns on as great a scale as in Scandinavia is placed beyond doubt.

Lack of Fertilisers for Russian Sugar.—Advices from Russia show that the sugar industry has a very sorry future before it on account of many causes, amongst which special mention is made of the complete absence, or nearly so, of any kind of fertiliser—either natural or artificial. The want of superphosphates is particularly felt. In fact the fields generally are being allowed to fall into a very backward condition.

Sulphate of Ammonia.—Export prices for this material show some irregularity, but the home demand is active. Although the present price is a higher one than British users have been accustomed to pay for a good long time now, the quotation is recognised as being comparatively low. The latest advices from the other side of the Atlantic state that conditions in sulphate of ammonia continue along the same steady lines that have been noted for some time past. Whilst there has been an absence of any trading in large quantities, sufficient business is passing to keep market prices firm.

Basic Slag.—The market in this material is brisk, and works are reported to be full of orders from those who desire to participate in the rebate for August delivery. So active is the demand, in fact, that it is said that the current output will be insufficient to cover these wants. At the same time those who may not be fortunate enough in getting deliveries will have the satisfaction of knowing in due course that their turn will come in the early autumn by the time they propose applying it. Supplies of higher grade slag are certainly limited. There is talk of a further rise in slag prices despite some increase in the make. Manufacturers' costs are undeniably heavy and buyers are getting such good prices for their own produce that it is said they should not mind paying a little more for this valuable fertiliser.

Superphosphate.—Prices for superphosphate are to be advanced after the August deliveries. The amount of material available does not appear to be as large as was expected and the limitation is making itself felt.

Potash.—There does not seem to be very wide trading in potash salts at present and prices, apparently, appear to be regarded by cultivators as high. The quotation of £40. 10s. is now mentioned for sulphate of potash, whilst nitrate of potash is at a figure that apparently precludes any possibility of use as fertiliser. American potash producers are still asking for protection against the feared foreign competition. Alsatian potash is reported to be now arriving more plentifully in the United States.

Other Fertilisers.—Holiday dulness has marked the trading in most other sections. Bone meal is firm, values being as last recorded, which means about £15. 10s. for East Indian meal, with lower figures for inferior grades down to about £9. 10s. There is no business doing in foreign tannage owing to the absence of supplies, and quotations are purely nominal. The same remarks may be applied with regard to the present position in dried blood.

SOUTH WALES NOTES.

(SPECIALLY CONTRIBUTED.)

Outputs of tinplates are slightly increasing, but the position is such that there is not much regularity in booking orders owing to the various disputes in the coalfield and also at many of the steelworks. It is a matter of great difficulty for the manufacturers to quote for any orders the execution of which would take some time to complete. Inquiries for plates are numerous and there is a great demand from the packing centres.

Operations have been resumed at the oxalic acid works of Messrs. Pritchard, Port Tennant, Swansea. A few weeks ago owing to some dispute with the plumbers work was suspended indefinitely or rather until the stocks of acid were reduced. Although there has been a somewhat better request for oxalic acid the prices have slightly fallen during the last few weeks, but there are indications that business will be much better in the near future. The Port Tennant factory is the oldest oxalic acid works in the country, and during the stoppage many important repairs and improvements have been made.

Those engaged in the patent fuel trade had only a short holiday, the demand for briquettes being so heavy, especially from foreign customers. Cargoes were dispatched from Cardiff to St. Nazaire, Rouen and Morlais. The Swansea shipments were above the average and included cargoes for Naples, Casa Blanca, Buenos Ayres, and Alicante.

So far there has been no damping down of coke ovens at Ebbw Vale but the position, owing to the stoppage of the furnaces, has now become acute and there is yet no prospect of the works being restarted in the immediate future. Other coke ovens are working regularly and the yields of sulphate of ammonia are being fully maintained at present.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

(SPECIALLY CONTRIBUTED.)

The outlook has brightened somewhat this week, rail makers on the West Coast having succeeded in booking orders which, if the labour situation allows, will enable them to keep their rolling mills in operation for some months to come. It is obvious, therefore, that there can be no immediate reduction of output of ordinary iron, and in that case, of course, the by-product coke ovens will continue to work if only at two-thirds of their capacity. It is still hoped, however, that there may yet be forthcoming such a pressure on steel-makers here as to compel an increase in the make of ordinary iron. The practicability of that step depends, again, upon output at the iron-ore mines and upon imports of Spanish ore. At present both sources of supply are below normal. It has been difficult this week to get sufficient coal for the coking plants on account of the holidays, and if work was not resumed at mid-week it was feared that there may be a shortage next week. The make of by-products has fluctuated slightly, but, except as regards benzole and sulphate of ammonia, the whole production of which is fully absorbed, it is in excess of demand. Creosote is being shipped at Maryport for Spain, and a good deal of it is going to home users. Pitch is fairly firm, but there are considerable stocks to dispose of yet. The chemical works here have no market for pyridine, and naphthalene is in but slight demand.

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 4, Queen Anne's Gate Buildings, London, S.W.1, whence further information may be obtained:—

Belgium.

An agent in Liège desires to secure an agency, with depot, for the sale of industrial chemicals and pharmaceutical products. The inquirer has specialised in the study and analysis of chemical products. (Reference No. 212.)

A Belgian inquirer desires an agency, in Belgium, for United Kingdom firms dealing in pharmaceutical, veterinary, and industrial chemical products, and optical, photographic, and scientific instruments and material. (Reference No. 229.)

A Belgian-born subject, with showroom and store in Brussels, and travellers throughout Belgium, North of France and Luxembourg, desires to secure agencies for fine chemicals and drugs, varnishes, cold glues, etc. (Reference No. 231.)

H.M. Consul-General at Antwerp has forwarded a supplementary list of Belgian firms (buyers and agents) desiring to establish business relations with United Kingdom manufacturers of the following goods:—

GOODS REQUIRED.

Heavy chemicals; starch and dextrine, grinding, mixing and crushing material for making plant, oil for paint, linseed oil, arachide oil, chemicals, drugs, perfumery, optical goods, fertilisers, oils (vegetable), leather scrap, bone powder, all kinds of guano, and sulphate of ammonia, anti-corrosive and anti-fouling compositions, lead, tin, and tin plate.

AGENCIES DESIRED.

Chemicals, paint and varnish, ultramarine blue, extracts for tanners and dyers, white-lead and linseed oil, soft pig lead, antimony.

Communications in connection with the foregoing inquiries should be addressed to the Belgian Trade and Reconstruction Section of the Department of Overseas Trade, Canada House, Kingsway, London, W.C.2. (Reference No. 3742 T. and R.)

United States.

A firm of commission merchants, exporters and importers in New York, desire to become the purchasing or selling agents of United Kingdom manufacturers of, or dealers in, chemicals, drugs, dyes, and allied products. Firms should state the amount of subsidies and commission allowed, if cabling costs are paid by them, and whether they are prepared to make offers of parcels as opportunities arise. (Reference No. 262.)

Spain.

A merchant of Malaga desires to secure an agency in the Malaga district for a United Kingdom house manufacturing drugs and pharmaceutical products. (Reference No. 248.)

Switzerland.

An agent at Bâle wishes to represent United Kingdom firms dealing in chemicals, drugs, etc. (Reference No. 252.)

Peru.

The agent of a United Kingdom firm of exporters, is on a visit to England for the purpose of developing business generally and arranging for sole agencies in particular for chemicals. (Reference No. 268.)

ACID STILL FATALITY.—The Flintshire coroner conducted an inquest at Flint regarding the death of John Henry Martin, chemical labourer, who was killed last week owing to the collapse of an acid still at the works of the United Alkali Company. From the evidence it appeared that deceased and two other men were standing on the top of the still, and were engaged in losing the stones, when a wedge slipped, and the whole still then collapsed. Martin was practically killed outright, and Williams, who was assisting him, sustained severe injuries. A works engineer stated that he had examined the top stone and found a flaw in it, and in his opinion this caused the accident. Williams, who was in charge of the job of demolishing the still, was a very careful man, and always inspected a job beforehand. A verdict of "Accidental death" was returned.

GAZETTE NEWS.

LIMITED COMPANIES.—Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions, Orders, and Official and Other Notices.

Low Moor Munitions Company, Ltd.—Resolved June 26, confirmed July 21: That the company be wound up. J. Herschel, 39, Well Street, Bradford, liquidator. Meeting of creditors at liquidator's, August 6. Claims to liquidator by September 6.

Treburland Wolfram and Tin Company, Ltd., London, E.C.—Resolved July 16: That the company be wound up. T. D. C. Parker, 87, Bishopsgate, E.C., liquidator.

DISSOLUTIONS OF PARTNERSHIP.

(Note.—When two dates are given in the following announcements, the first is the date of the dissolution. The date in parentheses is that of the official advertisement.)

Bowley, S., and Son (Joseph Jno. Bowley, deceased, and Joseph Plunkett Bowley), Wellington Works, Wellington Road, Battersea Bridge, oil importers and refiners. August 21, 1918. (July 22.)

Lower Lansalson China Clay Company (Wm. Jas. Adams and Jno. Stephens, as trustees of Rchd. Frdk. Stephens, deceased; Wm. Jas. Kelly, Hart Nicholls, sen., Hart Nicholls, Jun., as trustee of Tom Nicholls, deceased; Hy. Pinch and Arthur Maunder Richards, as trustee of Rchd. Richards, deceased), St. Austell, china clay merchants. July 1. Debts will be received and paid by H. N. Wright, St. Austell, solicitor, liquidator of the firm. (July 25.)

Skilbeck Brothers (Geo. Thornton Skilbeck and Chas. Thornton Skilbeck), 205, Upper Thames Street, E.C., dry-salters. December 31, 1918. Debts by C. T. Skilbeck, who continues. (July 25.)

CORRESPONDENCE.

*** We do not hold ourselves responsible for the opinions expressed by our correspondents.*

Patents, Designs, and Trade Marks.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—The Council of the Chartered Institute of Patent Agents desire to draw the attention of those interested in the protection of industrial property to articles 306-311 of the treaty of peace.

According to these articles, extensions of time are given for performing any act for the maintenance or obtaining of patents, designs, trade marks, or other industrial property in enemy countries, and also in Allied countries, which ought to have been accomplished during the period of the war—that is, since August 1, 1914. Moreover, rights of priority under the International Convention, which had not expired before August 1, 1914, may still be claimed.

It would be advisable for any person interested in any such matters to communicate at once with his patent agent, in order that he may be further advised in ample time to do what is necessary. Patent agents are now authorised to communicate with the former enemy countries, and to transact business relating to industrial property.—Yours, etc.,

H. THOMPSON, Secretary.

Staple Inn Buildings, London, W.C. 1, August 1, 1919.

BOOKS RECEIVED.

Welfare and Welfare Supervision in Factories and Workshops. Issued by the Home Office. London: H.M. Stationery Office. 1919. 2d. net.

Metrology in the Industries. Report of recent discussion before the Physical Society of London. London: Fleetway Press, Ltd. 1s. 2d., post free.

"An Apology for War Work." Messrs. Edgar Allen and Co., Ltd. A booklet containing in narrative form a very interesting record of their vast efforts during the war.

MARKET REPORTS.

FRENCH CHEMICAL MARKET.

PARIS, July 29.

Business has been quiet. Stocks are now somewhat reduced and if general conditions were more settled, trade might be resumed to a greater extent. However, under the prevailing circumstances, buyers are exceedingly cautious and business is entirely of the hand to mouth kind. The situation of English industry has, of course, been keenly watched and the crisis in the mining industry has been a foremost topic. The effect has been felt on the market by hardening prices of chemicals imported from England. As a whole, prices have been very firm. It would be idle to try to foresee the course of events, but the situation is sufficiently serious to require close examination. Caustic soda is much less abundant and, though manufacturers' prices for the 75/76 grade remain at 60 francs per 100 kilogs, delivered free buyer's station (equal to £17. per ton, c.i.f., Channel port), available lots have been sold at fully 10% more. Soda ash is also less freely to hand, whereas the production of bicarbonate of soda is sufficient at unchanged prices. Sodium sulphide is well asked for and is not produced in sufficient quantities, notwithstanding Customs duties amounting to £4. per ton; large quantities have been imported, mostly from Belgium, at a value of 75% of the cost of home manufactures. Hyposulphite of soda is manufactured in rather large quantities, leaving a certain margin for export; manufacturers' prices are 65 francs per 100 kilogs for the commercial quality and 70 francs for photographic purposes. Glauber salts are somewhat scarce, though manufacturers in the North of France are now able to produce again, but only in limited quantities. Sodium fluoride, which is mostly used by railway companies, is also manufactured in sufficient quantities for home use, imports from America being now practically nil. The same applies to sulphite of soda, whereas the demand has been rather good in bisulphite of soda powder, 60/62%. This chemical has been imported from England in fair quantities at an average price of £29. per ton c.i.f. French port. Liquid ammonia is still very scarce, but it is expected that French manufacturers will be able to meet the demand soon. Meanwhile import from England has been quite active. Salammuniac in lumps is in good demand at unchanged prices whereas the powder is still very dull. The requirements in carbonate of ammonia are increasing and imports from England and Holland have been rather important. Arsenic is dull and left aside. Borax is exceedingly scarce as previously and very high prices have been paid for available lots. Chloride of calcium is quiet. The demand for chloride of lime is important, home manufacturers being able to supply most of it. However, some quantities have again been imported from England, at reduced prices, ranging from £12. to £14. per ton c.i.f. French port. Phosphate of lime is a little more active, whereas carbonate of lime is quiet. Stocks of naphthalene are large, and the demand is nil; flakes especially find no buyers at all. Carbonate of magnesia is quiet, but business has been concluded in chloride of magnesium and commercial epsom salts. The price of mercury is below the London quotation and trade has been very quiet. The same applies to vermillion. Phosphate of ammonia is in very good demand, at higher prices, but phosphate of soda is entirely left aside, the Paris wholesale price being now 85 francs per 100 kilogs equal to £22. per ton c.i.f. French port. Salacetos is in moderate demand at unchanged prices. White sugar of lead is scarce, but the demand is small; most orders have been placed with American manufacturers at low prices. White lead is in very great demand; home manufacturers, like English and American producers, can deliver only with great difficulty. Import from Spain has been fairly important. Red lead and litharge are in fair request. Potassium salts are far from being abundant, but for previously explained reasons, buyers are very reluctant and hesitate to order at present high prices. The demand has been important in carbonate of potassium (98.99%), caustic potash, metabisulphite and permanganate of potash. Alsatian mines produce now important quantities of natural salts and chloride of potash, but are not in a position to deliver the above mentioned chemicals. Sulphur is in fair demand. Chloride of zinc is still dull, but sulphate is more active and scarce; also lithopone and zinc oxide. American lithopone has been again imported in large quantities. Zinc dust has been quiet, export to England having kept at the normal level. Amongst mineral acids, mention may be made of muriatic which is very scarce and offered at high prices. Sulphuric is still abundant. Acetic is rather scarce. In nitric

acid, production and demand are normal, at unchanged prices. Imports took place chiefly in phosphoric acid. Amongst organic acids, oxalic and lactic acids are scarce. Imports of tartaric and citric acids from Italy have been rather active. Customs duties have been again revised, but the change is little. The overtax will not be calculated *ad valorem*, but the existing duties are to be multiplied by a coefficient (ranging for chemicals between 1.4 to 3) which doubles and trebles the former duties.

TAR AND AMMONIA PRODUCTS.

WEDNESDAY.

Benzole: London, 90%, 2s.; North, 1s. 10d. to 1s. 11d.; 50%, 1s. 10d.; North, 1s. 9½d., naked. Carbolic acid, crude, 60%, East and West Coast, nominally 1s. 5d. to 1s. 6d.; crystals, 30-40%, 6d. to 6½d., f.o.b. Crude tar, London, 45s. to 60s.; Midlands, 44s. to 46s.; North, 45s. per ton, ex works. Pitch, 72s. 6d. to 75s.; East Coast, 65s., f.o.b.; West Coast, 53s. to 55s., f.a.s. Solvent naphtha, naked, London, 90-190%, 2s. 5d.; North, 2s. 3d. to 2s. 4d.; 90-160%, naked, London, 2s. 1d.; North, 1s. 10d. to 1s. 11d. Crude naphtha, naked, 30%, 9d.; North, 8d. Refined naphthaline, £18. to £22.; salts, £6. to £7. Toluol, naked, London, 2s. 6d.; North, 2s. 5d. Creosote, naked, London, 6½d.; North, 5½d. to 6d.; heavy oil, 6½d. to 7d. Anthracene, 40-45%, 6d. per unit. Cresylic acid, 95%, 2s. 7d. to 2s. 8d.; 97-99%, 2s. 9d. to 2s. 10d., ex works, London, and f.o.b. other ports. Sulphate of ammonia: Home trade, £19. 10s. per ton; basis 24½%. Nitrate of soda, £21. to £22.

FERTILISER MATERIALS.

LIVERPOOL, THURSDAY.

Nitrate of soda is again easier on spot, and the price of 95-96% quality is now £20. 2s. 6d. per ton, net cash, f.o.r., prompt delivery. East Indian Bone Meal: Shippers still maintain a firm attitude, and the nearest value of 41% ammonia and 52% phosphates, August-October shipment, is now £15. per ton, net cash, ex ship, Liverpool. On spot, Liverpool, holders require £15. per ton, net cash, for 41% and 45% quality. Mineral Phosphates: No alteration is to be reported in this market, and values are at present only nominal. Dried Blood: This article is scarce, the value being about 30s. per unit of ammonia per ton, net cash.

LONDON METAL MARKET.

THURSDAY.

Copper: Standard brands, £96. to £96. 5s., cash; £97. to £97. 5s., three months; electrolytic, £108. to £123. Tin: Standard, £276. to £276. 10s., cash; £263. to £263. 10s. three months; Straits, £280; English, £273. to £274. Lead: Soft foreign, £24. 15s.; English, £26. Spelter, £39. 10s.; hard, £31. to £32. Antimony, English regulus, 90%, £42. Aluminium, £150. Nickel, £205., delivered, packages extra. Quicksilver, £23. to £23. 10s. Bismuth, 12s. 6d. Platinum, 442s. per oz. Wolfram, 30s. per unit.

MANCHESTER CHEMICAL MARKET.

THURSDAY.

Business generally during the past week has been fairly satisfactory, both for home and export, and values all round are steadily maintained. Resale lots of caustic soda, 70%, are still obtainable at £17. 10s., but 58% alkali is dearer at £6. 15s. to £7. per ton. Refined bicarbonate of soda, bags, unaltered at £8. per ton, f.o.b. Bleaching powder easy at £15., softwoods, on rails. Chlorates are dull at 7d. and 1s. 1d. for soda and potash respectively. Bichromates in good request at recent rates. Salteake firm at 60s. per ton, carriage paid. Recovered rock sulphur, £17. per ton, on rails. There is no change in copper sulphate, and export price continues nominal at £45. per ton, f.o.b. Commercial hyposulphite of soda is steady at £16. 10s., on rails, and pea crystals at £22. per ton. Phosphate of soda quiet at £25. 10s. per ton. Concentrated sodium sulphide, 60-65%, in casks, lower at £19. 10s. per ton. Nitrite of soda higher at £60. per ton. Supplies of white arsenic continue scarce, and price only nominal at £50. per ton. Yellow prussiate of potash firm at 1s. 9d. per lb. Soda is moving more freely at 7½d. per lb. Lead salts are in better demand, and quotations are steady: white acetate at £85. and brown £75. per ton. Nitrate, £57. per ton. Acetic acid and acetate of soda are quiet and unchanged. English brown acetate of lime is dearer at £11. per ton. American grey firm at £19. per ton. Miscible and solvent wood naphtha have a lower tendency. Oxalic acid, 1s. 2½d. to 1s. 3d. per lb. Permanganate of potash, English, is now quoted at 3s. 9d. per lb. for B.P. grade.

SWANSEA MARKET REPORT.

THURSDAY.

The prices of tinplates were firmer and standard size boxes were quoted at 33s. 3d. f.o.b. cas^t in 14 days. Copper prices were irregular and for immediate delivery small lots sold at £104. per ton. Tin £266. per ton cash, and slightly cheaper three months. Lead: Spanish £24.; English £25. per ton. Spelter £41. Antimony, English regulus, 90%, £40. Quick-silver £23. 5s. 0d. per bottle. Aluminium £150. Nickel in better request at £205., including delivery London or equal. Galvanised sheets (24g) £28. 10s. 0d. per ton f.o.b. Zinc sheets £65. f.o.b. New York. Pitch firm at 53s. per ton. Sulphate of ammonia £19. 10s. per ton, with steady sales for home demands. Nitrate of soda firm at 21s. 6d. per cwt. in bags. Arsenic in better request at £46. per ton for white powdered in bags f.o.b. Sulphate of copper remains quiet at £45. per ton for home purposes and £47. 10s. 0d. export in casks, f.o.b., less 5%. Turpentine 109s. per cwt. prompt cash. Bone meal dull at 14s. 3d. per cwt. Oxalic acid quiet at 1s. 2d. per lb.

LIVERPOOL CHEMICAL MARKET.

THURSDAY.

The chemical and produce markets have been disturbed since Tuesday by the strikes and riots with which the order loving element of the communities at Liverpool and the other Merseyside towns have had to contend. Since Saturday, a large force of soldiers, with "tanks" and full war equipment, may be said to have held the district. On Tuesday, business was resumed as far as could be, but the possibility of unfavourable developments of the labour crisis had a very repressing effect, and kept the markets quiet. Inquiries have come in to an extent that has shown that apart from these disturbances, trade is fairly good and chemical products are wanted largely. Bleaching powder has had a moderate inquiry, and is £14. 10s. to £15. per ton, free on rail or conveyance, in buyers' packages, and £17. per ton for export. Chloride of calcium has been quiet, and is £8. to £11. per ton in casks, f.o.r. Caustic soda has been in fair request, and is £24. per ton for 76%, £22. per ton for 70 to 72%, and £19. per ton for 60 to 62%. Nitrate of soda has been quiet and is £20. 10s. to £21. 10s. per ton. Saltcake has been but little called for and is £6. 10s. per ton in casks, f.o.b. Soda crystals have met with a rather good inquiry and are £5. per ton, in 2cwt. bags, f.o.r. at works. Bicarbonate of soda has been in fairly active demand and is £7. 5s. to £10. per ton, according to terms of delivery. Borax has been in very fair request and continues in light supply. Prices are £42. per ton for ordinary, and £44. per ton for powdered, in bags. Ammonia alkali has been in good request, and is £6. to £6. 5s. per ton, f.o.r. at works. Hyposulphite of soda has been quiet and is £19. to £20. per ton for ordinary, in crystals, and £25. per ton for pea crystals, in 1cwt. kegs. Sulphite has been inactive and is £11. per ton for ordinary and £18. to £19. per ton for pea crystals in 1cwt. kegs. Bichromate of soda has been but little in request and is 9d. per lb. Phosphate of soda has been very quiet and is £25. per ton. Sulphide of sodium has moved but slowly, and is £20. per ton in casks, and £22. per ton in drums. Chlorate of potash has had a moderate inquiry and is 1s. 1d. to 1s. 3d. per lb. Permanganate of potash has been in fair request and is 3s. 6d. per lb. Sulphate of potash has been neglected and is £40. per ton. Carbonate of potash has been quieter and is £85. to £90. per ton, for 80 to 85%. Caustic potash has had a more limited sale and is £90. to £100. per ton for 35° Bé. Nitrate of potash continues to meet with a very fair inquiry and is £50. to £58. per ton for refined and £40. per ton for ordinary. Canadian potashes have been inactive. Montreal first quality are £200. to £220. per ton and second quality, £190. to £210. per ton. Bichromate of potash has been quiet and is 1s. 6d. to 1s. 7d. per lb. Yellow prussiate of potash has been but little called for and is 1s. 9d. to 1s. 10d. per lb. Salammoniack has been in moderate request and is £80. per ton for lump, £75. per ton for seconds, and £5 extra per ton for ground. Sulphate of ammonia has been very quiet and is £19. 10s. per ton, less traders' discount of 10s. per ton, free to nearest wharf or railway station; to September 30. Carbonate of ammonia has been but little in request, and is 6½d. per lb. Muriate has been inactive and is £50. to £60. per ton according to quality. Magnesia has been in fair request. Carbonate is £3. 10s. per cwt., and sulphate £10. to £16. per ton, according to grade. Alum has met with a fairly active inquiry and is £18. 10s. per ton for the home trade, and £18. 10s. to £19. 10s. per ton for export. Aluminoferric has been but little in demand and is £8. 10s. to £12. per ton, according to quality. Sulphate of alumina

has been very quiet and is £12. to £17. per ton, according to grade. Sulphur has been in moderate demand, and supplies are still light. English kinds are: Flowers, £32. per ton; roll, £28. per ton; and rock, £22. per ton, in bags, f.o.r. Sicilian grades are: flowers, £28. per ton; roll, £22. 10s. per ton, and third quality, £17. 15s. per ton. Cream of tartar has been in very fair request, and is £11. 5s. to £11. 10s. per cwt. Tartaric acid has been rather more in demand and is 3s. 1d. per lb. Boracic acid has been quieter and is £72. per ton for crystals, and £74. per ton for powdered. Oxalic acid has been in limited demand, and is 1s. 3d. per lb. Magnesia carbonate is £3. 10s. per cwt. Citric acid has been in somewhat freer request, and is 4s. 4d. per lb. White acetate of lead has been very quiet and is £85. to £90. per ton. Arsenic has been but little called for and is £48. to £50. per ton for white powdered. Sulphate of copper has had a moderate sale on home trade account. For farm purposes in the United Kingdom it is £45. per ton, and for export, £47. to £48. per ton, less 5%, in casks, f.o.b. at Liverpool.

TYNE CHEMICAL REPORT.

TUESDAY.

Business in heavy chemicals continues fairly brisk, the demand for consumption for home trade being good; there is also more inquiry for export. Sulphur very scarce and firm. Soda crystals locally in steady request at £5. per ton 2cwt. bags. The following prices are per ton net: Bleaching powder, softs, and hards, £15. per ton net; caustic soda, 74/77%, £23. 5s., do. 70%, £22.; do., 60%, £20.; recovered sulphur, 2cwt. bags, £23.; hyposulphite of soda, 5/7cwt. casks, £19.; 1cwt. kegs, £25.; sulphite of soda, 5/7cwt. casks, £12.; do., 1cwt. kegs, £20.; silicate of soda, 75 Tw., £9. 12s. 6d.; do., 100 Tw., £10.; do., 140 Tw., £10. 10s.; soda crystals, 2cwt. bags, £5.; sulphate of soda (salt cake) in bulk, £3. 10s.; pure white sulphate of alumina, 14/15%, £19. 10s.; blanc fixe, £22.; chloride of barium, £27.; sulphide of sodium, crystals, £18.; do., refined concentrated solid, 60/62%, £25; hydrate of barium, crystals, £56.

COALS.—Market is quite unsettled and business extremely difficult—very little work has been done at the majority of the pits over the week-end. Quotations for neutral markets are about: Best Northumbrian steam, 85s. to 90s. per ton; best Northumbrian small coals, 45s.; best Durham gas coals, 70s.; seconds, 67s. 6d.; Durham bunker coals, 60s.; foundry coke, 70s. to 75s.; gas coke, 72s. 6d. to 77s. 6d.

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Wednesday.

Glasgow only officially celebrated Peace on Monday of this week and this consequently led to a stoppage of business generally for the time being. By Tuesday morning, however, business was again more or less in full swing; but the general tone in the chemical and other markets during the week has been quietish. Only a moderate number of orders have been passing within the last few days and prices generally have been on a steady level. Current quotations are:—Arsenic £42. per ton net, Glasgow; bicarbonate of soda, £8. 15s. and £10. per ton for 6-8 casks and 1cwt. kegs, Liverpool; boracic acid crystals, English refined, £72. for 2cwt. bags, and borax crystals, £39. for 2cwt. bags, carriage paid; caustic soda, white, 70-72%, £24. per ton, net, Glasgow; chlorate of potash, 1s. 1d. per lb., net, Glasgow; chlorate of soda 9d. per lb., net, Glasgow; citric acid, 4s. 4d. per lb., 5%, Glasgow; cream of tartar, 83%, £11. 5s. per cwt., net, Glasgow; salammoniack, £80. and £75. per ton, net, any port, for first and second lump respectively; salammoniack crystals £35. per ton, net, Glasgow; saltpetre, £3. 4s. net, Glasgow; tartaric acid, 3s. 1d. per lb., 5%, Glasgow.

In the sea oil section there are no special points of interest at the moment and the chief feature is the scarcity of supplies. Among the whale oils, for instance neither pale, yellow, nor brown varieties have this week been on offer: while what has been available of the black variety has maintained a steady tone at 78s.—which is about 2s. higher than the quotation about a month ago. Neither Newfoundland cod, pale seal, nor Menhaden have been on offer at all and generally the feeling pervading this section of the market is one of inactivity.

There was no change as far as the coal market in the Glasgow and West of Scotland is concerned and demand keeps somewhat quiet. Supplies of most kinds of coal are coming forward fairly well, but both from the domestic and industrial side there is a quiet feeling pervading the market.

IMPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

GLASGOW.

Week ending August 2.

BARYTES—
Valencia and Barcelona, 250 brls.
CREAM OF TARTAR—
Valencia and Barcelona, 4 cs.
DYESTUFFS (otherwise undescribed)
New York, 1 brl.
IRON PYRITES—
Huelva, 2,818 t.
LITHOPONE—
New York, 1,112; Philadelphia, 250 brls.
OCIRE—
Philadelphia, 320 brls.
SILICO MANGANESE—
Gothenburg, 7 cs.
SOAP—
New Orleans, 1,100 brls.; Philadelphia, 800 brls.; 2,200 bxs.; New York, 100 brls.
TALLOW—
Montreal, 200 tes.
WHITE LEAD—
Philadelphia, 41 pkgs.
ZINC OXIDE—
Boston, 2,000 brls.; N. York, 50 brls.

GOOLE.

Week ending August 2.

CARBON (DECOLOURISING)—
Amsterdam, 21 bgs.
OXALIC ACID—
Rotterdam, 8 cs.
POTASSIUM PRUSSATE—
Amsterdam, 3 csks.

GRANGEMOUTH.

Week ending August 2.

MAGNESITE—
Christiania, 610 bgs.

HULL.

Week ending August 2.

ACETATE—
New York, 100 brls.
BORAX—
New York, 350 bgs.
CRYOLITE—
Copenhagen, 1 cs.
CYANAMIDE—
Trondhjem, 5 bgs., 4 drms.
FERRO CHROME—
Trondhjem, 63 pkgs.
GLUE—
Rotterdam, 20 bgs.
MANGANESE ORE—
Bombay, 1,200 t.
NITRATE—
Dunkirk, 46 cks.
OXALIC ACID—
Fredriksstad, 20 cks.
POTASH—
New York, 30 cks.
ROSIN—
New York, 500 brls.
TAR (WOOD)—
Trondhjem, 100 brls.
TURPENTINE—
Gothenburg, 20 cks.
WOOD OIL—
Trondhjem, 131 brls.

LIVERPOOL.

Week ending August 2.

BARYTES—
Barcelona, 1,000 sks.
CANDELLILLA WAX—
New York, 56 bgs.
CHEMICALS (otherwise undescribed)
New York, 56 pkgs.
CREAM OF TARTAR—
Oporto, 25 cks.
DEXTRINE—
Philadelphia, 215 bgs.
DYESTUFFS—
Dyewood Extract
Philadelphia, 100 bxs.
Fustic
Kingston, 4 t.
Logwood Crystals
New York, 156 brls.
Myrabolans
Bombay, 3,667 bgs.
Quebracho Extract
Buenos Ayres, 3,596 bgs.
Tanning Extract
New York, 30 brls.
Valonia
Algiers, 248 bgs., 50 t.
LITHOPONE—
New York, 150 brls.; Philadelphia, 224 brls.
MAGNESITE—
Linn, 7,300 t.; Montreal, 23 bgs.
MANGANESE ORE—
Bombay, 1,000 t.
OCIRE—
Rouen, 83 cks.
OXIDE—
New York, 1 cs.
SOAP—
New Orleans, 500 brls.; New York, 20 cs., 850 brls.
STEARINE—
Philadelphia, 115 bgs.
TALLOW—
Montreal, 120 tes.; Philadelphia, 433 brls.
WAX—
Montreal, 9 cs.; New York, 117 brls.
ZINC OXIDE—
New York, 500 brls.
ZINC WHITE—
Rotterdam, 80 brls.

LONDON.

Week ending August 2.

ACETIC ACID—
Canada, 105 pkgs.
AMMONIUM PHOSPHATE—
U.S.A., 104 brls.
ARGON GAS—
U.S.A., 2 cs.
BARIUM SULPHATE—
Spain, 1,400 bgs.
BARYTES—
Spain, 500 bgs., 1,348 cks.; U.S.A., 370 cks.
BEES WAX—
British India, 11 cs.; Pt. E. Africa, 263 blks., 216 pkgs.
BORIC ACID—
Italy, 100 cks.
CARBON BLACK—
Japan, 5 cks.; U.S.A., 2,000 cs.
CARNAUBA WAX—
Brazil, 35 bgs.; U.S.A., 37 t. 19 c.
CHEMICALS (otherwise undescribed)
Italy, 3 pkgs.; France, 2 cks. 1 cs.; Holland, 14 cs.; Switzerland, 1 cs.
CHROME ORE—
Japan, £140.
CITRATE OF LIME—
Italy, 167 cks.; Spain, 20 drms.
CITRIC ACID—
France, 20 pkgs.; Italy, 10 pkgs.
CREAM OF TARTAR—
Spain, 12 pkgs.
DYE EXTRACT (otherwise undescribed)
China, 100 cs.
DYESTUFFS (otherwise undescribed)
Switzerland, 475 pkgs.
DYESTUFFS—
Aniline Dye
Switzerland, 25 pkgs.
Annatto
B.W.I., 260 bgs.
Cochineal
Canary Islands, 16 pkgs.
Indigo
British India, 13 chts.
Myrabolan Extract
British India, 1,231 pkgs.
Myrabolans
British India, 2,531 pkgs.
Sumac
Italy, 235 pkgs.; Switzerland, 23 pkgs.
Tanners' Bark
Natal, 331 kgs.
Tanning Extract
France, 5 cks.
Tartars
Italy, 85 cks.; Spain, 60 brls.
Turmeric
British India, 211 pkgs.
FORMIC ACID—
Holland, 173 pkgs.
GELATINE—
France, £2,261.; Holland, £847.
GLUE—
France, £750.; U.S.A., £133.
GLYCERINE—
New Zealand, £500.
GLYCERINE (DISTILLED)—
Holland, £450.
HYDROGEN PEROXIDE—
Switzerland, 20 pkgs.
KETONE—
Canada, 22 drms.
LITHOPONE—
Holland, 100 cks.
MANGANESE ORE—
British India, £1,960.
METHYL ACETONE—
Canada, 13 t. 2 c.
METHYL ALCOHOL—
Canada, 10,965g.
METHYL ETHYL KETONE—
Canada, 10 drms.
MINERAL WAX—
U.S.A., 3 t. 2 c.
PARAFFIN WAX—
U.S.A., 1,002 t. 9 c.
PIUMBAGO—
Cape, 1 cs.; Japan, 159 cks.

POTASSIUM PRUSSATE—
Holland, 35 pkgs.

PYROGALLIC ACID—
Canada, 9 cs.

QUININE—
Java, 873,024.

ROSIN—
France, 100 cks.

SOAP—
Channel Islands, £21.; France, £40.; Java, £56.; Spain, £200.; U.S.A., £10,232.

SODA—
U.S.A., 1 t.

STEARINE—
Argentina, 158 tres.; Victoria, 16 pkgs.

SULPHUR—
Italy, 359 pkgs.

TALLOW—
China, 199 t. 10 c.; N.S.W., 1,333 t. 15 c.; New Zealand, 408 t. 2 c.; Queensland, 1,018 t. 19 c.; S. Australia, 53 t. 1 c.; Victoria, 84 t. 19 c.

TANNIC ACID—
Canada, 25 brls.; U.S.A., 28 brls.

TAR—
Sweden, 140 cks.

TARTARIC ACID—
Italy, 60 pkgs.

WHITE LEAD—
Japan, 10 cs.; U.S.A., 4 drms., 1 kg., 372 brls., 35 cks.

ZINC OXIDE—
Belgium, 600 brls.; Holland, 53 cks.

MANCHESTER.

Week ending August 2.

BAUXITE—
Marseilles, 168 t.
CHEMICALS (otherwise undescribed)
Marseilles, 45 brls.
MURIATE OF LIME—
Skein, 20 cks.
PHOSPHORUS—
Skein, 1 cs.
ROSIN—
Pasages, 1,833 brls.
SOAP—
Boston, 1 cs.; Marseilles, 5 cs.
SODIUM MURIATE—
Skein, 114 cks.
TARTARIC ACID—
Marseilles, 45 cks.

NEWCASTLE-ON-TYNE.

Week ending August 2.

ZINC ASH—
Copenhagen, 75 t.

N. & S. SHIELDS.

Week ending August 2.

FERRO SILICON—
Christiania, 1 cs.

STOCKTON-ON-TEES.

Week ending August 2.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

GLASGOW.

Week ending August 2.

AMMONIUM MURIATE—
New York, 20 t. 8 c.

AMMONIUM SULPHATE—
Algiers, 5 t. 1 c.

CHEMICALS (otherwise undescribed)
Antwerp, 267 pkgs.; Alexandria, 22 t. 13 c.; Buenos Ayres, 1 t.

CHEMICALS (otherwise undescribed)
Montreal, 40 t.

COAL PRODUCTS (otherwise undescribed)
Antwerp, £1620.; Alexandria, £77.
B. Ayres, £25.; Rouen, £164.

DISINFECTANTS (otherwise undescribed)
Algiers, 1,290 galls.

DYESTUFFS (otherwise undescribed)
Alexandria, £3,657.; Havre, £1,280.

MAGNESIA (CALCINED)—

Montreal, 5 t.

MAGNESIUM CARBONATE—

Havre, 14 t. 19 c.

MANGANESE CHLORIDE—

New York, 2 t.

MINERAL PITCH—

New York, 25 t. 16 c.

PARAFFIN WAX—Antwerp, \$350.; Havre, 4 t.;
Nantes, 3 t.**POTASSIUM BICHRONATE**—

Alexandria, 2 t.

RED LEAD—

Malta, 1 t.

SHEEP DIP—

Buenos Ayres, 67 t. 15 c.

SOAP—Antwerp, 20 bxs.; Havre, 300
bxs.; Montreal, 10 bxs.**SPERMACEETI WAX**—

Rouen, \$73.

WHITE LEAD—

Algiers, 2 t. 9 c.

GOOLE.Publication of Official Returns
Suspended.**GRANGEMOUTH.**

Week ending August 2.

NIL.

GRIMSBY.Publication of Official Returns
Suspended.**HULL.**

Week ending July 29.

ALUM—

Wyburg, 14 cks.

AMMONIUM SULPHATE—

Pasages, 13 cks.; Rotterdam, 62 cks.

BARYTES—

New York, 34 t.

BEES WAX—

Antwerp, 29 bgs.

BLEACHING POWDER—

Bilbao, 156 brls.; Melbourne, 83 drms.

CHEMICALS (otherwise undescribed)

Antwerp, 13 cks.; Amsterdam, 10 drms.; Christiania, 60 cs., 23 cks.; Copenhagen, 11 cs.; Gothenburg, 4 cks., 7 kgs., 54 drms.; Helsingfors, 13 cs., 504 cks., 2 brls., 6 drms.; Hango, 13 cs.; New York, 16 t., 4 drms., 45 cks.; Rotterdam, 1 cs.; Stockholm, 2 cs., 34 cks., 60 bgs.

COAL PRODUCTS—

Benzole

Christiania, 16 drms.

Creosote

Christiania, 20 brls.

Naphthalene

Calais, 1 ck.

Pitch

Antwerp, 140 t.

DISINFECTANTS (otherwise undes.)Copenhagen, 1,000 drms., 11 cs.;
Sydney, 100 cs.**DYESTUFFS (otherwise undescribed)**

Christiania, 6 kgs.; Gothenburg, 1 ck.

DYESTUFFS—

Cutch

Pasages, 100 cs.

FERRO MANGANESE—

Bilbao, 44 cks.; Rotterdam, 200t.

GLUE—Christiania, 1 bx., 20 bgs.;
Copenhagen, 2 cs., 100 bgs.**IRON OXIDE**—

Rotterdam, 7 cks.

MAGNESIA—

New York, 40 cs.

SALT—

Copenhagen, 100 cs.; Gothenburg, 3 bxs.

SOAP—Amsterdam, 2 cs.; Antwerp, 1,358 cs., 5 brls., 100 kgs.;
Copenhagen, 154 cs., 72 bxs.;
Svendborg, 3 pkgs.**SODIUM PHOSPHATE**—

Gothenburg, 14 cks.

TALLOW—

Amsterdam, 5 cs.

TAR—

Helsingfors, 193 brls.

TIN OXIDE—

Christiania, 2 cks.

WAX—

Stockholm, 25 bgs.

WOOD PRESERVATIVE—

Christiania, 102 drms., 3 cks.

LEITH.

Week ending August 2.

ALUMINA HYDRATE—

Antwerp, 10 t., \$250.

AMMONIUM CARBONATE—

Barcelona, 3 t., \$197.

BLEACHING POWDER—

Barcelona, 11 t. 11 c., \$165.

BORAX—

Antwerp, 25 t., \$1,000.; Dieppe, 10 t., \$390.; Dunkirk, 10 t., \$390.; Lisbon, 2 c., \$5.

BORIC ACID—

Lisbon, 10 c., \$41.

CARBON BISULPHATE—

Antwerp, 1 c., \$21.

COAL PRODUCTS—

Tar

Dieppe, \$1,530.

PHOSPHORIC ACID—

Copenhagen, 13 c., \$57.

POTASSIUM BICHRONATE

Copenhagen, 2 t. 7 c., \$248.

SODA CRYSTALS—

Lisbon, 2 c., \$137.

SODIUM BICHRONATE—

Copenhagen, 8 t. 9 c., \$831.

LIVERPOOL

Week ending July 31.

ACETIC ACID—

Cartagena, 1 c., \$5.; Natal, 3 c., \$12.; Punta Arenas, 7 c., \$37.

ALUM—Barcelona, 9 t. 17 c., \$172.;
Buenos Ayres, 1 t. 19 c., \$40.;
Colon, 5 c., \$35.; Lagos, 1 t., \$22.; Mandos, 2 c., \$3.; Madras, 5 t. 14 c., \$86.; Puerto Cabello, 3 c., \$3.; Salonica, 2 t. 2 c., \$46.**ALUMINA SULPHATE**—Christiania, 14 t. 15 c., \$255.;
Dunkirk, 12 c., \$12.; Para, 1 t., \$13.**ALUMINOFERRIC**—

Monte Video, 49 t. 16 c., \$398.

AMMONIA—Alexandria, 3 c., \$25.; Colon, 1 c., \$10.; Cadiz, 1 t. 7 c., \$44.;
Dunkirk, 6 t. 6 c., \$160.; East
London, 1 c., \$3.; Karachi, 3 c., \$37.; Nantes, 9 c., \$220.**AMMONIUM CARBONATE**—Calcutta, 10 c., \$35.; Melbourne, 5 c., \$17.; Salonica, 10 c., \$38.;
Yokohama, 24 t. 17 c., \$1,524.**AMMONIUM CHLORIDE**—

Karachi, 1 c., \$6.; Sydney, 2 t., \$127.

AMMONIUM MURIATE—Alexandria, 19 t. 17 c., \$1,252.;
Buenos Ayres, 1 t. 19 c., \$117.;
Barcelona, 8 t. 5 c., \$463.;
Calcutta, 2 t., \$103.; Ferrol, 1 t., \$50.; Sydney, 19 c., \$52.;
Santa Cruz, 2 t., \$5.; Yokohama, 4 t. 18 c., \$270.**ANTIMONY**—

Christiania, 1 t.

ANTIMONY OXIDE—

Montreal, 2 t.

ANTIMONY REGULUS—

Buenos Ayres, 4 t.

ARSENIC—Barcelona, 2 t., \$72.; Pernam-
buco, 11 c., \$43.**BLEACHING POWDER**—Auckland, 2 c., \$4.; Buenos
Ayres, 30 t., \$465.; Bilbao, 25 t.,
\$350.; Barcelona, 18 t. 2 c.,
\$289.; Christiania, 10 t. 6 c.,
\$141.; Copenhagen, 10 t. 1 c.,
\$170.; Lyttleton, 4 c., \$10.;
Melilla, 4 t., \$63.; Madras, 2 t.
2 c., \$34.; Sydney, 2 t., \$16.;
Nantes, 10 t., \$195.**BORAX**—Antwerp, 30 t., \$1,100.; Buenos
Ayres, 2 t. 16 c., \$126.; Copen-
hagen, 4 t., \$166.; Manaos, 2 c.,
\$6.; Melbourne, 2 t., \$86.;
Sierra Leone, 1 c., \$2.; Salonica,
8 c., \$36.**BORIC ACID**—Alexandria, 2 c., \$25.; Copen-
hagen, 2 c., \$11.; Karachi, 1 c.,
\$6.; Melbourne, 11 c., \$42.;
Salonica, 6 c., \$19.**CALCIUM CHLORIDE**—Bombay, 25 t. 3 c., \$177.;
Barcelona, 5 t., \$44.; Fremantle,
10 t. 1 c., \$77.; Sydney, 22 t.
9 c., \$162.; Warri, 16 c., \$26.**CAUSTIC SODA**—Adelaide, 150 drms.; Antwerp, 37
drms.; Auckland, 40 pkgs.;
Calcutta, 76 drms.; Cape Town, 5
drms.; Karachi, 120 drms.;
Madras, 358 pkgs.; Monte Video, 160
drms.; Pernambuco, 4 drms.;
Patras, 120 drms.; Rouen, 80
drms.; Shanghai, 608 drms.;
Singapore, 20 drms.; Sydney, 766
drms.**CHINA CLAY**—

Alexandria, 5 t.

CITRIC ACID—

Montreal, 1 t., \$148.

COAL PRODUCTS—

Carbolacene

Lagos, 11 c., \$14.; La Guaira, 2
c., \$4.

Carbolic Acid

Alexandria, 2 c., \$20.; Copen-
hagen, 3 t., \$134.

Creosote

Monte Video, 19 t. 19 c., \$370.

Cresylic Acid

Buenos Ayres, 20 t. 6 c., \$619.;
Monte Video, 9 t. 3 c., \$1,269.;
Secondee, 2 c., \$3.

Naphthalene

Alexandria, 1 t., \$22.; Car-
tagena, 4 c., \$31.; Kilindini, 1 t.
10 c., \$40.; Lagos, 4 c., \$12.;
Mombasa, 14 t., \$100.

Tar

Accra, 5 c., \$4.; Bonny, 11 c.,
\$10.; Delagoa Bay, 100 t., \$367.;
Iquitos, 5 c., \$10.**COPPER SULPHATE**—

Karachi, 1 t. 5 c., \$57.

COPPERAS—Alexandria, 178 pkgs.; Las
Palmas, 10 t.**CREAM OF TARTAR**—Christiania, 5 c., \$60.; Copen-
hagen, 1 t., \$265.**DISINFECTANTS (otherwise undes.)**Accra, 10 c., \$28.; Amapala, 9
c., \$24.; Bombay, 6 t. 13 c.,
\$265.; Buenos Ayres, 16 t. 7 c.,
\$648.; Bilbao, 2 c., \$7.; Cape
Town, 4 t. 9 c., \$125.; Copen-
hagen, 3 t. 18 c., \$158.; Iquitos,
5 c., \$12.; Kilindini, 10 c., \$5.;
Mombasa, 7 t. 3 c., \$387.;
Opobo, 10 c., \$21.; Pasages, 13
c., \$104.; Port Said, 3 t. 11 c.,
\$110.; Port Harcourt, 2 c., \$4.;
Rio de Janeiro, 8 c., \$69.;
Salonica, 16 c., \$22.; Sydney, 33
t. 14 c., \$1,063.; Secondee, 5
c., \$12.; Sapele, 5 c., \$12.;
Shanghai, 6 c., \$20.; Sherbro,
3 t. 7 c., \$119.; Singapore, 6 c.,
\$52.; Vancouver, 1 c., \$14.;
Victoria, B.C., 3 c., \$12.**DYESTUFFS**—

Aniline Dye

Alexandria, 12 t. 19 c., \$2,161.;
Barcelona, 4 c., \$120.; Bombay,
7 c., \$287.; Christiania, 2 c.,
\$158.; Kobe, 1 t. 3 c., \$1,150.;**DYESTUFFS**—

Aniline Dye

Patras, 1 t., \$140.; Rio de
Janeiro, 12 c., \$598.**FERRO-MANGANESE**—Genoa, 400 t.; Rotterdam, 5 t.
4 c.**FISH OIL**—

Malaga, 8 brls.

FORMIC ACID—

Calcutta, 1 c., \$6.

GLUE SIZE AND GELATINE—Alexandria, 4 pkgs.; Antwerp, 20
pkgs.; Copenhagen, 58 pkgs.;
Malaga, 4 pkgs.; New York, 25
pkgs.; Rangoon, 20 pkgs.;
Shanghai, 163 pkgs.**GLYCERINE**—Lisbon, 10 cs.; Shanghai, 68
pkgs.**HYDROCHLORIC ACID**—Alexandria, 2 c., \$25.; Chris-
tiana, 18 c., \$60.**LITHOPONE**—

Genoa, 50 brls.

MAGNESIUM CARBONATE—Barcelona, 50 pkgs.; Montreal, 6
pkgs.**MAGNESIUM CHLORIDE**—

Bombay, 27 t. 6 c., \$429.

NICKEL SULPHATE—Barcelona, 6 c., \$19.; Gothen-
burg, 1 t. 1 c., \$55.**NITRIC ACID**—

Alexandria, 2 c., \$30.

OXALIC ACID—

Barcelona, 1 t., \$136.

POTASSIUM BICHRONATE—

Barcelona, 2 t. 3 c., \$350.

POTASSIUM CHLORATE—Bahia, 10 c., \$175.; Para, 1 c.,
\$7.; Porto Alegre, 4 c., \$29.;
Rio de Janeiro, 2 c., \$38.**RED LEAD**—

Melbourne, 4 t.

ROSIN—

Hong Kong, 6 pkgs.

SALAMMONIAC—Bombay, 2 t. 11 c., \$180.; Bar-
celona, 1 t., \$80.; Melbourne, 1
c., \$4.; Natal, 2 t., \$158.;
New York, 5 t., \$373.; Naples, 1
t. 1 c., \$81.; Rangoon, 10 t.
5 c., \$748.; Salonica, 10 c., \$57.;
Shanghai, 10 c., \$38.**SALT**—Accra, 23 t.; Antwerp, 517 t.;
Atani, 20 t.; Buenos Ayres, 272
t.; Cape Town, 3 t.; Calabar, 121
t.; Calcutta, 5,462 t.; Cona-
kry, 75 t.; Cotonon, 50 t.;
Duala, 75 t.; Ibadan, 100 t.;
Lagos, 1,257 t.; Litreville, 10 t.;
Onitsha, 125 t.; Opobo, 80 t.;
Quittah, 17 t.; Secondee, 11 t.;
Shanghai, 4 t.; Winnebah, 16 t.**SALTPETRE**—

Sierra Leone, 1 c., \$3.

SHEEP DIP—Buenos Ayres, 183 t. 3 c.,
\$6,238.; Iquitos, 5 c., \$27.; La
Guaira, 11 c., \$128.; Manta, 3
c., \$14.; Maracaibo, 15 c.,
15 c., \$77.; Para, 12 c., \$67.;
Puerto Cabello, 3 t., \$289.; San
Francisco, 3 t. 17 c., \$164.;
Trinidad, 7 c., \$77.**SOAP**—Accra, 3 bxs., 1 cs.; Aden, 516
pkgs.; Algiers, 1,437 bxs.; Ant-
werp, 10,407 bxs.; Banderjimas-
sin, 154 pkgs.; Bangkok, 500
pkgs.; Calcutta, 290 bxs.; Cali-
cut, 12 pkgs.; Casablanca, 75
pkgs.; Colon, 500 pkgs.; Copen-
hagen, 400 bxs.; Ciudad Bolivar,
1 cs.; Dakar, 230 bxs.; Fama-
gusta, 60 pkgs.; Gibraltar, 501
bxs.; Helsingfors, 2,000 cs.;
Kilindini, 217 bxs., 1 cs.; Koko,
1 cs.; Majunga, 50 bxs.; Nairobi,
60 pkgs.; Port Harcourt, 884
bxs.; Porto Novo, 6 pkgs.;
Rabat, 105 pkgs.; Rabisque,
5 pkgs.; Samarang, 7 cs.;
Sapele, 2 pkgs.; Shanghai, 2
bxi; Sierra Leone, 146 bxs.;
Zanzibar, 90 pkgs.

- SODA ASH**—
Calcutta, 10,230 pkgs.; Chefoo, 4,562 pkgs.; Dunedin, 21 pkgs.; Gion, 9 pkgs.; Kobe, 5,305; Melbourne, 34 pkgs.; Pernambuco, 30 pkgs.; Patras, 100 pkgs.; Rotterdam, 100 pkgs.; Shanghai, 8,176 pkgs.; Singapore, 20 pkgs.
- SODIUM BICARBONATE**—
Antwerp, 40 pkgs.; Casablanca, 100 pkgs.; Dunedin, 22 pkgs.; Kobe, 578 pkgs.; Palermo, 500 pkgs.; Patras, 100 pkgs.; Perth, 20 pkgs.; Singapore, 100 pkgs.; Sydney, 20 pkgs.
- SODIUM SILICATE**—
Antwerp, 20 pkgs.; Calcutta, 17 pkgs.; Rosario, 100 pkgs.; Rotterdam, 250 pkgs.
- SULPHUR**—
Amapala, 1 c., £2.; Copenhagen, 2 c., £12.; Colon, 1 c., £10.; Lome, 2 c., £4.; La Union, 5 c., £25.; Para, 4 c., £7.
- SULPHURIC ACID**—
Alexandria, 5 c., £32.; Valparaiso, 4 c., £7.
- TALLOW**—
Nantes, 125 pkgs.; Perim, 3 pkgs.; Rotterdam, 48 pkgs.
- TARTARIC ACID**—
Karachi, 2 t., £635.; New York, 2 t., £958.
- WAX**—
Alexandria, 41 pkgs.; Christiana, 6 brls.
- WOOD PRESERVATIVE**—
Bathurst, 1 t. 5 c., £25.; Colon, 3 t. 18 c., £104.; East London, 2 c., £6.; Natal, 13 c., £12.; Para, 5 c., £8.; Secondee, 2 c., £12.
- ZINC CHLORIDE**—
Rangoon, 9 t. 19 c., £555.
- LONDON.**
Week ending July 30.
- ACETANILID**—
Rangoon (F.), 1 cs., £9.
- ACETIC ACID**—
Athens, 2 crbys., £12.; Beira, 1 cs. (pt.), £7.; Bombay, 1 csk., £12.; Brussels (F.), 1 csk., £16.; Danzig, 6 cs., £95.; Jaffa, 4 cs., £25.; Mauritius, 2 cs., £15.; Perth, 6 cs., £17.; Pt. Madryn, 1 cs., £5.; Switzerland, 25 drs., £260.; Salonika, 5 crbys., £110.
- ACETO SALICYLIC ACID**—
Beyrout, 1 cs. (pt.), £5.; Shanghai, (F.) 1 cs., £15.
- ACETONE**—
Abo, 2 drs., £10.
Rouen, 3 drs., £97.
- ALUM**—
Durban, 6 c., £9.; Madras, 7 t. 4 c., £102.; Montreal, 1 cs., £17.; Paita, 2 t., £31.; Pt. Elizabeth, 1 cs. (pt.), £5.
- AMMONIA**—
Adelaide, 6 cs., £13.; Alexandria, 4 cs., £9.; Antwerp, 29 drms., £420.; Buenos Ayres, 15 drms., £280.; Canton, 3 cs., £12.; Rio de Janeiro, 14 cs., £37.; Rio Gallegos, 5 cs., £10.; Sevilla, 4 drms., £13.
- AMMONIA (ANHYDROUS)**—
Alexandria, 16 cylds., £164.; Buenos Ayres, 5 cylds., £92.
- AMMONIUM ACETATE**—
Bombay, 2 cs., £14.; Calcutta, 3 cs., £26.; East London, 1 cs., £10.; Singapore, 1 cs., £8.
- AMMONIUM CARBONATE**—
Alexandria, 2 t., £120.; Bombay, 3 c., £13.; Callao, 15 cs., £67.; Cape Town, 1 c., £5.; Cyprus, 5 c., £27.; Osaka, 10 t., £607.; Penang, 9 c., £39.; Porto Alegre, 1 c., £6.; Rio de Janeiro, 3 t. 14 c., £104.; Sao Paulo, 1 t. 15 c., £211.; Tokio, 10 t., £606.; Tuticorin, 2 c., £8.
- AMMONIUM CHLORIDE**—
Calcutta, 2 cs., £19.
- AMMONIUM MOLYBDATE**—
Paris, 3 cs., £191.
- AMMONIUM MURIATE**—
Abo, 1 t., £77.; Beyrout, 1 t., £73.; Brussels, 2 c., £6.; Bombay, 7 t. 10 c., £543.
- AMMONIUM SULPHATE**—
Dunkirk, 244 t., £6,250.; Yokohama, 200 t. 5 c., £4,800.
- AMYL ACETATE**—
Paris, 8 drms., £107.
- AMYLIC ALCOHOL**—
Brussels, 1 cs., £6.
- AMYL BUTYRATE**—
Sydney, 1 cs., £39.
- ANTIMONY SULPHIDE**—
Abo, 2 cks., £34.; Antwerp, 1 csk., £46.; Paris, 1 kgs., £23.
- ANTIMONY SULPHITE**—
Dunkirk, 2 cks., £76.
- ARSENIC**—
Rouen, 10 t. 6 c., £500.
- BENZOIC ACID**—
Melbourne, 1 cs. (pt.), £14.
- BISMUTH CARBONATE**—
Bombay, 1 cs. (pt.), £9.; Durban, 1 cs. (pt.), £11.
- BISMUTH SUBNITRATE**—
Amsterdam, 8 cs. (pt.), £76.
- BISMUTH SUBSALICYLATE**—
Amsterdam, 2 cs. (pt.), £76.
- BLEACHING POWDER**—
Boulogne, 10 t. 3 c., £200.
- BORAX**—
Abo, 2 t. 10 c., £120.; Antwerp, 4 t. 19 c., £210.; Karachi, 5 c., £13.; Paris, 50 t. (F.), £2,025.; Port Elizabeth, 3 c., £13.; Rio de Janeiro, 4 c., £11.; Rotterdam, 31 t. 19 c., £1,304.; Scheidam, 1 t., £40.
- BORIC ACID**—
Alexandria, 4 c., £20.; Buenos Ayres, 2 c., £11.; Calcutta, 12 c., £48.; Canton, 2 c., £11.; Hankow (F.), 10 t., £740.; Karachi, 1 c., £6.; Port Swettenham, 3 c., £14.; Shanghai, 25 t., £1,850.
- CABLE WAX**—
Genoa, 3 t.
- CALCIUM CARBONATE**—
Malta, 1 cks., £5.
- CALCIUM CHLORIDE**—
Cape Town, 1 cs. (pt.), £6.
- CAMPHOR**—
Buenos Ayres, £300.
- CARNAUBA WAX**—
Bordeaux, 10 c.; Genoa, 4 t. 10 c.
- CAUSTIC POTASH**—
Melbourne, 1 cs., £9.
- CAUSTIC SODA**—
Amsterdam, 16 drms., £108.
- CERESINE WAX**—
Amsterdam, 2 t. 4 c.; Antwerp, 4 t. 12 c.; Bordeaux, 3 t. 10 c.; Genoa, 3 t.
- CHEMICALS (otherwise undescribed)**
Canton, 1 cs., £15.; Durban, 13 pkgs., £405.; Durban (F.), 1 cs. (pt.), £10.; Hong Kong, 2 cs., £12.; Montreal, 7 cs. (pt.), £163.; Port Elizabeth, 2 cs., £57.; Port Swettenham, 1 cs., £27.; Salonika, 2 cs. (pt.), £53.; Shanghai, 2 cs. (pt.), £15.
- CHINA CLAY**—
Havre, 5 t.
- CHLORAL HYDRATE**—
Launceston (F.), 1 cs., £5.
- CHROMIC ACID**—
Brussels, 1 cs. (pt.), £6.
- CITRIC ACID**—
Barbados, 1 cs., £6.; Bombay, 1 c., £27.; Buenos Ayres, 1 cs. (pt.), £6.; Calcutta, 5 c., £126.; Cape Town, 5 c., £120.; Danzig, 10 c., £240.; Dunedin, 1 c., £24.; Hong Kong, 1 c., £26.; New York, 1 t. 5 c., £560.; New York (F.), 5 t., £2,150.
- COAL PRODUCTS (otherwise undes.)**
Brussels (F.), 1 cs. (pt.), £38.
- COAL PRODUCTS**—
Aniline Colour
Brisbane, 1 cs., £50.
Aniline Dye
Antwerp, 1 kg., £9.; Bordeaux, 2 cks., £67.; Boulogne, 7 cks., £775.; Durban, 1 cks., £6.; Italy, 7 cks., £770.; Hong Kong, 1 cs. (pt.), £15.; Singapore, 1 cs., £20.
Aniline Oil
Adelaide, 1 csi, £11.
Carbolic Acid
Buenos Ayres, 1 cs., £5.; Calcutta, 4 cs., £21.; Helsingfors, 52 cks., £436.; Karachi, 1 cs., £10.; Melbourne, 18 pkgs., £890.; Salonika, 6 drms., £34.
Creosote
Bangkok, 2 cs., £9.; Bilbao, 134 cks., £240.; Demerara, 10 cks., £40.; Shanghai, 2 cks., £12.
Mirbane Oil
Antwerp, 1 drms., £5.
Naphthalene
Bangkok, 1 cks., £6.; Canton, 1 cks., £5.; Demerara, 1 cks., £5.; Durban, 1 cks., £6.; Perth, 1 cks., £18.; Shanghai, 123 pkgs., £372.; Sao Paulo, 2 cs., £5.; Singapore, 3 cks., £14.
Paranitrotoluol
Bordeaux, 4 cks., £164.
Pitch
Antwerp, 327 t., £1,254.; Gibraltar, 13 cks., £7.
Tar
Bergen, 44 pkgs. (pt.), £10.
Terebine
Auckland, 2 cs., £10.; Brussels, 19 pkgs., £166.
Tolmol
Switzerland, 26 drms., £1,215.
Nylidine
Bordeaux, 1 drms., £111.
- COBALT OXIDE**—
Bombay, 2 cs., £106.
- COPPER AND ACETIC ARSENATE**
Santos, 4 cks., £234.
- COPPER SULPHATE**—
Antwerp, 4 t. 17 c., £210.; Amsterdam, 3 t. 6 c., £143.; Mombasa, 12 c., £26.; Syra, 3 t., £138.
- COPPERAS**—
Salonica, 16 cks., £20.
- CREAM OF TARTAR**—
Beira (F.), 1 c., £15.; Bombay, 1 c., £19.; Bombay (F.), 7 c., £102.; Constantinople, 1 c., £20.; Calcutta, 1 c., £13.; Hong Kong (F.), 1 c., £16.; Jamaica (F.), 1 cs. (pt.), £6.; Karachi (F.), 1 c., £19.; Mossel Bay (F.), 1 c., £16.; Port Elizabeth (F.), 1 c., £9.
- DIETHYLBARBITURIC ACID**—
Brussels (F.), 1 cs., £91.
- DISINFECTANTS (otherwise undes.)**
Alexandria, 6 c., £32.; Antwerp, 4 t. 11 c., £48.; Antwerp (F.), 1 t. 16 c., £240.; Bandjoewangi, 2 c., £5.; Batavia, 3 c., £24.; Bangkok, 5 t. 8 c., £195.; Bordeaux, 4 c., £10.; Brisbane, 3 t. 8 c., £177.; Brussels, 1 t. 11 c., £455.; Buenos Ayres, 1 c., £11.; Calcutta, 4 c., £41.; Canton, 3 c., £30.; Durban, 1 t. 18 c., £77.; East London, 1 c., £7.; Hong Kong, 11 t. 7 c., £237.; Ipoh, 1 t. 13 c., £37.; Kilindini, 1 c., £7.; Labuan, 2 c., £5.; Mauritius, 5 c., £11.; Paris (F.), 2 t., £240.; Penang, 15 c., £17.; Port Swettenham, 3 t. 14 c., £209.; Piraeus (F.), 2 t., £280.; Rangoon, 14 c., £33.; Salonika, 3 c., £7.; Samarang, 3 c., £24.; Santiago (Chile), 1 c., £9.; Shanghai, 5 t. 5 c., £225.; Sourabaya, 3 c., £25.
- ETHER**—
Buenos Ayres, 1 cs., £8.; Monte Video, 2 cs., £23.
- ETHYL CHLORIDE**—
Monte Video, 1 cs. (pt.), £8.
- FULLERS EARTH**—
Tientsin, 10 c.
- GALLIC ACID**—
Calcutta, 1 cs. (pt.), £5.
- GELATINE**—
Hamilton, 3 t. 5 c.; Toronto, 10 c.
- GLUE**—
Mantyluoto, 10 c.; Sydney, 1 t.
- GLUE AND GELATINE**—
Yokohama, 25 t. 3 c.
- GLUE SIZE AND GELATINE**—
Antwerp, 11 t. 1 c.; Alexandria, 1 t. 1 c.; Auckland, 1 t.; Beyrout, 1 t.; Bombay, 3 t. 11 c.; Boulogne, 6 t. 8 c.; Boston, 2 t. 10 c.; Brisbane, 1 c.; Calcutta, 1 t. 3 c.; Cape Town, 1 t.; Cochinchina, 1 t. 2 c.; Karachi, 5 c.; Kobe, 30 t. 5 c.; Mombasa, 1 c.; Ostend, 16 c.; New York, 11 t. 9 c.
- GLYCERINE**—
Alexandria, 1 t. 6 c., £175.; Bombay, 3 c., £18.; Buenos Ayres, 1 c., £9.; Calcutta, 9 c., £106.; Canton, 1 c., £8.; Durban, 2 c., £15.; Karachi, 3 c., £30.; Paris, 2 c., £31.; Port Swettenham, 1 c., £8.
- HYDROCHLORIC ACID**—
Adelaide, 2 c., £5.; Brussels, 2 t., £81.; Hong Kong, 1 c., £5.; Shanghai, 13 c., £38.
- HYDROGEN PEROXIDE**—
Alexandria, 16 cs., £33.; Brussels, 3 cks., £37.
- IODINE**—
Buenos Ayres, 1 cs., £110.; Rotterdam, 2 cs., £180.
- IRON AND AMMONIUM CITRATE**
Brussels, 2 cs. (pt.), £12.; Montreal, 7 cs. (pt.), £17.; Perth, 1 cs. (pt.), £13.; Shanghai, 1 cs. (pt.), £8.
- IRON & POTASSIUM CYANIDE**—
Brussels, 1 cs. (pt.), £11.
- IRON CITRATE**—
Amsterdam, 1 cs., £25.
- IRON CYANIDE**—
Brussels, 1 cs. (pt.), £6.
- IRON OXALATE**—
Brussels, 1 cs. (pt.), £8.
- IRON PERCHLORIDE**—
Calcutta, 2 cs., £7.; Port Elizabeth, 1 cs., £7.
- IRON SULPHIDE**—
Adelaide, 3 cs., £11.
- LACTIC ACID**—
Dunkirk, 5 brls., £78.; Melbourn, 6 cks., £67.; Sydney, 15 cks., £150.; Valparaiso, 20 cks., £212.
- LEAD ACETATE**—
Boulogne, 1 brl., £26.; Salonika, 1 kg., £11.; Sao Paulo, 5 cks., £50.
- LEAD SUBACETATE**—
Calcutta, 2 cs., £12.
- LEAD SULPHITE**—
Dunkirk, 2 cks., £77.
- MAGNESIA (CALCINED)**—
Monte Video, 3 cs., £90.
- MAGNESIUM CARBONATE**—
Buenos Ayres, 21 cs., £180.; Mollendo, 2 cs., £5.; Rouen, 14 cks., £51.
- MAGNESIUM CITRATE**—
Brussels, 1 cs., £15.
- MAGNESIUM OXIDE**—
Abo, 3 cs., £38.
- MAGNESIUM SULPHATE**—
Bombay, 19 c., £59.; Brussels, 10 c., £11.; Buenos Ayres, 5 c., £6.; Cape Town, 3 c., £5.; Hong Kong, 3 c., £5.; Karachi, 12 c., £31.; Montreal, 1 t., £33.; Mossel Bay, 6 c., £14.; New York, 1 t., £38.; Port Elizabeth, 12 c., £28.; Porto Alegre, 9 c., £24.; Toronto, 5 c., £5.
- MERCURY BICHLORIDE**—
Brisbane, 1 cs. (pt.), £7.; Paris, 2 cs., £163.
- MERCURY CHLORIDE**—
Paris, 4 cs., £330.

MERCURY IODIDE—
Brussels, 1 cs. (pt.), £7.

MERCURY OXIDE—
Brussels, 1 cs. (pt.), £21.; Dunkirk, 1 cs., £75.; Paris, 12 cs., £312.

MERCURY PERCHLORIDE—
Cape Town, 4 cs. (pt.), £9.; Karachi, 1 cs. (pt.), £9.

MOLYBDIC ACID—
Paris, 2 cs., £191.

MURIATIC ACID—
Port Madryn, 1 c., £5.

NICKEL OXIDE—
Dieppe, 5 cs., £110.

NICKEL SALTS—
Yokohama, 50 cs., £125.

NITRE SPIRITS—
Toronto, 1 cs., £5.

NITRIC ACID—
Adelaide, 2 c., £6.; Port Elizabeth, 9 c., £18.

OXALIC ACID—
Buenos Ayres, 1 kg., £7.; Calcutta, 1 cs. (pt.), £6.; Hong Kong, 1 cs., £55.; Sao Paulo, 10 kgs., £35.

PARAFFIN WAX—
Genoa, 70 t. 19 c.

PARALDEHYDE—
Barcelona (F.), 1 cs., £29.

PHOSPHORIC ACID—
Montreal, 10 crbys., £91.; Paris, 60 crbys., £453.

PHOSPHORUS—
Canton, 1 cs., £10.; Launceston, 2 cs., £26.

PHOSPHORUS SESQUISULPHIDE—
Barcelona, 10 cs., £165.; Santander, 30 cs., £474.; Seville, 20 cs., £329.

PLUMBAGO—
Rosario, 2 t.; Shanghai, 4 t.

POTASSIUM BICARBONATE—
Cape Town, 1 cks., £36.

POTASSIUM BICHROMATE—
Rotterdam, 12 cks., £735.

POTASSIUM BISULPHITE—
Montreal, 40 kgs., £575.

POTASSIUM BROMIDE—
Alexandria, 1 cs. (pt.), £5.; Canton, 6 cs. (pt.), £5.; Cape Town (F.), 4 cs. (pt.), £5.; Launceston, 1 cs., £15.; Piraeus (F.), 1 cs. (pt.), £9.

POTASSIUM CARBONATE—
Athens, 1 cks., £20.; Brussels, 1 cks., £13.; Lisbon (F.), 2 cs., £8.; Rio de Janeiro, 1 cks., £14.

POTASSIUM CHLORATE—
Brussels, 11 c., £110.

POTASSIUM CHLORIDE—
Bangkok, 1 c., £20.; Melbourne, 1 c., £5.

POTASSIUM CITRATE—
Alexandria, 2 cs., £33.; Amoy, 10 cs. (pt.), £5.; Canton, 9 cs. (pt.), £18.; Montreal, 7 cs. (pt.), £72.

POTASSIUM CYANIDE—
Amoy, 1 drn. (pt.), £6.; Bombay, 8 c., £151.; Singapore, 4 cs., £55.

POTASSIUM HYPO—
Osaka, 10 cs., £365.

POTASSIUM IODIDE—
Amoy, 10 cs. (pt.), £13.; Amsterdam, 1 cs., £80.; Bangkok, 2 cs., £100.; Cape Town, 4 cs. (pt.), £10.; Genoa, 2 cs., £76.; Hong Kong, 1 cs. (pt.), £9.; Macas, 4 cs. (pt.), £7.; Naples, 2 cs., £78.; Rotterdam, 4 cs. (pt.), £161.; Swatow, 12 cs. (pt.), £12.

POTASSIUM METABISULPHATE—
Melbourne, 2 cs. (pt.), £3.

POTASSIUM OXALATE—
Cape Town, 1 cs. (pt.), £6.

POTASSIUM PERMANGANATE—
Brussels, 2 cs., £45.; Penang, 5 cs. (pt.), £16.

POTASSIUM SULPHATE—
Brussels, 1 c., £16.

POTASSIUM SULPHIDE—
Ab 4 cks., £33.

PRUSSIAN BLUE—
Antwerp, 6 cks., £154.; Paris, 6 cks., £154.

PYROGALLIC ACID—
Amsterdam, 1 cks. (pt.), £9.; Brussels (F.), 1 cs., £8.; Hong Kong, 1 cs., £11.

QUININE—
Cape Town, 1,162 ozs.

SALICYLIC ACID—
Antwerp, 20 cks., £160.; Barcelona, 4 kgs., £34.; Brussels, 2 cs., £12.; Singapore, 1 kg., £7.

SALT—
Cuba, 5 c.; Rosario, 1 t.; Singapore, 1 t.; Tientsin, 1 t.

SALTPETRE—
Alicante, 10 c., £25.; Amsterdam, 1 t., £62.; Barcelona, 4 t. 5 c., £213.; Bilbao, 1 t., £50.; Calcutta, 2 c., £9.; Montreal, 1 t., £50.; Port Swettenham, 1 c., £5.; Santander, 2 t. 18 c., £149.; Santos, 4 t. 18 c., £293.; Valencia, 1 t. 5 c., £63.

SHEEP DIP—
Buenos Ayres, 1 t. 2 c., £81.; Durban, 11 t. 5 c., £451.; Montevideo, 25 t. 7 c., £400.

SILVER NUCLEINATE—
Brussels, 1 cs. (pt.), £5.

SIZE—
Rangoon, 3 c.

SOAP—
Abo, 2 c.; Alexandria, 1 t. 15 c.; Aden, 5 c.; Amsterdam, 1 t. 18 c.; Adelaide, 3 c.; Antwerp, 313 t. 13 c.; Bangkok, 1 t.; Barbados, 1 c.; Batavia, 4 c.; Beira, 5 c.; Bombay, 2 t. 2 c.; Brisbane, 1 c.; Bordeaux, 1 t. 4 c.; Canton, 3 c.; Calcutta, 4 c.; Cape Town, 2 c.; Canary Islands, 6 c.; Cologne, 82 t. 14 c.; Constantinople, 19 c.; Colombo, 1 t. 14 c.; Cyprus, 4 c.; Danzig, 40 t.; Demerara, 9 c.; Dieppe, 19 c.; Dunkirk, 5 t. 14 c.; Durban, 12 c.; Genoa, 3 c.; Ghent, 7 c.; Hong Kong, 11 c.; Italy, 3 c.; Jaffa, 1 c.; Jamaica, 1 c.; Karachi, 17 c.; Kilindini, 1 c.; Launceston, 1 c.; Lisbon, 7 c.; Lyttleton, 3 t. 10 c.; Madras, 6 c.; Melbourne, 6 c.; Malta, 15 c.; Mossel Bay, 1 c.; Montreal, 15 c.; New York, 1 t. 17 c.; Ostend, 1 t. 3 c.; Paramaribo, 1 c.; Paris, 65 t. 12 c.; Perth, 1 t. 2 c.; Penang, 4 t. 3 c.; Porto Alegre, 4 c.; Port Elizabeth, 5 c.; Port Swettenham, 7 c.; Rangoon, 12 c.; Samarang, 3 c.; Shanghai, 13 c.; Singapore, 3 c.; Smyrna, 15 c.; Sydney, 5 c.

SODA—
Bangkok, 3 c., £5.

SODA ASH—
Genoa, 30 t., £300.

SODIUM BENZOATE—
Beyrout, 1 cs. (pt.), £7.; Constantinople, 1 cks., £50.; Port Madryn (F.), 1 cs. (pt.), £16.

SODIUM BICARBONATE—
Bangkok, 2 c., £8.; Bombay, 15 c., £17.; Bordeaux, 1 t., £14.; Brussels, 4 c., £7.; Calcutta, 4 c., £8.; Danzig, 9 t. 8 c., £94.; Hong Kong, 1 t. 3 c., £25.; Mollendo, 1 t., £33.; Montreal, 19 c., £41.; Port Elizabeth, 10 c., £19.; Smyrna, 2 c., £6.; Toronto, 1 t. 3 c., £50.

SODIUM BICHROMATE—
Port Elizabeth, 3 t. 3 c., £275.

SODIUM BISULPHITE—
Antwerp, 6 t. 2 c., £180.; Barcelona, 2 t., £65.

SODIUM CITRATE—
Alexandria, 2 cs., £14.

SODIUM GLYCEROPHOSPHATE—
Port Swettenham, 1 cs. (pt.), £7.

SODIUM HYDRATE—
Brussels, 1 cs., £35.

SODIUM HYDROSULPHATE—
Sydney, 1 t., £350.

SODIUM HYPO—
Brussels, 1 t. 19 c., £70.; Durban (F.), 5 c., £7.; Hong Kong, 9 c., £13.

SODIUM HYPOSULPHITE—
Antwerp, 1 t. 2 c., £27.

SODIUM IODIDE—
Amsterdam, 1 cs., £42.; Genoa, 2 cs., £83.; Naples, 2 cs., £83.

SODIUM PHOSPHATE—
Alexandria, 2 cs., £7.; Constantinople, 8 c., £13.

SODIUM SALICYLATE—
Cape Town, 2 cs., £15.; Montreal, 1 cs. (pt.), £7.

SODIUM SILICATE—
Constantinople, 6 c., £10.

SODIUM SULPH—
Alexandria, 1 cs., £9.; Port Swettenham, 1 cs., £16.

SODIUM SULPHATE—
Calcutta, 5 c., £5.

SODIUM SULPHITE—
Antwerp, 1 t. 1 c., £17.; Bombay, 1 cs., £13.; Dunkirk, 1 t., £17.; Sydney, 1 t., £33.

SODIUM TARTRATE—
New York, 5 t., £700.

STEARINE—
Antwerp, 12 c.

SULPHUR—
Wormerveer, 5 t., £110.

SULPHUR (FLOWERS)—
Antwerp, 6 t. 6 c., £173.; Bordeaux (F.), 20 t., £460.

SULPHURIC ACID—
Adelaide, 2 c., £6.; Oamaru, 3 c., £13.; Paranagua, 3 t. 6 c., £250.; St. Vincent, 3 t. 11 c., £105.

SUPERPHOSPHATE—
Canary Islands, 20 t.

TALLOW—
Havre, 24 t.; Port Swettenham, 8 c.

TANNIC ACID—
Brussels (F.), 4 cks., £94.

TARTARIC ACID—
Bombay (F.), 3 c., £60.; Bombay, 1 c., £21.; Buenos Ayres, 1 c., £23.; Callao (F.), 1 c., £22.; Dundee, 2 c., £35.; Durban, 1 c., £20.; Mollendo (F.), 3 c., £63.; Port Antonio, 2 c., £35.; Port Elizabeth, 1 cs., £6.; Sydney, 10 c., £151.; Toronto, 2 t. 2 c., £749.

THEOBROMINE SODIUM SALICYLATE—
Marseilles, 2 cs., £120.

WAX—
Kobe, 4 c.

WHITE LEAD—
Aden, £75.; Antwerp, £2,036.; Barbados, £54.; Bermuda, £47.; Bombay, £71.; Havre, £241.; Hobart, £19.; Hong Kong, £181.; Karachi, £185.; Ostend, £60.; Rabat, £182.; Sandakan, £22.; Tangiers, £32.

ZINC SULPHATE—
Karachi, 1 c., £7.

MANCHESTER.

Week ending July 30.

AMMONIUM CARBONATE—
Gothenburg, 85 pkgs.

BITUMASTIC SOLUTION—
Philadelphia, 100 cks.

CAUSTIC SODA—
Melbourne, 5 crts.

COAL PRODUCTS (otherwise undes.)—
Gothenburg, 49 drms.

DYESTUFFS—
Tanning Extract
Melbourne, 38 cks.

LITHARGE—
Sydney, 2 cks.

MAGNESITE (CALCINED)—
Marseilles, 140 bgs.

MANGANESE BORATE—
Gothenburg, 2 cks.

MANGANESE SULPHATE—
Philadelphia, 20 cks.

SALAMMONIAC—
Marseilles, 10 cks.; Montreal, 5 cks.

SALT—
Gothenburg, 5,420 pkgs.; Montreal, 11,152 sks.

SODA ASH—
Gothenburg, 434 bgs.

SODIUM BICARBONATE—
Gothenburg, 100 pkgs.

SODIUM PRUSSATE—
Montreal, 5 cks.

SULPHATE CRYSTALS—
Rotterdam, 10 cks.

SULPHIDE—
Rotterdam, 3 cks.

ULTRAMARINE BLUE—
Sydney, 4 cks.

ZINC CHLORIDE—
Rotterdam, 74 cks.

MIDDLESBROUGH.

Week ending August 2.

AMMONIUM SULPHATE—
Kobe, 2,011 t. 4 c., £39,700.; Singapore, 50 t., £350.; Yokohama, 224 t. 5 c., £3,755.

COAL PRODUCTS—
Benzole
Antwerp, 19 c., £20.

CHEMICALS (otherwise undescribed)—
Calcutta, 64 t. 4 c., £933.; Madras, 12 t. 5 c., £178.; Singapore, 18 t., £289.

COAL PRODUCTS—
Naphthalene
Antwerp, 1 t., £17.

Pitch
Antwerp, 1,617 t., 1 c., £4,310.

NEWCASTLE-ON-TYNE

Week ending August 2.

AMMONIUM CARBONATE—
Bergen, 2 t.

ANTIMONY—
Rotterdam, 3 t. 10 c.

BLEACHING POWDER—
Rotterdam, 54 t.

CAUSTIC SODA—
Rotterdam, 64 t. 2 c.

GELATINE—
Christiania, 1 c.

GLUE—
Christiania, 1 t.

LITHARGE—
Rotterdam, 9 t. 18 c.

MAGNESIA—
Rotterdam, 1 c.

RED LEAD—
Rotterdam, 15 t.

SODIUM SULPHITE—
Rotterdam, 5 t. 2 c.

SULPHUR—
Rotterdam, 10 t.

TAR—
Rotterdam, 15 t.

WHITE LEAD—
Rotterdam, 14 t. 17 c.

ZINC (WHITE)—
Rotterdam, 5 c.

N. & S. SHIELDS.

Week ending August 2.

WHITE LEAD—
Christiania, 2 t. 2 c.

STOCKTON-ON-TEES.

Week ending August 2.

NIL.

SWANSEA.

Week ending August 2.

OXALIC ACID—
Marseilles, 19 t., £136.

PRICES CURRENT.

THURSDAY, August 7, 1919.

PREPARED BY MESSRS. HIGGINBOTTOM AND CO., 21, SPRING GARDENS, MANCHESTER.

The values stated are F.O.R. at makers' works, or at usual ports of shipment in U.K., unless otherwise specified.
The prices in different localities may vary.

Acids:—		s. d.		£ s. d.	
*Acetic 40% and 60%	per cwt.	31/- & 47/-		51	0 0
* " Glacial	per ton	85 0 0		56	10 0
Arsenic, S.G. 2,000°	per ton	55 0 0		10	10 0
Boric, Crystals	"	72 0 0		19	0 0
*Fluoric	per lb.	0 0 7		15	10 0
*Muriatic (Tower Salts), 28° Tw.	per carboy	0 6 6		3	7 6
*Nitric, 80° Tw.	per ton	31 0 0		25	0 0
Oxalic	per lb.	0 1 2½		10	10 0
Phosphoric, 1,750°	"	0 1 9		16	0 0
*Sulphuric (fuming, 70%)	per ton	—		80	0 0
* " (Pyrites, 168°)	"	7 18 9		100	0 0
* " (" 140°)	"	4 10 0		0	5 7
* " (free from arsenic, 144°)	"	5 7 4		0	10 0
Tannic (commercial)	per lb.	0 2 6		0	10 0
Tartaric (crystals)	"	0 3 1			
*Acetone	per ton	80 0 0			
*Alum, loose lump (delivered)	"	17 0 0			
Alumina Sulphate (pure)	"	17 0 0			
Aluminoferrie (in slabs)	"	8 10 0			
Aluminium (Ingot Metal, 98/99%)	per ton	150 0 0			
*Ammonia, Anhydrous	per lb.	0 1 10			
* " 880	per ton	33 0 0			
* " 920	"	20 0 0			
" Carbonate	per lb.	0 0 6½			
" Muriate (grey)	per ton	50 0 0			
" (sal ammoniac) 1st & 2nd, per cwt.	80/- & 75/-				
" Nitrate	per ton	60 0 0			
" Phosphate	"	110 0 0			
" Sulphate (grey), London, net	"	—			
" " Hull	"	—			
" " Manchester	"	—			
*Aniline Oil (pure)	per lb.	0 1 2			
Aniline Salt	"	0 1 2			
Antimony	per ton	45 0 0			
" (tartar emetic), 43/44°	per lb.	0 3 4			
" (golden sulphide)	"	0 1 3			
Arsenic, white powdered	per ton	50 0 0			
Barium Chloride (in casks)	"	24 0 0			
" Carbonate (native), 92/94%	"	11 10 0			
" Sulphate (native levigated)	"	£7 to £14			
Baryta Chlorate	per lb.	0 1 3			
*Bisulphide of Carbon	per ton	55 0 0			
Bleaching Powder, 35%	"	15 0 0			
* " Liquor, 7%	"	6 0 0			
Casein (commercial)	"	82 0 0			
Chromium Acetate (crystals)	per lb.	0 1 6			
Calcium Chloride	per ton	8 0 0			
China Clay (at Runcorn), in bulk	"	70/- to 90/-			
Coal-tar Products and Dyes:—					
Alizarine (artificial), 20%	per lb.	0 2 0			
Magenta	18/- to 35/-				
Anthracene, 40/50% A, f.o.b., L'don, per unit,	6 to 7				
Benzol, 90's (naked)	per gal.	0 2 0			
" 50/90's	"	0 1 10			
Carbolic Acid (crude, 60°)	"	0 1 5½			
" (crystallised, 40°)	per lb.	0 0 6¼			
" Acid (pale liquid, 97/98%)	per gal.	0 2 9			
*Creosote (ordinary), naked	"	0 0 6½			
*Crude Naphtha, 30% at 120°C.	"	0 0 9			
*Grease Oils, 18° Tw. (naked)	per ton	6 10 0			
Pitch, f.o.b., Liverpool or Garston	"	2 14 0			
*Solvent Naphtha, 90% at 160°	per gal.	0 2 1			
Copper	per ton	96 5 0			
" Sulphate	"	45 0 0			
" Oxide (copper scales)	"	85 0 0			
Dross Salts	"	39 0 0			
*Glycerine (crude), 80%	"	72 0 0			
* " (industrial, S.G. 1,260)	"	110 0 0			
*Iodine	per oz.	0 0 10½			
*Iron Nitrate, 80° Tw.	per ton	12 0 0			
" Sulphate (copperas), delivered	"	4 10 0			
" Sulphide	"	7 15 0			
Lead (Foreign Pig)	"	25 0 0			
" Litharge Flake	"	45 0 0			
" Acetate (white), (ex ship)	"	84 0 0			
" " (brown)	"	75 0 0			
Lead, Carbonate (White lead), pure	per ton	51 0 0			
" Nitrate	"	56 10 0			
Lime, Acetate (brown)	"	10 10 0			
" " (grey), 80% (ex ship)	"	19 0 0			
Magnesium Chloride	"	15 10 0			
" Carbonate (light)	per cwt.	3 7 6			
" Calcined Magnesite	per ton	25 0 0			
" Sulphate (Epsom Salts) (coml.)	"	10 10 0			
" " (druggists)	"	16 0 0			
Manganese, Sulphate	"	80 0 0			
" Borate	"	100 0 0			
*Methylated Spirit, 64° (industrial)	per gal.	0 5 7			
*Naphtha (Wood), Solvent	"	0 10 0			
" " Miscible, 60° p.	"	0 10 0			
Oils:—					
*Cottonseed	per ton	135 0 0			
*Linseed	"	135 0 0			
Stearine, 115-120° M.P.	"	95 0 0			
Potassium, Bichromate	per lb.	0 1 6			
" Carbonate, 80/82%	per to	85 0 0			
" Chlorate	per lb.	0 1 1			
" Cyanide, 98%	"	—			
" Hydrate (Caustic Potash) 90% per ton	160	0 0			
" " 75/80% "	"	140 0 0			
" Potash Hydrate Liquid, 38° B.	"	70 0 0			
" Nitrate (refined)	"	60 0 0			
" Permanganate (B.P. crystals) per lb.	0	3 0			
" Prussiate (yellow)	"	0 1 9			
" " (red)	"	0 5 6			
" Sulphate, 90% (ex ship)	per ton	40 0 0			
" Muriate, 80%	"	30 0 0			
Silver (metal)	per oz.	0 4 9			
Sodium (metal)	per lb.	0 1 3			
" Acetate	per ton	52 0 0			
" Arseniate, 45%	"	50 0 0			
" Borate (Borax), Crystals	"	39 0 0			
" Bicarbonate (1 cwt. kegs)	"	9 10 0			
" Bichromate	per lb.	0 0 11			
" Carb. (Caustic Soda-ash), 48% per ton	12	10 0			
" " (Alkali), 58% (bags)	f.o.r. {	6 0 0			
" " (Soda Crystals), (bags)	4	2 6			
" Chlorate	per lb.	0 0 7			
" Cyanide (100% basis)	"	0 0 10			
" Hydrate (76% C. Soda) (f.o.r.)	per ton	24 0 0			
" " (74% C. Soda) "	"	23 5 0			
" " (70% C. Soda) "	"	22 0 0			
" " (60% C. Soda) "	"	21 0 0			
" (pure liquid, 90° Tw.)	"	10 2 6			
" 77/78% Powdered (99%) Hydrate	"	24 10 0			
" Hyposulphite (commercial)	"	16 10 0			
" Manganate, 25%	"	65 0 0			
" Nitrate, 96%, refd., f.o.r., L'pool	"	21 0 0			
" Nitrite, 100%	"	58 0 0			
" Phosphate	"	25 10 0			
" Prussiate	per lb.	0 0 7¼			
" Silicate (glass) Alkaline	per ton	12 5 0			
" " (liquid, 100° Tw.)	"	9 10 0			
" Sulphate (Salteake), delivered	"	3 0 0			
" " (Glauber's Salt)	"	3 0 0			
" Sulphide (conc.), 60/65% casks	"	20 0 0			
" Sulphite	"	9 0 0			
Sulphocyanide, Ammonium, 95%	per lb.	0 2 1			
" Barium, 95%	"	0 1 4			
" Potassium	"	0 2 4			
" Calcium, 70%	per lb.	0 1 4			
Sulphur, (Flowers)	Sicilian per ton	23 0 0			
" (Roll Brimstone)	"	21 0 0			
" Brimstone (best thirds)	"	—			
" (ex ship)	"	14 10 0			
Tallow	"	110 0 0			
Tin Crystals	per lb.	0 1 10			
" English Ingots	per ton	273 0 0			
Titanium, Potass. Oxalate	per lb.	0 1 6			
Titanous Chloride	per cwt.	4 10 0			
Zinc (Spelter)	per ton	40 0 0			
" Powder, 88/92°	"	70 0 0			
" Chloride (solution, 102° Tw.)	"	23 0 0			
" Sulphate, Crystal	"	22 0 0			

* Packages extra or returnable; otherwise prices usually include packages

THE CHEMICAL TRADE JOURNAL

AND CHEMICAL ENGINEER.

No. 1682.

LONDON, SATURDAY, AUGUST 16, 1919.

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Advertisers would oblige by writing advertisements and letters of instructions on separate sheets of paper.

EDITORIAL NOTICES.

INDEX.

Copies of the Index to Volume LXIV. (January-June, 1919), of the "Chemical Trade Journal and Chemical Engineer," which is now available, will be forwarded to those readers who make early application to the Publishers.

Readers are invited to forward items of intelligence, company reports and balance-sheets, or cuttings from local newspapers of interest to the trades concerned.

Articles, reports, and correspondence on all matters of interest to the chemical and allied industries, home and foreign, are solicited. Correspondents should condense their matter as much as possible, write on one side only of the paper, and in all cases give their names and addresses, not necessarily for publication. Sketches should be sent on separate sheets.

CURRENT TOPICS.

PATENTS AND DESIGNS.

THE conference on patents recently held in London and the fact that both the Patents and Designs Bill and the Trade Marks Bill have passed quickly through the Standing Committee stage of the House of Commons, enable a more or less definite review of the position to be given. One fact not unworthy of attention is that only 35 members out of a House of 700 took the trouble to attend on the occasion of the second reading debate and we are tempted to contrast that with the crowded Terrace on the occasion of the Pageant on the River Thames a few days later. This apathy on the part of our legislators is a little disconcerting at a moment when genuine hopes were being developed that the value of science and invention to the nation at large was receiving a greater measure of appreciation at the hands of Parliament and through it by the public. However, thanks to endeavours on the part of the scientific and technical societies in the first place, reinforced later by the Federation of British Industries, the ideas and demands of the industrial section of the community have been insistently impressed upon the Government, and we can have little hesitation in accepting the view of Sir George Croydon Marks, supported by Lord Moulton, that the 1919 Patents Bill constitutes a new charter for inventors, notwithstanding that it possesses certain points which, in the view of some people, are still unsatisfactory. The Standing Committee stage of both Bills was got through at one sitting of the committee in each case, and on the whole, it may be remarked that the almost obstinate policy which the Government appear to have developed of insisting in carrying measures more or less in the form in which they are originally introduced was again successfully adopted. In other words, the amendments accepted were but few. As we pointed out last week, two main points arose out of the Patents Bill; one, the question of meting out justice to patentees whose patents could not be worked

owing to the war, and, two, a reduction of renewal fees. The Bill dealt with neither of these matters as it was introduced and the Government resisted amendments to give effect to what was discussed at the conference. So far as the first point is concerned, therefore, the position is that the life of all patents in existence at the time of the passing of the Act will be automatically increased by two years, this two years to be added to the initial period of four years at present covered by a fee of £5, and if any patentee wishes to claim that he was damaged by the compulsory non-working of his patent during the war, he must apply under Clause 7 of the Bill for an extension on these grounds, the Court having power to grant an extension for a period of five years or, in exceptional cases, ten years. That of course meets the case up to a point, but it puts the patentee to a great deal of trouble and expense. Moreover, it rules out altogether the patentee whose patent has expired during the war and could not be worked during that portion of the war when it was not in force. An amendment by Sir G. Croydon Marks making the life of all patents 18 years instead of 14 years, apparently with the idea of covering the case of the non-worked patent during the war, although it would at the same time extend all patents, was resisted by the Government, and was withdrawn. Another amendment, giving effect to the views expressed at the conference, to reduce the renewal fees of £95 by half was also opposed by the Government and was also withdrawn. Clause 1, which deals with the prevention of abuse of monopoly rights received considerable criticism in committee, and the Government amended paragraph (c) of sub-section (2) by making it clear that unfair conditions would be regarded as an abuse of monopoly rights. Two other small amendments may be noted. One is that an independent tribunal is to decide the amount to be paid an inventor whose invention is used by the Crown, whilst the right of the Crown under Clause 15 in regard to the registration of a design is to be subject to an appeal.

The chief feature of the Trade Marks Bill is the introduction of a double register, Class A registrations being those at present in existence and accepted in future under the same conditions, whilst Class B will consist of registrations of trade names which at present are not registrable but in which, from long usage, the owners of particular goods have a proprietary interest. The chief fear of those who have entrusted this part of the Bill has been that registration in Class B will denote an inferior category, but that is not the intention. The two classes are intended to be of equal value, Class B making registrable, and therefore giving a status to, certain trade names which cannot be accepted under the existing trade marks law. As a matter of fact, we understand that the new classification is intended to benefit mainly the chemical industry and to protect it against the proprietary use of trade names by German chemical manufacturers in respect of substances which can commonly be made. The point is that many trade names in this country, which are recognised as referring to specified goods, cannot be registered abroad because hitherto they have not been acceptable in this country for registration; and registration under Class B should facilitate their adoption, and strengthen the position of the manufacturers abroad.

As we have already said, both Bills may be capable of further amendment, but it would obviously be impossible to express everybody's views because they would, in some respects, necessarily conflict. We believe the Government have made a genuine effort to hold the balance

evenly in a sincere endeavour to assist British trade by encouraging invention. Inventors naturally are but human and they may be inclined to take a rather too narrow view of matters concerning their own interests. Unfortunately past experience has given them good cause to investigate searchingly Government proposals in this respect and they are to be forgiven if they tend to go to the other extreme in what they demand. The position now, however, compared with what it was in 1907, has very much improved from the inventor's point of view, if only that we now have an Institute of Inventors which is backed up by some 25 of the leading engineering and scientific societies in the country and a Federation representing several thousands of millions of capital invested in industry. The 1919 Patents Bill is admittedly superior to the measure which was introduced in 1917 and quickly withdrawn, and except in respect of the two main points we have mentioned it has not met with considerable detailed criticisms. Anyway a good start has been made, and in regard to fees, that is not necessarily a point to be inserted in the Bill, because it can be dealt with under the powers of the 1907 Act. It is evident there is not time for the preparation this Session of that comprehensive measure by a committee representative of trade interests suggested at the conference by Mr. J. Hunter Gray, and what is now before Parliament will have to be accepted as something on account.

TRADE RETURNS.

The Board of Trade returns for last month, notwithstanding the improvement in the value of the total exports compared with a year ago, are the reverse of comforting in view of the very formidable increase in imports. Exports, valued at £65,315,000, were £21,671,000 higher than in July, 1918, but only about £750,000 more than in June of this year. The imports, on the other hand, were valued at £153,140,000 or an increase of £44,000,000 compared with the corresponding month of last year, and of £30,000,000 over the value of the June imports. Thus, the adverse trade balance, far from undergoing a drastic reduction, is considerably greater than at any time during the past five years. Chemicals, drugs, dyes and colours, on the export side, were valued at £1,985,000, an increase of nearly £162,000 over the value in the corresponding month of last year. The increase, of course, is satisfactory, but the total value is far behind what it was in the earlier months of the year. The shipments of bleaching powder, sulphate of copper, sulphate of ammonia and other chemical manures, muriate of ammonia, painters' colours and materials, nitrate, chromate and bichromate of potash, soda ash, sodium bicarbonate, sulphuric acid, and tartaric acid were on a larger scale. Declines in the exports of chemical products were few, and with the exception of "Chemicals, other sorts," which dropped from £600,000 to £372,000, were confined to certain coal-tar products, glycerine, and some of the soda compounds. Imports of chemicals and allied products were valued at £2,157,313, against £3,895,778 in July, 1918, a decrease of £1,738,465. The receipts of acetic acid, boracite, borate of lime, etc., calcium carbide, barytes, white lead, zinc oxide, and painters' colours and pigments were much heavier than they were a twelve-month ago, but decreases were shown in the imports of certain products, notably sulphur (from 171,200 cwt. to 1,013 cwt) coal products (not dyes), cream of tartar, glycerine, saltpetre, soda compounds, tartaric acid, and "chemicals, enumerated" (from £2,243,763 to £338,206.)

ALKALI INSPECTOR'S REPORT FOR 1918.

(Concluded from page 141.)

Chemical Manure Works.

THE number of registered works of this class was 142, an increase of four over 1917. This increase is notable as breaking the continuous gradual decrease in number of these works during the preceding eight years. There were also considerable alterations and improvements effected which gave increased power of production. The means provided for preventing escape of noxious gases were maintained in satisfactory condition.

AVERAGE OF TESTS TAKEN AT CHEMICAL MANURE WORKS.

Total Acidity in Terms of the SO 3 equivalent of Silicofluoric Acid (H ₂ SiF ₆). Grains per Cubic Foot.								
District.	Number of Exits tested.	Leaving Mixer and Den.			Number of Exits tested.	Leaving Condenser.		
		Maxi- mum.	Mini- mum.	Average.		Maxi- mum.	Mini- mum.	Average.
No. I.	4	38.50	4.80	17.09	4	0.10	0.07	0.09
" II.	6	9.20	0.80	6.19	6	0.20	trace	0.13
" III.	2	1.96	1.23	3.09	2	0.08	0.02	0.05
" IIIA.	4	7.68	6.15	6.92	4	0.09	trace	0.04
" IV.	1	—	—	3.30	1	—	—	0.10
" IVA.	1	—	—	2.80	1	—	—	0.33
" V.	—	—	—	—	—	—	—	—
" VI.	8	25.20	2.25	8.98	8	0.60	0.08	0.22
" VIA.	1	—	—	9.25	1	—	—	0.30
" VII.	7	18.75	0.81	7.41	7	0.27	0.03	0.10
						Average 1918		0.155
						" 1917		0.127

Much greater activity characterised this industry, and still greater production might have been achieved had available labour been more abundant. There was not the lack of sulphuric acid evident in the previous year, but the use of nitre-cake referred to in the report for 1917 as a method of producing superphosphate in the absence of sulphuric acid was continued, and is likely to become a permanent process, as it has certain advantages apart from the question of producing supers during a period of limited acid supply.

The use of mechanical dens extended considerably, to the advantage of the industry and the improvement of conditions in the works. The number and variety of designs of the dens are now considerable; in addition to those which have been in operation for a number of years, many new examples continue to be introduced. Mr. Littlefield, in his report on District IVA., comments favourably on the Sturtevant plant; and Dr. Fryer, in his report on District VIA., describes the new "Hill and Eden" design, which differs from others in its general features. He states that there is a mixer in continuous operation discharging into a series of dens, and proceeds: "The dens are four in number, being rectangular in form, 9ft. high by 5ft. square below and 4ft. 6in. above, each holding three tons of superphosphate. When one is filled, the false bottom is wheeled away on a trolley and replaced by a screen of pianoforte wires, and pressure is then applied to the top of the den, and the mass of superphosphate passes through the wire screen into a hopper below."

Sulphate and Muriate of Ammonia and Gas Liquor Works.

There was an increase of one in the total number of registered works in these two important groups. The total of 743 was composed of 632 sulphate of ammonia and 111 gas liquor works, as compared with 634 sulphate of ammonia and 108 gas liquor in 1917. Towards the end of the year there was a reversion towards the manufacture of sulphate of ammonia in several works where plant for production of concentrated ammoniacal liquor had been erected to meet the extensive but temporary demand for that product required for munition purposes.

Through the courtesy of manufacturers, I am again able to present figures showing the quantity of ammonia products manufactured in the United Kingdom as a by-product in the various industries named in the following statement.

The production and character of ammonia products continued to be influenced by war conditions. The total quantity produced was less than in 1917 by the equivalent of 26,066 tons of sulphate of ammonia; thus the first and the last year of the war were both associated with a reduction in recovery

of ammonia products, although in 1914 the reduction was only 6,206 tons. The shrinkage in 1918 was large when the expanding character of ammonia recovery for many years past is considered.

AMOUNT OF AMMONIA PRODUCTS MANUFACTURED IN THE UNITED KINGDOM (expressed in Terms of Sulphate 24½ per cent. NH₃)—Tons.

From Liquor produced in	1918.	1917.	1916.
Gas works	173,541	188,478	172,269
Iron works	12,717	13,621	15,151
Shale works	58,311	60,560	57,988
Coke oven works	161,418	166,354	159,506
Producer-gas and carbonising works (bone and coal)	23,534	29,604	28,786
Total	432,551	458,617	433,703

NOTE. Of the above total quantity of ammonia products the equivalent of 121,681 tons was manufactured as concentrated ammoniacal liquor; the balance of 310,870 tons consisted of other ammonia products (sulphate, chloride, nitrate, etc.).

Many influences tended towards a reduced production. Amongst those affecting gasworks may be mentioned the inferior quality of coal used in many works, the use of water gas, the large production of gas per ton of coal carbonised, the use of steam in vertical retorts, the production of concentrated ammoniacal liquor accompanied too frequently by a high working loss of ammonia, and a reduction in the quantity of gas consumed.

It may be well to point out, as a similar passage in last year's report was not fully apprehended by everyone, that a large production of gas per ton of coal carbonised and the use of steam in vertical retorts may lead to an increased recovery of ammonia per ton of coal; but if the weight of coal used per volume of gas distributed is more than correspondingly less, an increased recovery per ton of coal is associated, on a similar gas consumption, with a decrease in the actual quantity recovered.

There was, further, a reduction in the ammonia products recovered in shale works and in producer-gas and carbonising works, as well as a moderate reduction in ironworks.

From a recent report on mines and quarries for the year 1918 the following statistics have been extracted: There were 16,540 coke-ovens in use, comprising—7,013 of the beehive type, 2,217 of the Otto Hilgenstock design, 1,750 of the Simon Carvès design, 1,415 of the Coppee design, 1,361 of the Koppers design, 1,357 of the Semet Solvay design, and 1,427 unnamed.

It is noteworthy that all these designs of named origin are of foreign creation, as also are some at all events of the residue of 1,427 not specially particularised. The number of ovens of the beehive type is still large, but in some cases local conditions—such, for instance, as the total quantity of local coal—may not justify the expenditure necessary for the erection of the more elaborate recovery plants. Prior to the war the erection of recovery coke-oven plants seemed to have got under foreign, largely German, control. During the war important additions have been made to works of this class by British effort and British material, so that the future erection of such need not return under the former control.

The sulphuretted hydrogen evolved in course of dealing with crude ammoniacal liquor was disposed of satisfactorily by the methods previously in use. The oxide of iron purifier came into more extended use. In one works a Claus sulphur recovery plant, and in another works a combustion with subsequent neutralisation plant, were discarded and replaced by oxide purifiers of the heap type. In one works the general condition of the plant was allowed to deteriorate, but new condensers were being erected and other needful improvements were being effected at the end of the year.

A fatal case of gassing occurred in a gas-liquor works. Owing to omission to follow the proper procedure when taking steps to remove a blockage in the exit pipe from the decomposer in a plant for producing concentrated ammoniacal liquor in a coke-oven works, the attendant was overcome by the waste gases, which escaped in his vicinity instead of being directed into the channel provided for them.

A second fatality occurred in a sulphate of ammonia works from the action of the noxious gases evolved from gas liquor. A young woman who was operating the sulphate of ammonia

plant had apparently removed a plug from a vent hole in the pipe leading from the ammonia still to the saturator, and then left the plant for a short time. On her return it is probable that she endeavored to replace the plug, but was fatally affected by the discharge through the vent hole, which would consist mainly of steam, ammonia, carbonic acid, and sulphuretted hydrogen, with possibly also some hydrocyanic acid. Death was stated to be due to carbonic-acid poisoning, but other constituents of the discharge would also act prejudicially. A fatality arising in this way is most uncommon, and was not to be anticipated. Means have been provided to prevent by special ventilation a recurrence of so regrettable an experience.

New installations of the direct process in gasworks were put into operation, but in two gasworks this process was discontinued as unsatisfactory, and replaced by plant of the ordinary distillation type. In other gasworks the recovery of ammonia by the direct process was disappointingly low. It is only by careful attention to working conditions at the "bubbler," the ammonia still, and the gas purifiers that the best results can be obtained. At those works where this process has been specially studied further improvements in production were effected. In another works the yield of sulphate of ammonia per ton of coal carbonised was raised from 13lb. to 17lb.

SULPHATE MANUFACTURE WITHOUT SULPHURIC ACID.

Mr. Littlefield forwards the following remarks regarding a process for the manufacture of sulphate of ammonia without consumption of sulphuric acid, which has for some time past been under trial in District IVa:—

"Professor Cobb's process aims at utilising the sulphur contained in coal for fixing ammonia in gas as ammonium sulphate without the use of sulphuric acid supplied from outside. For this purpose the gas is passed through a centrifugal washer, and there treated with a solution of zinc sulphate. Zinc sulphide is precipitated, and ammonium sulphate is formed in solution. On filtration, the ammonium sulphate is recovered by evaporation. The precipitated zinc sulphide is roasted, and the roaster gases with excess of air are blown through water which contains in suspension zinc oxide from a previous roasting. Zinc sulphate is so regenerated and the cycle completed. Tarry matter does not interfere, because it is destroyed in the roaster. The process has been proved successful on the laboratory and small-scale works. The erection of a plant to make a ton of ammonium sulphate per day has been delayed by war conditions, but is now completed, and the process is undergoing trial on the full works scale indicated."

EFFICIENCY IN AMMONIA RECOVERY.

There were widely varying experiences in the manufacture of concentrated ammoniacal liquor as regards the working loss of ammonia. In some works this amounted to a serious figure, in others it was no greater than had been found to arise in the ordinary process of manufacture of sulphate of ammonia as previously carried on in the same works. As an example of one of the latter, I insert extracts of a letter I received in December last from Mr. W. B. McLusky, Halifax:—

"You will be pleased to know that the quantity of concentrated ammonia liquor recovered and available for sale during the eight months ending November 30, 1918, was equal to 30.54lb. of 24½ per cent. commercial sulphate of ammonia per ton of coal carbonised, as compared with an average of 25.31lb. for the previous 10 years on sulphate of ammonia manufacture, and 24.78lb. for the year 1917-18 on concentrated liquor production. The increase for the past eight months has been obtained despite the admixture of 31.9 per cent. of Durham coal."

"Owing to the irregularity in the size of coal received, the thickness of the charge of coal laid on the floor of the inclined retorts varies considerably. The percentage of ash in the various grades of coal also varies to a large extent, and the quality of the coal is variable, containing at times as much as four hundredweights of foreign matter per ton. Therefore our results vary considerably from week to week, and it has been difficult to fix the cause of the improvement in ammonia returns."

"Durham coal is very dry, and we have used the water-spray consistently; and we attribute the improved returns to this damping of coal and coal-dust, which has the effect of rolling the powder into moist nodules. The charge of coal in the retort is therefore more open, the interstices larger, and the steam generated not only keeps the charge more or less in a state of movement, but the puffing of the steam from the

interstices as the carbonising of the coal proceeds tends to form a protective envelope between the hot walls of the retort and the gas."

The use of steam in coal carbonising has, of course, long been recognised as a means for increasing the proportion of ammonia recovered, and this is one more instance of advantage so gained; but the high yield of an equivalent of 30.54lb. per ton of coal could only have been reached with an efficient plant for producing concentrated liquor, whilst the increase of the 1918 figures over those for the previous year point to increased efficiency from accumulated experience.

The loss of ammonia during handling and storing of ordinary liquor, referred to in the report for 1915, is naturally of much greater importance in the case of concentrated liquor.

UTILISATION OF NITRE-CAKE.

Dr. Fryer, in his report on District VIa., refers to the successful utilisation of nitre-cake for manufacture of sulphate of ammonia in the following terms:—

"It has been found easy of application to the present sulphate of ammonia plant. A suitable lead-lined box provided with grid and lead steam coils is the only extra plant required. A nitre-cake solution with an approximate content of 6 per cent. sulphuric acid is made by dissolving nitre-cake in water. The solution is fed to the saturator along with the acid in certain fixed proportions. The ammonia and steam passing forward from the stills in the case of ordinary sulphate of ammonia plants, or the ammonia with the coke-oven gas in the direct and semi-direct plants, enters the saturator; absorption of ammonia takes place, and the specific gravity begins to increase. After a time deposition of sodium sulphate containing some of the corresponding ammonium salt takes place. At this stage of the operation an excess of back pressure gradually begins to be thrown by the liquor in the saturator, and this is the signal for the ejection of some of the saturator liquor into the mother liquor well. Following the latter operation, the supply of acid and nitre-cake solution to the saturator is resumed till the normal level of the bath has been restored. Meanwhile, the solution discharged to the mother liquor well is cooling, and on reaching 46° C. practically the whole of the sodium sulphate will crystallise out. The specifically lighter mother liquor containing ammonium bisulphate and lesser quantities of sodium bisulphate is again injected to the saturator, and so a definite cycle of operations is established. The management of the Llwynypia by-products works of the Glamorganshire Coal Company have adopted this method of manufacture for over a year, and are well satisfied with the results obtained."

Owing to the diminished supplies of available male labour, women were employed to a considerable extent in many gasworks. The operation of the sulphate of ammonia plant was one of the numerous directions in which women efficiently carried out the necessary duties.

"DIRECT PROCESS" OF SULPHATE MAKING.

The working of plant for the manufacture of sulphate of ammonia by the "Direct Process" has been the subject of special study and research during the past four years. In these investigations typical plants have been kept under continual observation with a view to ascertain the causes of the periods of disorganisation which characterised the process at its inception. The conclusions arrived at from a study of the data furnished by this research have enabled various suggestions to be made for a more scientific control of purifier working, by regulation of temperature, ammonia content of crude gas, and humidity of oxide, and a reduction of working losses by better circulation of acid liquor in the "Bubbler," and more careful attention to the working of the virgin liquor still.

With respect to working losses generally, which are still regarded as exceptionally great at many of the works operating plant of the "Direct" type, further experience tends to confirm the conclusion arrived at in 1916—that too little attention is paid whilst distilling the virgin liquor to the due adjustment of the lime and liquor feeds; the ammonia content of virgin liquor is by no means a constant quantity, nor is the quality of the lime always beyond reproach; moreover, the advantage of a continuous lime feed is insufficiently appreciated, even at works where the scale of operations would fully justify its adoption. The following figures are of significance as indicating the difficulty of safeguarding losses in the effluent spent liquor from the still, even where samples are systematically submitted to analysis in the laboratory, and where in other respects the control of operations leaves nothing to be desired.

AMMONIA LOSSES,
AT PURIFIER AND STILL.

Entering Purifier.			In Effluent Spent Liquor.		
Date of Test.	Ammonia Grains per 100 Cubic Feet.	Equivalent to lbs. S/a per Ton Coal.*	Average for Month.	Ammonia Parts per 100.	Equivalent to lbs. S/a per Ton Coal.†
April			April	0.102	1.6
May			May	0.090	1.4
June 13th	0.5	0.04	June	Idle	—
„ 17th	1.2	0.09	July	Idle	—
July 3rd	2.0	0.14	August	0.114	1.7
„ 30th	6.1	0.46			
August 8th	8.0	0.58			
„ 20th	5.0	0.36			
Average ..	3.9	0.28	Average ..	0.102	1.6

NOTE.—* Taking 13,000 c.f. of gas per ton coal. A varying proportion of the NH_3 entering purifier is recovered in the condensed liquor
† Taking 40 gallons effluent per ton coal.

At three works the function performed by the "neutralising box" has been effected in a simpler manner, and at less cost, by the introduction of what may be termed a "neutralising pipe" in the "Bubbler." This pipe enables vapours from the ammonia still to be delivered direct to a point just above the bottom of the "Bubbler," which in this respect performs the function of a saturator. Very favourable reports have been received respecting the efficiency of this device, and its continued working will be watched with interest.

Picric Acid Works.

The number of registered works of this class fell from 21 in 1917 to 15 in 1918. In those works continuing upon the register a great fall-off in operations followed the completion of the armistice.

In the earlier part of the year recovery towers were brought into more extended use for recovery of nitric acid, which reduced the proportion of noxious gases discharged. Improved methods of manufacture were developed and brought into successful operation, but with the cessation of war conditions the future requirements of picric acid will be small.

Tar Works.

The number of registered works of this class was 375, an increase of 15 over 1917.

Owing to difficulties of transport and labour the stocks of pitch were unduly heavy in some localities, whilst in others there was an active demand.

The erection of tar dehydrating plants in gasworks continued to extend, whilst plants for the full distillation of tar also increased in number. In two works plant of the continuous type for distillation to pitch were in course of erection at the end of the year.

Through the courtesy of the owners, the Chief Inspector is again enabled to give some particulars as regards the operations carried on in these works throughout the United Kingdom:—

Tar distilled in:—	Tons.
Gas and coke oven works	1,510,065
Other works	131,325
Pitch produced in:—	
Gas and coke oven works	720,527
Other works	71,237

ALKALI WORKS IN SCOTLAND.

The number of works registered in Scotland was 166, a decrease of two from 1917. In many of these works more than one registered process was in operation. The number of these processes was 321, an increase of four over 1917. Of these 321 processes, 6 were alkali (saltcake), 2 alkali (wet copper process), 3 smelting, 19 sulphuric acid, 19 sulphuric acid (Class II.), 30 chemical manure, 13 gas liquor, 8 nitric acid, 109 sulphate and muriate of ammonia, 2 chlorine, 4 muriatic acid, 15 sulphide, 2 alkali waste, 13 lead deposit, 2 arsenic, 7 nitrate and chloride of iron, 1 bisulphide of carbon, 1 picric acid, 5 paraffin oil, 8 bisulphite, 50 tar, and 2 zinc extraction.

Alkali Works.

The registered works of this class remained unchanged in number or condition. They were conducted in a satisfactory way throughout the year. The use of mechanical furnaces continued to give satisfaction, alike as regards costs and as regards the maintenance of minimum escapes of acid gases at the furnaces. As in the majority of the works the operations

do not proceed beyond the production of saltcake and hydrochloric acid, there is not the same opportunity of introducing electrolytic methods which produce in a direct way caustic alkali and chlorine.

Attention continued to be given to the alkali waste heap which in the recent past gave cause for special consideration, and improved conditions were maintained during the year.

The average amounts of muriatic acid escaping per cubic foot of chimney gases were: Maximum from any one works, 0.146 grain; minimum from any one works, 0.024 grain; average for the district, 0.058 grain.

Smelting Works.

The acidity of the chimney gases discharged from the three registered works of this class was very slightly higher than in 1917. Operations were restricted owing to scarcity of the requisite raw materials, so that the total volume of chimney gases discharged was smaller. Very slow progress was made with the erection of plant, referred to in the report for 1917, for the manufacture of sulphuric acid from the acid gases developed during the calcination of zinc sulphide ores, and it was not completed at the end of the year.

The average amounts of total acidity per cubic foot of chimney gases were: Maximum from any one works, 1.58 grain SO_3 ; minimum from any one works, 0.10 grain SO_3 ; average for the district, 1.03 grain SO_3 .

Sulphuric Acid Works.

The pressure upon this class of works for maximum output was lessened, and permitted of greater opportunity for repair and reconstruction of plant, of which advantage was taken to effect extensive improvement.

In one works the trial of a combination of an intensive working section and an ordinary chamber section did not give the improved results looked for.

One of the units of the sulphuric acid plant at a registered works was provided with an oxide of iron contact tower placed between the burners and the Glover tower. This was brought into operation in the course of the year, and was accompanied with a reduction by one-third of the nitre required to work the process. This is, so far, a satisfactory feature, and the further experience from continued working of this unit will be watched with interest.

The system referred to in the report for 1917 of a more complete observation of the chamber process by testing the gases at successive stages had to be relinquished in part, owing to unusual and excessive demands upon the chemical staff from other departments in the works in question. It is hoped, however, that this subject will again be taken up and applied even more fully than had previously been the case.

The average amounts of total acidity per cubic foot of residual gases discharged were: Maximum from any one works, 1.61 grain SO_3 ; minimum from any one works, 0.26 grain SO_3 ; average for the district, 0.76 grain SO_3 .

Sulphuric Acid (Class II.) Works.

CONTACT PROCESS WORKS.

Works using three types of contact plant continued in satisfactory operation. In one works a new platinum contact plant was put into operation, which gave much cause for anxiety. When started it gave rise to local complaint of excessive discharge of acid gases, and was not efficient as a producer of "oleum." It was only kept temporarily in operation, and is not working for the present.

CONCENTRATION PROCESS WORKS.

Kessler, Gaillard, cascade and glass retort plants continued in operation without any change in the means for preventing undue escape of acid gases. The acidity of the gases discharged into the atmosphere was in all cases well below the maximum of 1.5 grain SO_3 per cubic foot recognised by the Act.

In two cases, however, complaints were made of annoyance from discharged fumes. In one case the chimney receiving the waste gases from acid concentration was increased in height and means taken to increase the volume of discharge from the chimney by dilution with air, in order still further to reduce the proportion of acid present, although it was already well below Act requirements. In the second case, owing to a defective flue, there was some low-level escape. The owners at once stopped operations and put the plant into order, which completely removed all cause of dissatisfaction.

The average amounts of total acidity per cubic foot of chimney gases in those works in which a chimney was used

were: Maximum from any one works, 0.85 grain SO_2 ; minimum from any one works, 0.27 grain SO_2 ; average for the district, 0.55 grain SO_2 . The average amounts of total acidity per cubic foot of residual gases from those works in which a separate outlet was used were: Maximum from any one work, 1.01 grain SO_3 ; minimum from any one works, 0.23 grain SO_3 ; average for the district, 0.57 grain SO_3 .

Chemical Manure Works.

The number of registered works of this class was 30, a reduction of one from 1917. Although the number of works was less, the production of chemical manure was much greater, and materially exceeded that for 1917, which was quite up to the pre-war figure. Indeed, the quantity of 76,800 tons of phosphates and bones dissolved for this manufacture is the largest on record for Scotland.

A further increase in the use of mechanical dens was made, a development to be welcomed, improving as they do alike the conditions inside the works with capacity for production.

The treatment of the noxious gases evolved continued to be satisfactory, save, temporarily, in one works, where, owing to failure of certain luted connections, an escape of noxious gases occurred. The fault was quickly remedied, and the normal satisfactory conditions reinstated.

Sulphate and Muriate of Ammonia and Gas Liquor Works.

The number of these two associated classes of work increased by two, two additional being registered as gas-liquor works, whilst the sulphate and muriate of ammonia works remained unchanged.

The means for preventing undue escape of noxious gases remained in use without alteration, and were maintained in satisfactory condition.

The requirements of concentrated liquor for munition purposes led to activity in the gas-liquor works for the greater portion of the year; but with the cessation of active military operations these requirements no longer continued on so extensive a scale, and towards the end of the year there was in many such works a return to the manufacture of sulphate of ammonia.

Nitric Acid Works.

These works continued in active operation for the greater part of the year, but the altered position in November, as regards munition requirements, materially lessened the demand for nitric acid.

In one works the oxidation of ammonia to oxides of nitrogen by a catalytic method was successfully applied to the manufacture of nitrates, but the altered position at the end of the year led to the stoppage of these operations. In this case, as in the others, the prevention of atmospheric pollution was adequately and satisfactorily effected.

Zinc Works.

One of the two registered works of this class required much attention. Notwithstanding the value of material recoverable from the fumes discharged into the air, the use of suitable appliances was not regularly maintained, chiefly owing to labour difficulties. As a consequence, the amount of fume permitted to escape left much room for improvement.

UTILISATION OF WASTE SULPHITE LYES.

THE problem of effecting the utilisation of the waste sulphite liquors resulting from the wood pulp industry in Canada is dealt with in a publication prepared by the Forestry Branch of the Canadian Department of the Interior. The first difficulty in complete utilisation of the liquor is presented by the fact that only about 40 per cent. of the total liquor will drain off from the pulp without special arrangements for forced draining, and even with such equipment it would probably be difficult to recover more than 60 per cent. The remaining portions must be removed by water, which means a further dilution, and therefore an appreciable increase of the volume; requiring large-sized apparatus for handling. It is of great interest, therefore, to prevent a further dilution of the already very dilute liquor, as most of the processes of utilisation call for a concentration of the liquor. The fact that the economy of many of these processes largely depends upon the cost of evaporation—as the ten tons of liquor obtained per ton of pulp contain only 11 to 12 per cent. of solid substances—has made the question of evaporation one of the most important in the discussion of the waste

sulphite liquor problem. Various methods of evaporation which are as a rule carried out in connection with the simultaneous recovery of sulphurous acid are discussed.

The manufacture of ethyl alcohol from waste sulphite liquor is described, and the calculations, which are based upon the experience of operating sulphite spirit plants, give a manufacturing cost of 0.185 dols. to 0.32 dols. per Imperial gallon, which is considerably less than the cost of production of alcohol from grain. The main question is, therefore, whether there is a sufficient market for this alcohol, which without special purification contains certain impurities, especially methyl alcohol (about 3 per cent.). Canada produced in the calendar year 1916, 7.5 million gallons of crude petroleum valued at 392,300 dols. The imports of crude and refined petroleum were about 290 million gallons valued at about 14,000,000 dols. It can be seen that Canada is dependent on foreign sources for her supplies of petroleum and petroleum products. In 1916 the imports of refined and illuminating oils amounted to over 8,000,000 gallons valued at 540,000 dols., and during the same year 18,000,000 gallons of gasoline were imported. If industrial alcohol could be produced economically in Canada it would mean a saving in imports of over 4,000,000 dols. On the basis of a manufacturing cost of 0.185 dols. to 0.32 dols. per Imperial gallon for 100 per cent. alcohol from waste sulphite liquor there ought to be some hope, if suitable markets and legislation were provided, to introduce this alcohol for industrial purposes. The total production of alcohol from waste sulphite liquor would be about 3,320,000 gallons of absolute alcohol, which would assist in freeing Canada from dependence on foreign sources as well as utilise a waste product.

The manufacture of alcohol from waste sulphite liquor does not solve the waste liquor problem completely, as only about 15-20 per cent. of the total solid of the liquor is utilised. But the residual liquor from the alcohol process may be further used in the production of binding material, fuel, or using the dry substances for destructive distillation. The use of waste sulphite liquor products for cattle food has not given very satisfactory results, and as a fertiliser the waste liquor has only an indirect value, as it contains the chief chemicals required of a good fertiliser, namely, nitrogen and phosphate, in very small quantities. It may, however, be useful in mixture with other products such as cyanamide, and may improve a soil poor in humus on account of its organic substances, which form a good medium for the growth of nitrogen-fixing bacteria.

As a mordant the sulphite lignin, or more correctly the substances precipitated by albumin or gelatine or salted out with sulphate or chloride of sodium, have been proposed under names such as lignosin and lignorocin. Of theoretical interest, but as yet without any practical value, are the condensation products with aromatic amines and the preparation of azo-dyes by coupling aromatic di-azo compounds with lignin sulphonic acid or its salts, obtained from waste sulphite liquor.

Recently it was suggested that sulphur dyestuffs might be prepared by heating sulphonic acids or sulphonates with alkali sulphides or other sulphur-containing substances, dissolving the product in water and precipitating with acid, but all the attempts in producing dyestuffs from the waste sulphite liquor are still limited to laboratory experiments.

The precipitation of organic substances at high temperature and pressure, for use as a fuel or for destructive distillation, is probably, in the present form, not of immediate interest to Canada, but the development of this very interesting process should be followed by the sulphite pulp manufacturers.

PRICES OF OIL CAKES.—The Board of Agriculture give the following maximum prices per ton, ex mill to farmer, for home-manufactured cakes and meals: Linseed cake, containing from 8 to 10 per cent. oil, £25.; cottonseed cake (black), £20.; cottonseed cake (white), £19. 10s.; extracted palm-kernel meal (in bags), gross weight, £17.; ground-nut cake, decorticated, £24.; semi-decorticated, £22.; undecorticated, £21.; soya cake, £25.; extracted soya meal (in bags), gross weight, £25.; cocoanut cake (in bulk), £21.; rape cake, £18.; extracted rope meal (in bags), gross weight, £18.; sesame cake, £23. 10s. The above prices are net cash per ton, ex mill Hull, London, Bristol, and Liverpool, to the farmer. All distributing commissions to intermediaries are to be included in the above prices.

CHEMICAL INDUSTRIES OF INDIA.*

By DR. J. J. SUDBOROUGH AND DR. J. L. SIMONSEN.

(Concluded from page 144.)

Sodium Salts.

REFERENCE has already been made to three sodium derivatives—sodium carbonate and caustic soda and common salt (sodium chloride). Other salts to which attention may be directed are sodium sulphate and sodium silicate.

Sodium sulphate, or Glauber's salt, is already made in India in considerable quantity. It is obtained as a by-product in the manufacture of carbon dioxide (for soda water), which is prepared by treating sodium carbonate with sulphuric acid. Large quantities are also obtained as a by-product in salt-petre refining in Bihar. It may also prove possible to obtain it from bitters. Glauber's salt is used largely in cotton mills, in the manufacture of glass, and for dehydrating oils such as turpentine.

Sodium silicate is chiefly used in soap manufacture as a filling agent. It is prepared by treating sand with alkali under suitable conditions, and it is understood that it is now being made in Bombay on a small scale. The possibility of its being manufactured on a large scale in India would appear to be dependent on a cheap supply of fuel and alkali.

Potassium Salts.

The only potassium compound which occurs in large quantities in India is saltpetre. Appreciable amounts of this are recovered from old village sites in Bihar and the Punjab. The product obtained from the local refineries always contains at least 5 per cent. of common salt, and frequently as much as 20 or 30 per cent. This crude product was exported to France and other countries, where it was refined. A certain amount is now being converted into pure nitrate in Calcutta, but it is probable that, with more care and scientific supervision, it would be possible to produce in the local refineries a product containing 99.5 per cent. of potassium nitrate at much the same cost as it takes to produce 80 or 95 per cent. nitrate. Occasional occurrences of potassium salts are found in the Salt Range, but these are too small and irregular for commercial exploitation. Possible sources in the future are (a) potash feldspar, (b) ashes of plants such as the water hyacinth, (c) the ash from coconut shells, (d) the liquors from wool washing, (e) the gases from blast furnaces and from the flues of coke ovens. It is more probable, however, that acid potassium sulphate, obtained as a by-product in the manufacture of nitric acid, will provide a sufficient source of supply.

The chief salts for which there is a market are potassium carbonate (already made in some quantity), caustic potash, potassium chloride, and chlorate.

The carbonate is manufactured in India by igniting the nitrate with loss of the valuable oxides of nitrogen. The process is extremely wasteful, and is unlikely to meet with success in time of peace, unless the oxides of nitrogen can be utilised. Small quantities of the chloride have recently been made in Bengal from the ash of the water hyacinth, but it is doubtful if this method could compete with the high-grade chloride obtainable from extensive natural deposits in Italian East Africa. The quantity obtainable from the former source is also not unlimited. It is mainly required for use as a fertiliser for jute.

The manufacture of potassium chlorate would also probably prove remunerative, as the demand is likely to increase with expansion of the match-making industry.

Magnesium Salts.

Apart from magnesium carbonate or magnesite, there are two salts of magnesium of technical importance—namely, magnesium chloride and magnesium sulphate. These two salts can be obtained readily from bitters. This source of supply is already being exploited by one firm of chemical manufacturers for the production of magnesium chloride. Their product, however, is not by any means a satisfactory article, and frequently contains considerable quantities of other salts. With unlimited supplies of raw material available, there should be, under scientific supervision, little difficulty in placing a pure product on the market.

Magnesium sulphate, or epsom salts, can also be obtained from the bitters, but so far this has not been attempted on the large scale. The salt has been made from magnesite by treatment with sulphuric acid—an uneconomic process, and one which it will not pay to continue after the war, unless the carbon dioxide can be collected and sold, and unless the sul-

phuric acid can be obtained at a cheaper rate, as the value of the acid required is greater than that of the salt obtained.

Zinc Salts.

When the distillation of the zinc concentrates from Burma is undertaken in Singhbhum, the manufacture in India of the various zinc derivatives of technical value could be developed without difficulty. The three most important are zinc oxide, zinc sulphate, and zinc chloride. This last is already being manufactured on a considerable scale, in solution, and about two hundredweights of the anhydrous salt have been prepared in the form of sticks for medicinal purposes. It finds its chief application in cotton mills, for preserving wood, for making soldering solution, and is also used as a disinfectant and deodorant and in medicine as a caustic. In the manufacture of white vitriol and also of zinc chloride, crude hydrogen is produced as a by-product, and the cost of the salts would be reduced if use were made of this hydrogen. It would not repay to purify it for the purpose of hydrogenating oils, although it could be burnt and used for generating steam or for concentrating solutions. The successful production of these salts depends largely upon the cost of fuel and also of sulphuric and hydrochloric acids.

Alums.

The local extraction of aluminium sulphate and the manufacture thereof of alums has long been an Indian industry. Aluminium sulphate is extracted from pyritic shale, which is found mainly in the Punjab. The shales contain about 9 per cent. of sulphur, and the aluminium sulphate is extracted by roasting the shale, lixiviating and concentrating the crude aluminium sulphate solution. A mixture of crude chlorides, nitrates and sulphates of sodium, and potassium is then added, and the alum crystallised. The product is mainly soda alum, and finds its chief market in the Delhi district, where it is used in the tanning and dyeing industries. Crude aluminium sulphate, "alum cake," is also being made by several chemical firms in India from bauxite, but unless the present price of sulphuric acid is very much reduced there would appear to be little prospect of this product competing with the imported article. It is largely used for water purification. Alum is also used for paper-sizing and in medicine.

Lead Salts.

With large supplies of lead readily obtainable from Burma, the manufacture of the various lead derivatives of commercial value should be an industry capable of considerable expansion. Litharge and red lead, both of value as pigments, are already being made on a considerable scale. The manufacture of white lead, probably the most important of all pigments, has not as yet been undertaken. The experiments which have been made on this subject by Drs. Sudborough and Watson at the Indian Institute of Science have now practically reached completion, and it is possible that they will shortly be developed on a technical scale. The method adopted is a modification of a German patent, and utilises metallic lead and acetic acid as the starting material, with a periodic replacement of small amounts of acetic acid lost in the process.

Chromium Salts.

Owing to the increased demands for chromium for metallurgical purposes, the internal and external demands for chrome iron ore are gradually increasing, and the sources of supply being rapidly opened up. The chief deposits of chrome iron ore are in Mysore, Baluchistan, and Singhbhum. Attempts on a comparatively small scale have been made to manufacture the various chromium salts, such as sodium and potassium chromates, dichromates and alums, which are of technical importance, being used in chrome leather manufacture and in khaki dyeing. There should be no difficulty in making these products in India, provided cheap fuel, sodium carbonate, and potassium carbonate are available. For manufacturing sodium chromate the finely divided ore is roasted in a reverberatory furnace for several hours with lime and sodium carbonate, the resulting mass extracted with water and the aqueous solution evaporated.

Within the last few years appreciable quantities of chrome tanning liquor have been made in India from imported sodium dichromate, sulphuric acid, and jaggery. It should be possible to make products of the nature of "tannolin" in India.

Lead chromate is also of commercial value as a yellow pigment, and could easily be produced if sodium chromate were manufactured in the country, as it is prepared by precipitating a solution of lead acetate with one of sodium chromate.

* Indian Munitions Board Industrial Handbook, 1919.

It is largely used as a pigment, and also in calico printing, and is the chief constituent of all the members of the group of chrome yellows—e.g., Cologne yellow, Paris yellow, and Leipzig yellow. By mixing with Prussian blue, these yellows give the Brunswick greens; and by treatment with alkali, various orange and red pigments—e.g., Chinese red and American vermilion.

Although the imports are comparatively small, the demands for chromium salts for chrome leather tanning are likely to increase, and the manufacture of these salts in India in quantity sufficient to meet the Indian demands and also for export appears to be worthy of consideration.

Iron Salts.

The only iron salt manufactured in India on a large scale is ferrous sulphate or copperas, which is prepared by treating scrap iron with warm dilute sulphuric acid. This salt is largely used in dyeing and tanning and in the manufacture of inks, Prussian blue, and other pigments. The production in India has developed since the outbreak of war, and as a result the imports have shown a large diminution. The success of the manufacture after the war will depend solely on a cheap supply of sulphuric acid being available. The present output is approximately 1,000 tons per annum.

Cyanides and Ferro-cyanides.

In view of the dependence of the gold mines on an adequate supply of either sodium or potassium cyanide, it would appear to be highly desirable that the manufacture should be undertaken locally. One method adopted is to treat a mixture of sodium or potassium carbonate and charcoal with ammonia gas under suitable conditions (Beilby's method), whilst another is to fuse nitrolim with salt. The latter method, which yields a crude product (30 per cent. sodium cyanide) suitable for gold extraction, might prove the more suitable if the manufacture of nitrolim is undertaken in India.

It would appear to be very doubtful if the preparation of ferro-cyanides could with advantage be undertaken in India. The ferro-cyanides are obtained as by-products in gasworks, and the price is therefore extremely low. Small quantities of potassium ferro-cyanide have been made in India by the old method from horns and old organic matter. This process would not appear to be likely to be remunerative after the war, as the yields are always poor. The ferro-cyanides are mainly used for the manufacture of pigments, such as Prussian blue.

Acetic Acid.

The world's chief source of acetic acid is the crude pyroligneous acid produced during the destructive distillation of wood. The crude acid is redistilled, neutralised with lime and the solid calcium acetate, heated preferably under reduced pressure, with sulphuric acid. As the number of wood distillation factories has increased, it is probable that after the war the supply of acetic acid and acetates from pyroligneous acid will be large and prices low.

Numerous experiments have been made in recent years on the production of acetic acid from other sources, and a large number of patents have been taken out. A method which appears to have commercial possibilities is the conversion of acetylene made from calcium carbide into acetaldehyde by the addition of water in the presence of small amounts of mercury salts, and the subsequent catalytic oxidation of the aldehyde to acetic acid. This method is of no value in India unless calcium carbide is manufactured in the country at a low cost.

Another process consists in passing alcohol vapour and air over a catalyst, such as metallic copper, condensing the acetaldehyde, and oxidising this by atmospheric oxygen in the presence of a catalyst. In a hot climate like that of India, the cost of condensing the volatile aldehyde vapour would be a disadvantage.

The oxidation of alcohol to acetic acid by means of sodium dichromate and sulphuric acid, and the subsequent recovery of the dichromate by electrolytic oxidation, has been studied by Mr. Usher in Bangalore.

Methyl Alcohol.

Crude methyl alcohol, known under the name of wood spirit, is one of the by-products obtained from wood distillation factories. It is usually obtained by neutralising the redistilled pyroligneous acid with lime, and distilling the neutralised liquid in steam-heated pans provided with fractionating columns. At present it is not produced in India, but immediately wood distillation plants are installed appreciable amounts should be available. The normal pre-

war price in England was Rs. 1.12 per gallon, but in 1918 the price had risen to Rs. 12.8 per gallon. Very large amounts have been produced in Europe and America. The average yearly import for the period 1913-15 into Great Britain was more than half a million gallons.

One of the chief uses of wood spirits is as a solvent, more particularly in the manufacture of spirit varnishes. Enormous quantities are also used as a denaturant for alcohol. The product known as methylated spirit usually contains 90 per cent. of rectified spirits and about 10 per cent. of wood spirits, together with small amounts of such substances as pyridine. Wood spirit is not used as a denaturant in India, probably owing to its scarcity. If manufactured in the country, appreciable amounts might be used for this purpose.

Since the outbreak of war oxalic acid has been manufactured on a small scale in India by fusing sawdust with caustic soda, whilst a patent for its extraction from "sal" bark, the fibrous bark of *Shorea robusta*, has also been taken out. The lack of a cheap supply of caustic soda and caustic potash has probably retarded any extensive manufacture from sawdust in India. In Europe it is now as a rule manufactured from sodium formate, which is cheaply prepared by treating sodium carbonate and lime under pressure with power gas rich in carbon monoxide.

Formic and oxalic acids and their salts are used mainly in the dyeing industries and for medicinal purposes. Within the last few years appreciable quantities of formic acid have been used in dye works and tanneries owing to the difficulty of obtaining lactic acid.

Citric Acid.

It would appear probable that the manufacture of citric acid could be undertaken with advantage in India, provided that limes were cultivated in plantations for the purpose, and the juice collected in a central refinery, where it could be worked up in large quantities and the essential oil also extracted. A cheap supply of sulphuric acid would also be requisite for success, since the acid is purified by conversion into the calcium salt, which is decomposed by the addition of the necessary quantity of sulphuric acid. The imports of citric acid are not large, and it would be necessary to export a portion of the products of the factory.

Tartaric Acid.

Tartaric acid is manufactured in Europe from by-products obtained in the manufacture of wines by the fermentation of grape juice. The two chief sources are "argol," or slightly impure potassium hydrogen tartrate, which separates as crystalline crusts on the sides of the vats and "lees," which is highly impure potassium hydrogen tartrate mixed with yeast and various other organic substances. The higher grades of argol are usually recrystallised, and thus yield the pure potassium hydrogen salt known commercially as "cream of tartar," whereas the lees and the lower grades of argol are used for manufacturing the free acid.

These sources are not available in India, and the only material which appears to be at all suitable is the pulp of the tamarind fruit. This pulp contains about 12 per cent. of tartaric acid, mainly in the form of the free acid, but partly as the potassium hydrogen salt. Small quantities have been prepared from this source, but its production in larger quantities could only be profitable in normal times if the pulp could be obtained at an extremely low price. It is possible that its manufacture in Indore, where tamarinds can be bought at about Rs. 1 to Rs. 1.5 per cwt., might pay. The pulp, as regards its tartaric acid content, is only comparable with low-grade "lees," as many of these contain 25 to 30 per cent. of tartaric acid, and the method of manufacture would probably be similar.

CITY AND GUILDS INSTITUTE.—The Council of the City and Guilds of London Institute has awarded Diplomas of Associate to the following students who have completed a full course of instruction at the close of the present session: In Engineering, to students of the City and Guilds (Engineering) College: J. de Aguiar, R. H. Barfield, J. A. A. Best, C. Grad, A. G. Griffith, T. J. Griffiths, F. St. A. Hartley, G. H. Hopewell, E. W. A. Janmouille (Siemens Medal), A. A. de Lemos, K. P. P. Menon, R. B. McC. Potter, J. H. Reyner (Henrici Medal), C. J. H. Trutch, S. Vaughan, A. C. Warren (Henrici Medal), H. C. Wilkinson, E. W. Workman, and R. G. P. Wyatt (Branwell Medal). In Applied Chemistry to students of the City and Guilds Technical College, Finsbury: E. Fisher, J. R. Fraser, F. D. M. Hocking, S. J. Hopkins, L. Mendel, N. Plotzker, N. Singer, C. E. Spearing, H. G. Tribble, and H. B. Williams.

SULPHUR SITUATION IN NORWAY AND SWEDEN.

Norway.

ALTHOUGH there are no deposits of native or pure sulphur in Norway, the large deposits of iron and copper pyrites overcome the deficiency in many respects. While pyrites constitute one of the leading exports from Norway, they are also extensively used in connection with the sulphite paper-pulp industry. The introduction of the pyrites process has been progressing rapidly among Norwegian sulphite pulp mills since 1904, and now it is reported that the greater number of the mills are so equipped, and hence normally use pyrites instead of sulphur. Some conception of the use of pyrites in Norway may be obtained from the following figures showing in metric tons the production of pyrites (including cuprous pyrites of low copper content—from 2 to 4 per cent.): 1911, 369,055; 1912, 464,326; 1913, 441,291; 1914, 414,886; 1915, 513,335. Production statistics subsequent to 1915 are not available, but it is quite certain that the annual production has been at least as great as in that year, inasmuch as the markets called for all the pyrites obtainable, and at relatively high prices.

During the war the exports of pyrites did not keep pace with the increased production. This signifies that the domestic use of pyrites increased quite sharply after 1914. This fact must be kept in mind when interpreting the decreased sulphur imports during the same period. Exports of pyrites during the last five years were, in metric tons, as follows: 1914, 360,228; 1915, 466,759; 1916, 253,362; 1917, 212,909; 1918, 240,774.

The pre-war use of sulphur was almost twice as large as the use since 1914. In this connection, however, two qualifying influences must be considered: In the first place, the decreased use of sulphur was undoubtedly due in part to the substitution of pyrites for it in the pulp mills, and also to the use of substitutes in other lines, because of the sharply advancing prices of sulphur since 1914. Secondly, however, there is a probability that the stocks of sulphur in the country have been almost completely wiped out since 1914, and thus the actual use since that date has been somewhat greater than the records indicate. The average annual imports, 1910-1914, were 11,746 metric tons, while the average annual imports, 1915-1918, were only 5,294 metric tons. Prior to the outbreak of the war the principal sources of supply were Great Britain, Italy, and Spain, while during 1915 and 1916 Great Britain and Italy furnished almost the whole supply. Detailed statistics are not available since 1916, but it is known that in 1918 the United States furnished more than 50 per cent. of the imports.

The greater part of the sulphur imports are used by the sulphite mills which are still employing the sulphur process. Statements made by engineers as to the total quantity of sulphur needed by these mills annually vary from 4,000 to 8,000 tons. It seems very probable that the demand for sulphur by the sulphite mills, if operating at abnormal capacity, would be between 4,000 and 5,000 tons. Minor sulphur-using industries, such as explosives and chemical industries, are estimated to use approximately 2,000 tons. From this it appears that the probable consumption, and hence the import demand of sulphur, is about 7,000 tons. Inasmuch as the sulphite mills constitute the leading market and are the most prominent importers of sulphur, it is to them that sulphur exporters must turn for their largest market.

The present situation of the sulphur market is one of uncertainty, because of several factors. It is reported that Italian sulphur has been offered, but prices have not been made public. It is very probable that British sulphur will again become available, and if so, the nearness to the Norwegian market is, of course, a very large factor to its advantage. Finally, the sulphite mills are facing difficulties with respect to marketing their products. Conditions in the sulphite pulp industry have been growing steadily worse since January, until now there are rumours that extensive shut-downs are probable. If these should occur, they would, of course, automatically close the largest sulphur market in the country. Until these conditions become settled, conservatism in buying large quantities of supplies may be expected. On the other hand, should the sulphite pulp situation be relieved, it seems certain that an active market for fairly large quantities of sulphur may be expected in Norway.

Sweden.

The pre-war consumption of sulphur in Sweden was about 40,000 tons yearly, for which supply consumers were entirely dependent upon imports, there being no domestic production. As a result of conditions brought on by the war, the state of the Swedish sulphur market is more or less uncertain, and future consumption depends primarily upon the price quoted.

The principal consumer of sulphur in Sweden is the cellulose industry, whose supply is purchased by a centralised society, known as the Pappersbrukföreningen. The quantity used by the chemical and match industries is small, amounting to a few thousand tons yearly.

Formerly the bulk of Sweden's imports of sulphur came from Sicily, some came from Great Britain. At present great interest is being exhibited as to the ability of America to enter the market with the proper price requirements. It has been mentioned that Japan also will soon enter the market, thus adding a new factor.

Due to the great increase in price and the difficulty of obtaining sulphur the great majority of the cellulose factories have been readjusted. These plants found it necessary to make use of the Norwegian pyrites, and they are now so equipped that they can use either pure sulphur or pyrites. Cellulose manufacturers expect to continue on their existing contracts for pyrites unless there is a reduction in the price of pure sulphur.—*U.S. Com. Reps.*

INDUSTRIAL SYNTHETIC AMMONIA.

IN a communication presented recently to the Académie des Sciences, M. Georges Claude, well known by his work on the liquefaction of gases and the isolation of the rare gases, submits some considerations as to the future of the synthetic ammonia industry, which has taken so extraordinary a development during the war. In peace time, he points out, the object of the fixation of atmospheric nitrogen is essentially the manufacture of fertilisers. In the shape of liquid, ammonia is useless as fertiliser, and difficult to transport; the nitrate is valuable, but expensive; in the shape of sulphate, ammonia can be transported, but the sulphuric acid used for binding the ammonia is useless in the fertiliser, and thus a considerable fraction of the sulphuric acid manufactured is practically wasted. To reduce this cost, German chemists have, according to the reports of French chemical delegates, worked out a process of converting gypsum into ammonium sulphate. But we need not depend upon sulphate. According to Georges Ville, ammonium chloride is, as fertiliser, at least equal to the sulphate, and is less heavy and expensive in transport. Little would be gained, however, if the ammonia prepared were to be bound by hydrochloric acid instead of sulphuric acid. There is the ammonia-soda process successfully introduced by Solvay about fifty years ago after many failures. In this process large quantities of sodium chloride (brine) are decomposed with the aid of ammonia and carbon dioxide precipitating sodium bicarbonate; the carbon dioxide is recovered by heating the bicarbonate, and the ammonia is recovered by boiling the ammonium chloride with lime. The recovery is fairly complete, but the resulting calcium chloride is a troublesome waste product, often a nuisance. If it were not for this well-known fact, the ammonia-soda process, which has largely superseded the Leblanc process, would be almost supreme. What Claude now proposes is to separate and to precipitate both the sodium bicarbonate and the ammonium chloride by the repeated-precipitation method of Schreib. He does not say how and where this process is carried out. But the advantage would be obvious. The ordinary Solvay process shares with the old sulphuric acid process the feature that expensive materials (ammonia and nitric acid respectively) are utilised for the purpose of preparing relatively cheap products (soda and sulphuric acid). If the ammonium can successfully be obtained as chloride, and if it should really answer as fertiliser, there would be a new important industrial application of synthetic ammonia, and the chlorine of sodium chloride and the lime would no longer be wasted as they are at present in many plants. Claude concludes that every ton of fixed nitrogen would yield as by-product three tons of soda (sodium carbonate). That may be a legitimate form of expressing the problem. Yet one must remember that ammonium chloride has first to be tried as fertiliser. For one thing, the commercial sal ammoniac is apt to turn hygroscopic and acid; even the pure salt is difficult to pulverise, and therefore not a convenient material for fertiliser dressing.—*Engineering.*

EMPLOYMENT OF CHEMISTS IN CHEMICAL WORKS.

THE following remarks of Dr. T. Lewis Bailey are quoted by the Chief Inspector of Alkali, etc., Works, in his annual report for 1918:

The more extended employment of chemists in chemical works generally is a hopeful sign, though one regrets that repeated attempts at persuasion in this direction in past years received comparatively little notice; it seems to have needed the upheaval of war to bring about a realisation of the disadvantages under which so many works were carried on in days gone by, when manufacturers either would not employ chemists at all or would only have such men as had been trained in the works themselves for the special purposes of those particular works. One has heard so frequently the excuse that a University-trained chemist is useless in works—in such cases it seems to have been assumed that a man taken direct from the University should have been able to drop immediately, and without trouble, into the intricacies of a works laboratory and of works processes generally. There have been, undoubtedly, faults on both sides—on that of the University and that of the manufacturer. It is not desirable that educational institutions should attempt to train chemists simply and solely on a technical basis; the student should surely be given first a good sound scientific training, with a sufficiency of laboratory work to make him a painstaking and accurate manipulator, irrespective of the time taken to arrive at his results; then, and then only, should he be taught to adapt himself to questions of time saving and shortened or rapid methods, coupled with the degree of accuracy desired for the end in view. He will then appreciate truly the evolution of technical methods necessary for the rapid control of the results of manufacturing operations.

But training on either the one or the other of these lines only is surely insufficient to produce the character required for a satisfactory and successful works chemist, who may be required to take his place in ever varying branches of the industry.

Further, when the manufacturer gets the product of this training, he still must not expect to have a man who can at once take his place under technical conditions, of which he cannot possibly know all the details; the manufacturer must now take up and complete the training and ascertain what is the adaptability of the man in question. Some quite naturally become leaders of men, and so can in a short time be led on from the laboratory to process and even works management, in which, be it remembered, thorough knowledge of scientific principles is a necessity for the development and extension of the processes of manufacture—there is no finality and there can be no standing still. Others, again, have little ability as men leaders, but they may be excellent investigators and as such particularly suitable in other departments of a works which aims at being progressive. Simple process testers there will always be, but these are quite apart from the guiding hands and have no effect on development.

May the near future see this all-important question take its proper place as one for serious consideration in all works where there is any pretension to permanency. In the immediate past the idea of progressiveness has been left too much to others; the attempt to stay where we were and work ever on old stereotyped lines has been well-nigh disastrous.

EXPLOSION OF CHLORATE OF SODA.

AN explosion of chlorate of soda caused, it is believed, by the heat of the sun's rays striking through the glass roof of a shed on to a number of steel drums containing the product, occurred shortly before noon on Tuesday at the dye works of Messrs. Naylor, Jennings and Co., Green Lane, Yeadon, near Leeds, and was responsible for a considerable amount of damage. About eleven of the firm's workpeople were gassed by chemical fumes and as many more were cut by falling glass from the shattered roofs and windows. One man, Alvin Smith, of Guiseley, was injured seriously enough to necessitate his removal to the Leeds Infirmary where he received attention. The Leeds Fire Brigade were summoned, and meanwhile the workmen—there are 360 men and women employed by the firm—fought the flames with their own appliances, and the fire was extinguished in about half an hour. Where the drums of chemicals had exploded a hole several feet in diameter had been blown in the stout stone wall of

the bleaching house. An additional danger during the short time the fire lasted arose from a number of carboys containing various acids. They were very close to the flames but fortunately no further explosion occurred. No estimate has been made of the damage but the repairs to the various roofs and walls and windows will cost many hundreds of pounds. The damage is covered by insurance.

EXPORT OF SULPHATE OF AMMONIA.

IN the course of his address at the half-yearly meeting of proprietors of the South Metropolitan Gas Company, held in London on Wednesday, Dr. Charles Carpenter, chairman, said that if temporary hardships due to pre-war sliding-scale were inevitable, and he thought they were, an extension of the hardships under which they were working by restricting their overseas chemical trade was surely unjustifiable. Of their by-products, other than coke, ammonia was, before the war, the most valuable, and they exported nearly all they produced. Some years before the war they were aware that Germany was producing in increasing quantities an artificial product of the highest quality, and they realised that to compete they would have to work up to an equally high standard. They had spent much time and money in achieving this, and looked forward to the cessation of hostilities to commence again their valuable export trade. But one of the many Governmental controls—necessary during the war, but so loath to take the opportunity peace provided of returning to their pre-war callings—declined to issue to the company an export licence unless they would join in a pool and do the business through its machinery.

But for the surprises of the war that would seem an incredible attitude to be adopted by a Department of the Government which certainly had no mandate to encourage trusts. He thought they were a very dangerous weapon for Government officials to play with, and that, whatever restrictions might be necessary as to imports, the sooner restrictions with regard to exports were removed from goods manufactured in Great Britain and not required by her inhabitants, the better it would be for her and her industries. The company's stock of chemical products stood at nearly a quarter of a million pounds. It would be much better realised, and in the country's coffers. He ought to add that dealings in other ammonia compounds than the particular one in which they were interested, though their basic value was the same, were entirely unrestricted.

DISPOSAL OF GLYCERINE STOCKS.

THE Imperial Government (writes a well-informed South African Correspondent of the *Morning Post*), were naturally left at the close of the war with a large stock of glycerine, the equivalent, I understand, of somewhere about 18,000 tons of crude, which they have handed over to the United Kingdom Glycerine Producers' Association to sell under commission *pari passu* with their own stocks. The Government have, of course, paid for the whole of their stocks. The result of this deal is to put many pounds sterling per ton into the pockets of the soapmakers, wholly at the expense of the users of glycerine; it is also understood the combine are endeavouring to rope in the French producers as well, so that they will have effectively cornered the glycerine market and be in a position to name their own price.

This is a grievance especially to the South African mining industry, to which cheap glycerine for the manufacture of dynamite is a vital necessity. During the war the Rand gold companies only received a standard fixed price for their gold. This price left many of them without a profit, and it is a tribute to their patriotism that they continued to produce without complaint. Several mines are now on the verge of closing down, owing to higher wages and the enormous increase in the cost of mining supplies. No doubt in some measure this is due to profiteering and high sea freights.

But now the Government, by creating a corner in glycerine, will make dynamite exorbitantly dear. They are, in fact, giving a glaring example of the very profiteering against which they are now introducing a Bill. And they are also striking a very serious blow at one of the most important of the producing industries of the Empire, at a time when increased production is vital.

PARLIAMENTARY NEWS.

Alcohol for Industrial Purposes.

In the House of Commons, Sir F. Hall asked the President of the Board of Trade whether he is aware that the present duty on spirit adds so heavily to the cost of certain manufactured articles, especially those in which it forms the basis of the manufacture, as to render it impossible for British manufacturers to compete with Germany, having regard to the relatively low cost of spirit in that country; and whether he will consider the advisability of modifying the duty in such cases, and to that extent enable the British home trade to compete with German imports?

Mr. Baldwin: Methylated spirit, which is free of duty when made in this country, is allowed in the manufacture of a large number of articles in which the use of spirit is required by British manufacturers. In addition, pure spirit is, under certain conditions, allowed to be used by them free of duty in arts or manufactures under the provisions of Section 8 of the Finance Act, 1902. As at present advised, I do not think that any alteration of the law is called for, but if the hon. member has any particular manufacture in mind, and will put before me the case, I will consider it. Where imported articles contain spirit they are, of course, charged on importation with the full spirit duty.

Chemists' Salaries.

Mr. R. Young asked the Parliamentary Secretary (1) whether he is aware that in November, 1918, a letter, signed by the chemists in His Majesty's factory, Gretna, and other explosive factories, was forwarded to the then Minister of Munitions, asking him to receive a deputation with regard to their claim for a revision of salary; whether he is also aware that the Superintendent expressed himself as being in sympathy with the claim of the chemists, and that no reply has ever been sent to the letter; whether he will have this matter inquired into and full consideration given to the question of salaries; (2) whether he is aware that a memorial signed by the chemists employed at Gretna and other explosive factories was forwarded to the Department of Explosives Supply; whether any reply was given by the Department to this memorial; whether he is aware that the memorial asked that a minimum salary of £350. be paid to chemists on the grounds that, for purposes of efficient factory control and the maintenance of discipline, the principle must be admitted that any official should be paid more than individuals for whose work he is responsible and whom he controls, and that a considerable percentage of the operatives and tradesmen employed are paid more than the chemists, while a very large number receive about the same amount; whether any consideration has been given to this memorial; and whether it is proposed to grant the claim?

The Parliamentary Secretary to the Ministry of Munitions (Mr. J. Hope): The question of the salaries paid in national factories to chemists and other technical officers had been under consideration before the memorial was addressed to the Minister of Munitions on November 16, 1918, by the chemists employed at Gretna and other explosive factories, and at about the same time a memorandum was received from the Institute of Chemistry of Great Britain and Ireland which covered the whole ground of the memorial. This letter was communicated to the Government Departments concerned, and finally led to the appointment of a Committee by the Treasury. This Committee is examining, in consultation with the Departments, the question of the salaries to be offered to scientific and technical officers whom it is desired to employ in the Government service. I sincerely regret that owing to pressure of work at the time of the armistice a reply was not sent to the memorial. I think it right, however, to add that the Explosives Supply Department of the Ministry of Munitions did much during the war to improve the status of chemists employed in industry; and even after making full allowance for the increased cost of living, the scale of salaries paid by the Department can be compared favourably with the salaries paid by private firms under pre-war conditions. At the present the number of chemists employed in the Explosives Department is thirty-five, and owing to the cessation of production this number is being rapidly reduced.

Gretna Green Munition Factory.

Mr. Kellaway, replying to Mr. Rose, said: The total capital expenditure on the building and equipment of the Gretna Green explosives factory was approximately £9,184,000. The

cost of working the factory from September, 1916, to the end of September, 1918, has been about £12,769,000. The staple product of the factory was cordite, though considerable quantities of intermediate products were supplied to other factories. Taking cordite alone, the value of the total production of the factory is estimated at about £15,000,000, on the basis of the average cost of the cordite supplied from home contractors' works during the same period. Prior to Gretna coming into production, this country had been dependent on the United States for a large part of its cordite. Had we bought from America the quantity of cordite produced at Gretna, the cost at the high price to America in 1916 would have been £23,600,000. As I have recently stated in reply to other questions, a report on the future use of the factory is at present under consideration.

Mr. Kellaway, replying to a further question on Monday, said the average number of persons employed at the factory between December, 1916, and September, 1918, was 18,117. The number employed at present was round about 3,000.

National Smelting Company, Limited.

Mr. Holmes, on Monday, asked the Parliamentary Secretary to the Ministry of Munitions whether the National Smelting Company, Ltd., has resumed building operations at Avonmouth; if so, what is the nature of the arrangement which the Government has entered into with that company, or with other parties, to induce such resumption as the result of consideration of the whole position and consultation with experts; and whether the Board of Trade proposes to carry out the recommendations of the Post-War Sulphuric Acid Committee, which recommendations were endorsed by the Government representatives serving thereon?

Mr. Bridgeman: I have been asked to answer this question. The arrangements made between the Government and the National Smelting Company in 1917 have not so far been modified in any respect. The whole question of the future of the spelter industry in this country is receiving very careful consideration, but my right hon. friend is not at present able to announce any decision on the matter.

Enemy Trade Marks.

Sir F. Hall asked the President of the Board of Trade whether, in a case where a British subject has purchased during the war from the Controller appointed by the Board of Trade under the Trading with the Enemy Act, 1916, all the machinery, material, stock in trade, and other movable assets of a German enemy business, but excluding goodwill and trade mark rights, and has by means of such purchase since carried on the business and manufactured and sold proprietary articles identified with the business, he is or will be liable to any proceedings on the part of the German proprietor of the goodwill and trade mark in respect of such manufacture and sale?

Sir A. Geddes: By Article 297 of the Treaty with Germany, every sale of or in connection with an enemy-owned business under exceptional war legislation is confirmed, and no claim or action can be brought in respect thereof by the previous proprietor. As regards any use of trade marks other than authorised by the Board of Trade under such legislation, the only protection afforded by the treaty is that given in Article 309.

British Oilfields.

Mr. Jameson asked the Chancellor of the Exchequer whether he is in a position to give an assurance that down to this date nothing has been done to commit the country to the policy of establishing a new system of royalties upon oil, and that nothing will be done in this direction during the recess?

Mr. Chamberlain: The answer is in the affirmative.

Mr. Bonar Law, in reply to Mr. Spoor, on Monday, said: Until the Government have come to a decision as to the ownership of petroleum in the British Isles, the purchasers of land and petroleum rights are warned not to assume that the ownership of petroleum is vested in the owner of the surface rights.

Imports and Exports.

Major Hayward asked the President of the Board of Trade whether, in deciding the question of restricting the import of any individual article, the effect of such restriction on trade as a whole is considered; and if so, what bodies are consulted to this end?

Mr. Bridgeman: The answer to the first part of the question is in the affirmative. The existing list of restrictions is due almost entirely to the recommendations of the Imports Consultative Council.

British Cellulose Company.

Colonel William Thorne, on Wednesday, asked the Prime Minister whether his attention had been drawn to the increasing number of complaints in the Press respecting the delay in presenting the report of the committee of inquiry into the British Cellulose Company; whether the Government were keeping the report back until after the summer vacation; whether he could state how it was this committee had been so long, seeing that the original inquiry only occupied 34 sittings; and whether, seeing that if the committee of inquiry found the original charges correct it might be necessary to take proceedings against some of the persons implicated, he could now give a definite date by which the report should be laid upon the table of the House.

Mr. Bonar Law said the reasons for the delay were contained in the report which was laid on the table on Tuesday, and would be circulated to members as soon as it was printed.

LEGAL INTELLIGENCE.**Schliemann's Oil and Ceresine Company, Ltd.**

The Official Receiver in the Companies Winding-up Division of the High Court has now issued his report under the liquidation of Schliemann's Oil and Ceresine Company, Ltd., of London House, 8, New London Street, E.C. 3, from which it appears that the statement of affairs shows as regards creditors gross liabilities amounting to £7,903. 9s. 6d. The assets consist of cash in hands of Controller £9,165. 9s. 10d. and a good book debt of £38. 0s. 3d., making the total assets amount to £9,203. 10s. 1d., and disclosing a surplus of £1,300. 0s. 7d.

With regard to contributories, the paid-up capital of the company is £500., so that there is an established surplus of £800. after payment of the company's debts and the shareholders' capital. The expenses of the Controllship have amounted to £480. 17s. 9d. (including the Controller's remuneration and law costs and other expenses), and £450. has been paid as compensation and other expenses), and £450. authorised by the Board of Trade.

The Winding-up Order was made on July 17, 1917, on a petition presented to the Court under Section 1 of the Trading with the Enemy Amendment Act of 1916, following upon a winding-up of the company's business by a controller appointed under the Provisions Act.

The assets have been realised by the Controller (with the exception of a small amount of book debts), and the amount £9,165. 9s. 10d. shown in the statement of affairs represented the balance in his hands at the date of the Winding-up Order. The book debts have been collected by the Official Receiver.

Bankruptcy Examination.

At the Leeds Bankruptcy Court on Tuesday, Ernest Erwin Ferdinand Heesch, lately residing at 158, Woodsley Road, Leeds, and formerly carrying on business at 212, Wellington Street as manufacturer's agent, now residing at 59, Clarendon Road, and carrying on business at the Stansfield Mill Yard, 77 and 79, Kirkstall Road, as oxy-acetylene welder and chemical manufacturer, under the style of "The Gatap Company," came up for his public examination. The debtor estimated his gross liabilities at £1,013. 19s. 6d., of which £924. 5s. 1d. is expected to rank for dividend, whilst the total available assets amounted to £155. 15s. 7d., leaving a deficiency of £768. 9d. 6d. Debtor attributed his failure to "bad trade and losses in the chemical business owing to faulty manufacture."

Answering Mr. Clifford Bowling (the Official Receiver), debtor said he was 50 years of age, and "a Dane by birth and a German by conquest." He came to England in 1891, and in 1896 commenced business as a manufacturer's agent, dealing mainly with textile machinery made in Germany. In October, 1915, he commenced business under the style of the "Gatap Company."

The examination was subsequently adjourned until October 7.

COPPER PRODUCTION IN THE UNITED STATES.—According to advance statistics giving the production of copper in the United States in 1918, the smelter production of primary copper was 1,908,533,595lb., compared with 1,886,120,721lb. in 1917. The production of new refined copper was 2,432,000,000lb., an increase of 4,000,000lb. over that of 1917. In addition to their output of metallic copper, the regular refining companies produced bluestone having a copper content of 7,917,696lb.

CHEMICAL STANDARDS.

WITH the sanction of the Council of the Institute of Chemistry, the Standards Committee convened a conference, which was held recently, to consider whether it is desirable to provide for the preparation and distribution of samples of pure chemical substances, ores, metals, etc., of ascertained composition, for use as standards in analytical work. The conference was attended by representatives of the Federal Council for Pure and Applied Chemistry, the Chemical Society, the Society of Public Analysts, the Society of Chemical Industry, and the Institute of Metals.

On the understanding that the provision of standard samples of steel and iron had already been taken in hand by the Iron and Steel Institute, in conjunction with the National Physical Laboratory, and that the Institute of Metals and the National Physical Laboratory have under consideration the same problem with regard to non-ferrous metals, the attention of the conference was directed mainly to the advisability of providing authoritative standard samples of other chemical substances and the steps to be taken to attain that object.

In the course of the discussion, the conference agreed to the following conclusions:—That the provision of standard chemical substances was desirable, for the general use of both chemists in practice and students: That, having regard to the fact that such standards could not be provided without reference to methods of analysis, the scheme should not aim at restricting the choice of methods, but always at their revision and improvement, thereby diminishing the chances of discrepancy in results. Incidentally, by this means, science will be advanced and accuracy more generally attained. That, in view of the importance of analysis in carrying out the scheme, the whole matter should be referred in the first place to the Society of Public Analysts, with the suggestion that the Society should form a special Committee, on which representatives of the allied Bodies should be co-opted; That the Society be asked to frame a scheme for the consideration of the Federal Council for Pure and Applied Chemistry, reporting on its practicability, the cost of the investigations involved, and the organisation generally; That ultimately the scheme be submitted to the Department of Scientific and Industrial Research, and, if necessary, the support of the Conjoint Board of Scientific Societies should be asked to secure the co-operation of the Government in its fulfilment; That, in the event of the Government placing the matter under official control, provision should be made for the co-operation in the scheme of the recognised Bodies concerned with chemistry and their respective members; That copies of this report be forwarded to the Federal Council for Pure and Applied Chemistry and the Councils of the Chemical Society, the Society of Chemical Industry, the Society of Public Analysts, and the Institute of Metals.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

(SPECIALLY CONTRIBUTED.)

AT any other time than the present the decline in coal production would have severely affected the by-product industry. Output this week is twenty per cent. below that of the pre-holiday period, and it has been a struggle to satisfy adequately the requirements of the district. The Irish market is, of course, hard hit, the cross-Channel shipments being down some 3,000 tons compared with those of a fortnight ago. If more blast furnaces were on ordinary iron the difficulty of keeping the 380 ovens supplied with sufficient coal to maintain them in full blast would be considerable. The prospect, however, of any increase in the make of ordinary iron, and, therefore, of local coke being needed is as remote as ever. It is true that the steel trade is still busily engaged on the shipbuilding side, but most of the West Cumberland hematite ordinary iron is smelted for the rail makers, and American competition has almost completely knocked the bottom out of the rail trade. What precisely the demand is for ordinary iron will be seen next week if, as is expected, the West Coast iron smelters this week-end decide to re-open the market. They long ago sold their output to the end of September, and are now ready to accept business for the last quarter of the year. There is little movement to be recorded in the by-products market. Benzole remains as heretofore in keen demand both in Ireland and locally; the make of sulphate of ammonia is absorbed without exporting; pitch and creosote are both moving away fairly freely; naphthalene is dull and there is no sale for pyridine.

ITEMS OF INTEREST.

KNIGHTHOOD.—The name of Mr. James Wallace Paton, head of the Matchless Metal Polish Co., Liverpool, appears in the list of Birthday Honours, published on Wednesday, a knighthood having been conferred upon him.

SULPHURIC ACID MANUFACTURE IN JAVA.—Recent investigations have shown that the mud of Lake Telga Bodas, Java, contains 80 per cent. of sulphur, and the Dutch Government propose to erect a plant for the manufacture of sulphuric acid.

JAPANESE MATCH EXPORTS.—The Japanese match trade with Bombay and Calcutta, two principal importers, is experiencing a revival from the dullness recently experienced, and shipments to China, Formosa, and Java are increasing.

OBITUARY.—Mr. John Midgley Nicholson, of the firm of Messrs. J. Nicholson and Sons, chemical manufacturers, of Hunslet, Leeds, has died suddenly in London from pneumonia. He was the only son of the late Mr. Joseph Nicholson, of "Wheatfield," Headingley, Leeds. At one time Mr. Nicholson held a commission in the West Riding R.F.A. (T.), and during the war he joined the Sportsmen's Battalion and served as a ranker. He is survived by a widow and one son.

NON-FERROUS MINING.—The President of the Board of Trade has appointed a Departmental Committee to investigate and report upon the present position and economic possibilities of non-ferrous mining in the United Kingdom and to make recommendations as to such Government action as may be expedient in regard thereto. The members of the Committee are:—Mr. H. B. Betterton, M.P., chairman, Mr. H. F. Collins, Mr. J. Harris, Dr. F. H. Hatch, Sir Lionel Phillips, Bart., Mr. R. A. Thomas, and Mr. James Wignall, M.P. Secretary, Mr. W. Palmer, Gwydyr House, Whitehall.

JAPANESE ZINC.—During the war the Japanese zinc industry was very prosperous and large profits were made on ore which was imported from Australia and the French Indies. The signing of the armistice, however, had dealt quite a blow to this industry, and it is reported that it costs £40. per ton to produce Japanese zinc, while the market price is only £37. per ton. It is expected that this will result in a request for subsidies and import protection, since the deposits of Japanese ore are of such inferior quality that competition with imported ore cannot be met successfully.—*U.S. Com. Rep.*

DRUG AND CHEMICAL WORKERS' CLAIM FOR HIGHER WAGES.—A mass meeting of the Amalgamated Society of Pharmacists, Drug, and Chemical Workers was held in London on Saturday, in connection with the agitation for higher wages and shorter hours in the drug and chemical industry. The Society alleges that some of its members are very badly paid, the average wage for men being 50s. to 55s. per week, and for women 25s. to 30s. It was announced that the drug and fine chemical manufacturers were ready to meet the Society, but it was decided to take no action until the result of the negotiations was known.

CANADIAN CHEMICAL TRADE.—Canada's foreign trade in chemicals has declined greatly since last year. According to the Federal report for the month of June the decline is marked in regard to both imports and exports, dutiable and free goods. The cessation of munitioning is believed responsible to a large degree. Chemicals and chemical products entered for home consumption in June, 1918, are as follows:—Free, \$2,182,631; dutiable, \$1,557,109. For June, 1919, the totals are:—Free \$730,282; dutiable, \$1,069,999. Exports for June of last year totalled, domestic, \$3,362,107, and foreign, \$21,395. June of this year, domestic, \$1,611,294, and foreign, \$1,382,647.

DUTCH IMPORTS OF FERTILISING MATERIALS.—No figures are available concerning the Dutch imports of potash from Germany during 1916, 1917, or 1918. The imports of potash, including kainite, muriate, and manure salts, were, however, 163,748 metric tons in 1914, and 121,933 metric tons in 1915. During the war Germany followed a policy of demanding Dutch agricultural produce in exchange for potash; and in 1917 and in 1918 the terms asked by the Germans were considered very harsh by the Dutch farmers. During the 1914-18 period the imports of rock phosphate for home consumption were in metric tons, as follows, according to official statistics: 1914, 134,032; 1915, 46,587; 1916, 64,667; 1917, 5,000; 1918, none. Official statistics of the imports of saltpetre for home consumption during the same period are, in metric tons, as follows: 1914, 72,800; 1915, 50,874; 1916, 69,625; 1917, 49,932; 1918, 26,662.

NON-FERROUS METAL STOCKS.—The following particulars are published of the stocks (exclusive of old metal and scrap) in this country in possession of the Minister of Munitions on August 1, 1919: Copper, 37,230 tons; spelter, G.O.B., 23,168 tons; spelter, refined, 12,136 tons; aluminium, 10,500 tons; soft pig lead, 108,010 tons; nickel, 2,452 tons; antimony regulus, 4,411 tons.

BUSINESS NOTICE.—The firm of Dawson and Emerson, chemical manufacturers, Longroyd Bridge, Huddersfield, has been amalgamated with that of J. C. Bottomley, Brookfoot Chemical Works, Brighouse, Yorks. A private limited company has been formed, and will trade under the name of J. C. Bottomley and Emerson, Ltd., the directors being Mr. J. Floyd Bottomley and Mr. Louis Emerson. Business will be carried on at the same addresses, and under the management as before.

ZINC AND ZINC DUST PRICES.—The market for zinc dust is still brisk, and £70. per ton is quoted for Australian high-grade brand (88-92 per cent metallic zinc), f.o.r. Further sales of a substantial character have been made, mainly parcels to arrive. There is no increase to report in the price of Australian electrolytic zinc (99.95 per cent. metallic zinc), the price of which remains at £42. per ton, f.o.b., Australia, for direct shipment to New Zealand, India, South Africa, and the Far East.

FATAL ACCIDENT AT SOAP WORKS.—A verdict of "Death by misadventure" was returned at an inquest at Widnes on Monday concerning the death of George Kay, who was employed at the soap works of Messrs. William Gossage and Sons, Ltd., Widnes. The deceased man was engaged with a travelling crane at the works, and on Friday of last week he stepped on to a plank which broke in the centre, and precipitated him on to the floor below. He died later in the day without recovering consciousness.

CHEMICAL MANUFACTURE IN CHINA.—Several factories have been erected in the province of Kwan-tung for the production of sulphuric acid, caustic soda, creosote, stearine, glycerine, and soap. The raw materials are obtained from Manchuria, but as these are available from other parts of China, it may be possible to develop the chemical industry throughout the country. Oils for the manufacture of soaps and ointments, seaweed for the production of iodine, ample raw material for calomel, caffeine, and pitch; as well as for alcohol, ammonia, various acids, etc., are all obtainable.

SWEDISH SHALE-OIL INDUSTRY.—The experts for the investigation of the possibility of the Swedish production of mineral oils from shale have made their report, which contains a number of interesting figures. They have calculated the size of the oil-bearing shale-strata and the oil-content, and have found that the whole supply of oil-shales in the South of Sweden corresponds to 144 million tons of crude oil. Sweden's resources in oil-shale are by themselves sufficient to satisfy for a long time to come the country's requirements of oil, which are estimated at 150 million kg. per annum. In the present state of prices the costs of mining the shale are estimated at about 2.30 kr. per ton if about 50,000-100,000 tons are mined a year. Consequently the mining will be very highly dependent on the question of prices; but the experts are of the opinion that the inquiry they have made shows that, despite the very high prices during the war, a shale-oil industry would have been a very profitable undertaking. The necessity of a State subsidy for the industry in question is emphasised.

WELFARE ARRANGEMENTS IN OIL-CAKE MILLS.—The Home Secretary has made an order, under the Police, Factories, etc. (Miscellaneous Provisions) Act, that in all factories in which the manufacture of oil-cake is carried on the occupier shall provide and maintain for the use of all persons employed suitable protective clothing, accommodation for clothing put off during working hours, with equipment for drying it if wet. Adequate messrooms, warmed during meal-times, must be provided, together with washing facilities, including a supply of clean towels, soap, and warm water. Shower baths must be fitted, if one-half of the employees so desire, in the proportion of one bath to every fifty employees. A sufficient number of boxes or cupboards, containing specified first-aid requisites, must be installed, and if the number of employees exceeds 500 the occupier must provide and maintain in good order an ambulance room under the charge of a qualified nurse or other person trained in the rendering of first aid, who shall be readily available during working hours. The order comes into force on September 1.

CELLULOSE INQUIRY.—Lord Sumner's report on the Cellulose Inquiry was laid on the table of the House of Commons on Tuesday night, and will be published immediately.

MALAY STATES TIN EXPORTS.—It is reported officially from Kuala Lumpur that the July exports of tin from the Federated Malay States amounted to 3,756 tons, as compared with 2,873 tons in June and 3,373 tons in the corresponding month of last year. For seven months of the present year the export amounted to 22,145 tons, against 21,911 tons in 1918, and 23,005 tons in 1917.

CHEMISTS IN WAR.—The Chairman of the Proceedings Committee of the Institute of Chemistry has been requested to investigate the possibility of preparing an account of the services of British chemists during the war. The General Purposes Committee have had before them a schedule of possible contents of a book on the subject, and preliminary arrangements have been made with Messrs. Constable and Co. to act as the publishers for the Institute. All chemists who are in a position to assist in this matter are invited to communicate with the Registrar.

OIL PRICES FIXED.—The Ministry of Food (Oils and Fats branch) have issued an Order fixing the following prices for deodorised oils, to be paid by margarine makers or other licensed consumers, net, naked, ex mill: Deodorised palm-kernel oil, spot November delivery £110., December £104., January £102., February £100.; deodorised ground-nut oil, spot September delivery £130., October-December £120., January £110.; deodorised soya-bean oil, spot December delivery £110.; and deodorised coconut oil, spot and forward delivery £110. Brokers' commissions, etc., if any, to be borne by the sellers.

DETECTION OF OXIDISED SULPHUR COMPOUNDS.—An extension of the use of mercuric chloride as a reagent for the detection of thiosulphates and other oxidised sulphur compounds is described by A. Sander (*Chem. Zeit.*) When this reagent is added to a solution of sodium sulphate the solution remains neutral and no precipitate forms. In the cold sulphite solutions give no precipitate, and remain alkaline to methyl orange as before the addition of the reagent, but on heating mercurous chloride separates and sulphur dioxide is liberated. Bisulphite solutions behave similarly, except that they become strongly acid even before heating, as hydrogen chloride is one of the products of the first reaction in the cold. If sulphides are present, a black precipitate of mercuric sulphide forms at first, but on the addition of excess of mercuric chloride this is transformed into the yellowish-white double salt $2\text{HgS} \cdot \text{HgCl}_2$. Excess of mercuric chloride is always added, as the further examination of the supernatant liquor is then simplified. Thiosulphates behave like sulphides except that in the case of thiosulphates the solution becomes strongly acid. Polythionates behave like thiosulphates, from which they can be distinguished by the fact that they do not reduce iodine.—*Analyst*.

SPANISH OLIVE OIL.—H.M. Commercial Secretary at Madrid reports that the *Official Gazette* of July 6 contains five Royal Orders affecting trade in olive oil. At the end of June the Spanish Press was almost unanimous in announcing that the Government had decided to permit the free exportation of olive oil. The announcements were so positive that the Minister of Supplies found it necessary to publish a statement to the effect that these rumours were entirely false, and, as a matter of fact, the actual circumstances were leading him to take precisely the opposite course. He added that he had no intention of authorising any exportation beyond the quantities fixed by the Royal Order of January 13, 1919. Order No. 120 deals with the question of the price of olive oil. Order No. 121 announces that licences which have not been taken advantage of within sixty days will not be extended for more than half that period. The deposits made in accordance with the permission to export 90,000 tons will remain at the disposal of the Ministry until December 31 of this year, after which, if they have not been distributed for national consumption, they will be cancelled, unless extraordinary circumstances arise. Persons to whom the oil in the deposits has been awarded to be sold at the legal price must remove it within thirty days. Order No. 122 fixes prices at which soap made from olive waste may be sold. Royal Order No. 123 provides for manufacturers to declare their present stocks. Royal Order No. 124 provides that no further applications for exportation of olive oil will be considered; that applications already received should be granted in the order of their dates, until the 90,000 tons have been exported.

DERBYSHIRE LEAD MINES CLOSED.—Owing to the strike, the proprietors of the Mill Close Lead Mines, Derbyshire, on Saturday closed down the whole of the works excepting the pumping machinery.

CHEMICAL SOCIETY.—The Chemical Society has applied for the grant of a Supplemental Charter. All petitions for or against the grant of the Charter should be delivered at the Privy Council Office not later than August 30.

ARSENIC IN THE UNITED STATES.—Advices from the United States place the production of arsenic in that country during 1918 at about 6,400 tons, which was contributed by four companies. This would show an excess against the previous year of 10 per cent. The imports for 1918 were about 5,600 tons, two-thirds of which came from Mexico and the remainder from Canada, apart from small parcels from England and Australia. Including the imports, the total supplies available for American consumption thus amounted to, roughly, 12,000 tons, while it is estimated that this total was practically equal to actual needs.

NEWCASTLE CHAMBER OF COMMERCE AND THE PATENTS BILL.—Mr. Charles Turnbull, electrical engineer for the borough of Tynemouth, at the Newcastle Chamber of Commerce last week, proposed the formation of a special committee to consider the Patents and Designs Bill. He said it appeared to be the intention of the Bill to wipe out British inventors, and under the present state of affairs he was bound to admit that he would advise a young man with ideas to keep them in his head, or go to America, where they would be developed. When the war broke out, Sir Albert Stanley went to inventors and told them they would have to cease working their inventions and get on with war work. The inventors agreed, and asked that in fairness they should be excused paying on patents during the war. Sir Albert Stanley said if they did not pay, their inventions would lapse. They asked for an extension of the patents after the war, and that was also refused. The new Bill would be even more oppressive to British inventors. America had a name for inventive genius, not because Americans were cleverer than Britishers, but because any man could get a patent for 17 years at £7, but in England he would have to pay £100 for only 14 years, and this country lost by the number of ideas which men who had suffered by the British patent law refused to develop. A small technical committee was appointed to report to the Chamber on the Bill.

RUSSIAN SALT.—Russia is possessed of extensive deposits of mineral salt. The salt beds are heavy, and in many places they are remarkably pure. Lake salt is also plentiful in many districts. The distribution of salt in Russia is very wide, and in some places the deposits are practically continuous over immense areas. There are salt deposits in southern Russia, hitherto the most fully exploited of any in the country, particularly at Bakhmut and Slavyansk. Rock salt is obtained at Bakhmut and lake salt at Slavyansk. Large quantities of salt produced here are extensively used in the various industries of Russia. To some extent the south Russian salt is exported and shipped from the southern ports on the Black Sea to other Russian ports on the Baltic. In the Urals there is a salt deposit called Iletz Zashchita, which is claimed by some Russian authorities to be not only the purest salt in the world but the most extensive bed. It is of large grain, crystalline, white, with a gray tinge, and its yield of chloride of sodium on analysis is declared to be 99 per cent. For the production of soda and other chemicals and for use in other industries there is sufficient salt in Russia to maintain a growing soda industry at home and to supply all other reasonable wants for a long time ahead. Baskuntchak Lake is another salt reserve of immense extent. The lake is shallow, and the salt is easily obtained from it. The salt recovered by natural evaporation in the summer time contains 98 per cent. of chloride of sodium. Rock salt is found at a depth of 42 feet, and a third grade after passing through clay of undetermined thickness. About 540,000 tons of salt are raised from this area annually, and the production increases steadily. A statement made some years ago shows salt exists in the Privilinsk and Baltic regions; in South Russia, particularly at Slavyansk and Bakhmut; farther south in the Crimea; in Astrakhan in the form of lake salt; in Perm, where it is obtained by evaporation; in Siberia, at Kurgan, Nikolaevsk, and Omsk. The known deposits of salt in eastern Siberia are of enormous extent. The most notable ones known are found on the River Vilyui, a tributary of Lena River. The known salt of the Caucasus and other regions is not yet sufficiently developed to be of much importance.—*U.S. Com. Rep.*

FERTILISER NEWS.

(SPECIALLY CONTRIBUTED.)

Nitrate of Soda.—Last month's shipments from Chili are officially announced as having been 6,990 tons to Europe, 7,990 tons to the United States and 5,400 tons to other parts, together 20,380 tons against 300,300 tons in July last year. It will be seen that the export business was still practically in abeyance, but as about 34,000 tons were loading on the 1st inst., the August figures will, as we expected, show some increase on those of the last few months. The July production of nitrate of soda having been 115,120 tons the stock on the West Coast rose to the unprecedented total of 1,600,650 tons, comparing with 817,000 tons on August 1, 1914, just before the beginning of the war. The statistical position is thus entirely abnormal, and it can right itself gradually only when the supply of tonnage for exports becomes more plentiful some months hence; the accumulation of stocks will indeed continue unless more oficinas close down. Transactions in Chili are confined to a few second-hand parcels and sales for account of the German works now about to resume operations, and, as stated in our last issue, at prices considerably below those "fixed" by the Nitrate Producers' Association. Endeavours are being made by the Government to complete the "combine" by bringing in the outsiders, who having made large forward sales will no doubt now be glad enough to join the *convenio*. After "squeezing" the Allies for several years, nitrate producers have, in order to recoup the falling-off in quantity, put up the price of the by-product iodine to one shilling per ounce. As the cost of the drug is under two-pence per ounce laid down in Europe, the profit made out of the treatment of the wounded in the war may readily be imagined. The nitrate business is not run on philanthropic lines.

A New French Fertiliser Concern.—The Société Generale des Mines d'Algerie-Tunisie (Omnium) is taking a direct interest in a new company that has just been formed in France with a capital of 12,500,000 francs embracing the Société pour l'Industrie Chimique en France and the Société des Produits Chimiques de Paimbœuf. The Omnium will be the directing agency of this new concern, the capital of which it is understood may be made up to 40,000,000 francs, the initial capital being 12,500,000 francs. The board will include M. Henry de Peyerimhoff de Fontenelle, who is president of the Spanish Phosphate Union of Constantine, etc. The name of the new concern is the Union Française de Fabriques d'Engrais, de Produits Chimiques, et de Superphosphates. The factories involved are at the port of La Palisse.

Italian Note.—On the Italian market there is nothing of note to be recorded. Prices remain practically as last reported. The Government are well aware of the need for fertilisers, particularly in Northern Italy, on the beetroot fields and such like. The measures already referred to as being urged on the Government for assuring the land cultivators of the necessary supplies have received what may be called fair attention, and as far as resources available can be directed into their proper channels by Government aid it may be expected that those who need the fertilisers will be duly provided. But tonnage remains the question.

Sulphate of Ammonia.—This material is in good demand just now at the price of £19. 10s. The amount that is being produced at present is not so large as was expected and it is feared that the export trade will be the sufferer. New prices are to be fixed after the end of September and it is rumoured that these will be at an advanced level, one suggestion being a minimum of £20. per ton. From across the Atlantic the news comes that despite the fact that there is a large production of sulphate of ammonia in the United States, there is apparently sufficient business arranged to prevent any special accumulation of stocks that would materially affect the market so far as price changes are concerned. Demand for export from the States is said to have eased off somewhat, but people interested in this line are declaring that they look forward confidently to an improvement in the volume of export business.

Basic Slag and Superphosphate.—The demand for basic slag continues to be brisk and the average of trade appears to be more than is usual at this season. A good many works are as full of orders as they can be for August delivery. An especially good sale of 30 per cent. basic slag is reported. The present prices of superphosphate are for delivery this

month only, and from September onwards advanced prices are to be fixed. Farmers are therefore giving extensive orders for August delivery. If payment is now made the lower price will rule. The French superphosphate market is concerned about the slowness of arrivals of phosphate from Algeria. The reason is lack of tonnage.

Potash.—Movements in this material are quieter, and in some cases lower prices are reported. Interest is once more being directed towards the American potash situation. There the domestic potash industry has been an outgrowth of the war. The capital invested in the industry is estimated at about £5,000,000., a considerable part of which is represented by expenditure for experimental purposes and for the determination of technical methods and plant construction. The actual output of all the American plants at the end of last year was about 55,000 tons, but the estimated capacity was double that. Even the latter figure, however, is hardly expected to be sufficient for the home demand, which is figured out at quite 200,000 tons. The regions of the greatest potash output in America are in the Far West, and they are handicapped in competition with foreign potash by their remoteness from the market and especially from the Eastern potato and kitchen stuff regions and the Southern cotton districts.

Bones, Bone Meals, Etc.—A good trade is reported to be passing in dissolved bone compound at from £7. 17s. 6d. to £8. 5s. per ton. Pure steamed bone flour at £11. to £13. also moves off easily where available. The price for East Indian remains at about £15. 10s. at Liverpool. Generally supplies are short and complaints are again being raised with regard to the hindrances in the way of transporting this much-needed material to this country.

Other Fertilisers.—In miscellaneous fertilisers trade is quiet, but there is reported to have been some active business in good quality fish guano, 9 per cent. ammonia and 14 per cent. phosphate, which has been traded in at £18. per ton.

SOUTH WALES NOTES.

(SPECIALLY CONTRIBUTED.)

There is much briskness in the tinplate mills and all factories are now again operating after the usual stoppages for repairs. It is thought among the manufacturers that they will be unable to keep up with the American competition if prices of fuel and steel are to remain for any length of time at the present high levels. During the last few days over 5,000 boxes from the United States have been discharged at Liverpool and the price delivered at this port is 31/- per box or about 3/- less than the Welsh makers' quotations. Effective measures in the way of alteration of machinery will have to be made if the local manufacturers are to compete. The exports for the week fell by 50,000 boxes compared with the previous week and stocks at docks have increased by 38,000 boxes.

A Brazilian delegation has been visiting Swansea this week, Dr. Pandia-Calogeras being at its head. The object of the visit is to devise some means of enlarging business relations between the two countries and the Swansea Chamber of Commerce have lost no opportunity of expressing their opinions upon the matter. The delegates were entertained by the Mayor and also by Mr. F. W. Gilbertson, chairman of the Swansea Metal Exchange, and during their three days' stay they visited the works of Messrs. Vivian and Sons, the English Crown Spelter Works, the tin and chemical works of Messrs. Gilbertson at Pontardawe, and the Cwmfelin Tin Works.

The Cardiganshire bog fields are being developed for peat to use as fuel. There are said to be 15,000 acres of good peat that can be exploited at a profit.

The National Oil Refineries are to erect four oil tanks at the King's Docks, Swansea, with a total storage capacity of 28,000 gallons.

The patent fuel trade continues active and the call for briquettes is increasing. Cardiff makers sent cargoes to St. Malo, Lannion and Cherbourg. The Swansea shipments were for Dieppe, Barcelona, Nantes and St. Brieux. The Port Talbot exports were above the average, and included 4,169 tons to Sfax, 3,160 tons to Dakar, and 2,497 tons to Rouen. Binding materials are much more difficult to obtain and prices have increased.

IMPORTS OF CHEMICALS AND ALLIED PRODUCTS.

THE following returns, which are taken from the import statistics of the United Kingdom, give the amount and value of chemicals and allied products imported during the month ending July 31, 1919, as compared with July, 1918.

ARTICLES.	QUANTITIES.		VALUE.		ARTICLES.	QUANTITIES.		VALUE.	
	Month ended July 31st.		Month ended July 31st.			Month ended July 31st.		Month ended July 31st.	
	1919.	1918.	1919.	1918.		1919.	1918.	1919.	1918.
CHEMICALS :			£	£	MANURES :			£	£
ACETIC ACID other than for table use cwt.	8,480	3,151	25,711	15,725	Basic Slag..... tons	—	—	—	—
Bleaching Materials,,	—	28	—	26	Bones for Manure (whether burnt or not)	198	433	2,220	8,404
Boracite Borate of Lime, Borate of Magnesium, and Borax	30,300	—	36,680	—	Guano	27	—	331	—
Brimstone	1,013	171,200	1,228	110,220	Nitrate of Soda (Cubic Nitre) ..	22	—	665	—
Carbide of Calcium ..	47,161	37,146	61,145	64,154	Phosphate of Lime and Rock Phosphate	13,106	34,645	38,535	147,748
Coal Products, not					OIL SEEDS :				
Dyes	1 274	1,797	21,710	15,726	Castor	40	127,265	72	192,400
Cream of Tartar ..	692	2,960	7,102	51,796	Cotton				
Glycerine: Crude ..	139	6,561	500	19,845	From Egypt .. tons	292	11,206	9,832	245,936
Distilled	—	59	—	1,356	„ British India ..	15,176	—	438,004	—
Potash Compounds:—					„ Oth'r C'tries ..	6,802	1,901	168,788	35,863
Salt-petre (Nitrate of Potash ..	14,860	34,954	27,950	74,888	Total	22,270	13,107	616,624	281,799
Other Sorts ... val. £	—	—	32,195	66,380	Flax or Linseed :				
Soda Compounds cwt.	4,468	13,670	15,208	58,094	From Russia . Qrs	—	—	—	—
Tartaric Acid ..	1,415	1,840	27,175	28,198	„ U.S.A.	—	18	—	385
Unenumerated, including Acetate of Lime, Acetone, Muriate of Ammonia, and Sulphuric Acid ..val. £	—	—	338,206	2,243,763	„ Argentine Republic ..	813	82,079	5,745	488,657
DRUGS & MEDICINES :					„ British East Indies	150,664	30,467	1,089,902	178,640
Bark, Peruvian . cwt.	608	4,102	4,235	37,330	„ Canada	40	6	802	89
Quinine and Quinine Salts oz.	1,335,672	704	124,555	230	„ Oth'r C'tries ..	792	—	6,238	—
Unenumerated .val. £	—	—	357,342	223,998	Total	152,309	112,570	1,102,687	667,771
DYESTUFFS (other than DYE WOODS) and SUBSTANCES used in Tanning or Dyeing :					Rape :				
Cutch	1,160	3,800	2,625	8,751	From Russia .. Qrs,	—	—	—	—
Dyes and Dyestuffs obtained from Coal Tar :					„ British East Indies	49,070	15,039	363,437	83,676
Alizarine and Anthracene... ..	207	344	220	677	„ Oth'r C'tries ..	—	38	—	253
Aniline and Naphthalene ..	5,813	3,725	173,862	143,302	Total	49,070	15,077	363,437	83,929
Synthetic Indigo ..	—	—	—	—	Sesame (or Sesamum, Benni, Gingelly, or Teel) :				
Other Coal Tar Dyestuffs	34	—	1,671	—	From China ... Qrs.	—	—	—	—
E'tets for D'ing val. £	—	—	30,636	35,193	„ Oth'r C'tries ..	9,025	82	81,809	533
Indigo	267	1,444	12,696	67,025	Total	9,025	82	81,809	533
Unenumerated ..	11,608	18,010	43,313	63,481	Soya Beans :				
Tanning Substances :					From Russia . tons	—	—	—	—
B'k for Tanning cwt.	43,119	49,598	32,229	54,712	„ China	—	—	—	—
Ex'ts for .. val. £	—	—	347,207	300,683	„ Japan	849	—	21,250	—
Gambier	1,742	7,520	3,389	37,610	„ Oth'r C'tries ..	—	—	—	—
Myrobalans ...	21,569	95,850	14,748	105,484	Total	849	—	21,225	—
Sumach	7,063	—	7,441	—	Unenumerated . Qrs.	6,530	1,019	38,453	9,547
Valonia	24,551	—	28,321	—	NUTS and KERNELS for expressing Oil therefrom :				
Unenumerated ..	2,023	18	1,862	164	Copra	6,419	126	327,280	5,671
PAINTERS' COLOURS AND PIGMENTS :					Ground Nuts (or Arachide Nuts, Monkey Nuts, or Pea Nuts)..	8,994	18,705	335,568	560,028
Barytes	55,153	—	32,383	—	Palm Kernels ..	14,449	27,213	641,554	722,792
Nickel Oxide ...	1,010	—	5,782	—	Other Sorts	1,221	464	54,650	16,702
Red Lead	—	—	—	—	Total	31,328	46,508	1,359,052	1,305,193
White Lead	19,817	—	49,040	—					
Zinc Oxide	34,745	233	99,844	978					
Unenumerated ..	51,211	11,618	107,332	38,861					
Total	161,936	11,851	294,381	39,839					

(To be concluded.)

EXPORTS OF CHEMICALS AND ALLIED PRODUCTS.

THE following returns, which are taken from the export statistics of the United Kingdom, give the amount and value of chemicals and allied products exported during the month ending July 31st, 1919, as compared with July, 1918.

ARTICLES.	QUANTITIES.		VALUE.		ARTICLES.	QUANTITIES.		VALUE.	
	Month ended July 31st.		Month ended July 31st.			Month ended July 31st.		Month ended July 31st.	
	1919.	1918.	1919.	1918.		1919.	1918.	1919.	1918.
BLEACHING POWDER: To U.S.A. cwt.s.	1,040	—	900	—	MEDICINES, comprising DRUGS and MEDICINAL PREPARATIONS:			£	£
" Other					Opium, dried and powdered in the United Kingdom lbs.	385	6,739	1,351	24,585
Countries ..	18,816	4,946	14,010	3,796	Quinine and Qui- nine Salts ozs.	365,232	69,708	45,979	10,387
Total "	19,856	4,946	14,910	3,796	Other Sorts val. £	—	—	306,184	240,819
COAL PRODUCTS, NOT DYES:					Total "	—	—	353,514	275,791
Aniline Oil and					MURIATE OF				
Toluidino lbs.	13,959	171,373	881	9,973	AMMONIA cwt.s.	6,806	3,375	19,992	10,333
Anthracene..... "	194,980	—	942	—	PAINTERS' COLOURS AND				
Benzol and Toluol gals.	139,459	917,144	18,190	78,698	MATERIALS:				
Carbolic Acid .. cwt.s.	7,880	6,366	22,142	15,806	Barytes' cwt.s.	1,265	422	902	305
Coal Tar, Crude ..	1,438	84	498	11	White Lead "	12,731	979	38,204	2,859
Refined and					Zinc Oxide "	1,924	338	7,608	1,075
Varnish gals.	258,473	52,538	10,293	1,619	Unenumerated . "	87,835	38,248	323,495	100,074
Naphtha "	50,984	600	6,790	160	Total "	103,755	39,987	370,209	104,313
Naphthalene ... cwt.s.	5,854	18,634	6,865	27,589	POTASH COMPOUNDS:				
Pitch "	452,193	323,266	58,614	33,118	Saltpetre (Nitrate				
Tar Oil, Creosote,					of Potash) British				
&c. gals.	429,982	87,102	15,584	2,028	prepared cwt.s.	1,426	1,330	4,089	4,364
Other Sorts cwt.s.	18,435	7,430	22,183	15,434	Chromate and Bi- chromate of Pot- ash	902	1	8,309	648
Total Value £	—	—	162,982	184,436	Other Sorts val. £	—	—	3,807	3,406
COPPER, Sulphate					Total "	—	—	16,205	8,418
of tons	1,911	1,747	98,961	107,913	SODA COMPOUNDS:				
DYE STUFFS:					Soda Ash cwt.s.	336,309	222,009	105,086	76,772
Products of Coal					" Bicarbonate ..	39,579	36,159	18,075	23,193
Tar cwt.s.	5,994	7,565	89,271	111,151	" Caustic "	65,514	67,418	70,534	95,301
Other Sorts "	4,937	3,204	14,153	17,050	" Chromate and				
Total "	10,931	10,769	103,424	128,201	Bichromate ..	3,506	5,024	10,865	12,508
GLYCERINE:					" Crystals "	7,928	409	2,538	174
Crude cwt.s.	629	2,381	2,095	7,863	" Sulphate (Salt- cake) "	29,992	54,999	6,587	9,588
Distilled "	4,750	5,301	29,354	24,181	" Other Sorts ..	41,732	45,184	44,838	61,605
Total "	5,379	7,682	31,449	32,044	Total "	524,560	431,202	258,523	279,141
MANURES:					SULPHURIC ACID - cwt.s.	4,060	2,730	3,971	3,329
Sulphate of Ammonia:					TARTARIC ACID . "	712	153	11,715	2,319
To France..... tons	489	645	13,757	16,375	CHEMICALS, other				
" Spain and					sorts val. £	—	—	372,475	600,377
" Canaries "	623	—	19,897	—	SALT, Rock and White				
" Italy "	172	850	5,074	24,148	(except Table Salt):				
" Dutch East					To Belgium tons	3,720	—	12,067	—
Indies "	1,288	—	32,845	—	" U.S.A. "	—	2,605	—	6,901
" Japan "	2,188	—	37,144	—	" British East				
" U.S.A. "	—	—	—	—	Indies "	—	1,343	—	3,064
" British West					" Australia.... "	152	10	535	41
India Islands					" New Zealand ..	—	300	—	1,326
(including Ba- hamas) and					" Canada "	3,300	3,026	10,454	7,950
British Guiana ..	57	697	1,377	22,652	" Other				
" Other					Countries "	9,346	17,399	37,146	58,187
Countries ... "	755	100	20,076	3,250	Total "	16,518	24,683	60,202	77,469
Total "	5,572	2,292	130,170	66,925	GREASE & UNREFINED				
Superphosphates ..	388	150	3,571	942	TALLOW & ANIMAL				
Basic Slag..... "	2,895	40	12,946	125	FAT cwt.s.	63,258	2,994	224,783	8,701
Unenumerated .. "	1,928	1,287	19,938	14,836					
Total of Manures ..	10,783	3,769	166,625	82,828					

(To be concluded.)

NEW COMPANIES.

British Window Glass Company, Ltd.—Capital £450,000., in 100,000 preference shares of £1 each and 1,000,000 ordinary shares of 1s. each. Solicitors: Johnson, Weatherell and Co., 7 King's Bench Walk, Temple, E.C.

Paripan, Ltd.—Capital £100,000., £1. shares. Objects: To acquire all or part of the business of Randall Bros. and the Copal Varnish Company, Ltd., including the trade mark "Paripan," and to carry on the business of importers, exporters, and manufacturers of and dealers in oils, colours, varnish, ship and other compositions, etc. Registered office: Sherwood House, Piccadilly.

Ajax Aniline Dye Manufacturing Company, Limited.—Private company. Capital £50,000., £1. shares (47,000 preference and 3,000 ordinary). Agreement between F. Young and E. A. Gedge of the first part, Pronk, Davis and Rushby, Ltd., of the 2nd part, and this company of the third part. Registered office: 119-120, London Wall, E.C.

Eastern Counties Bone Products Company, Ltd.—Private company. Capital £20,000., £1. shares. Registered office: Daxford Works, Daxford, Cambs.

G. A. Shankland, Ltd.—Private company. Capital £40,000., in 39,000 ordinary shares of £1. and 20,000 deferred ordinary shares of 1s. each. Chemical manufacturers and merchants, engineers, warehousemen, etc. Registered office: River Mills, Eynsham, Oxon.

G. F. Thew, Ltd.—Private company. Capital £20,000., £1. shares (3,000 deferred). Object: To take over the business of an ironmonger, hardware merchant, varnish manufacturer, and dealer in oils and gums carried on by him at 158, London Road and 84, Christian Street, Liverpool. Solicitor: R. T. Smith, 6, Newington, Liverpool.

North of England Chemical Works, Ltd.—Private company. Capital £25,000., £1. shares. Agreement with J. F. R. Wilson of the one part and A. Darling of the other part for the purpose of acquiring the business carried on at Spittal, Berwick-on-Tweed, as the "North of England Chemical Works." Office: North of England Chemical Works, Sandsell Road, Spittal, Berwick-on-Tweed.

Rigby Taylor, Ltd.—Private company. Capital £15,000., £1. shares. Dealers in bleaching, dyeing and sizing materials, disinfectants, soaps, chemicals, drugs, colours, glues and paints, drysalts, etc. Registered office: Victoria Works, Garside Street, Bolton.

Slag Products, Ltd.—Private company. Capital £10,500., in 10,000 ordinary shares of £1. each and 10,000 founders' shares of 1s. each. Object: To acquire the world's patent rights in an invention for the moulding of slag for building or engineering purposes, and in a secret process for the manufacture of Portland cement. Registered office: 6, Lloyd's Avenue, E.C. 3.

GERMAN COMPETITION IN DYES.

THE conviction in many well-informed circles at the time of the signing of the armistice that the dyestuff market in the United States would remain firm for a period of at least a year, and that German competition could not be feared for a period twice as long, if at all, according to a statement issued by the U.S. Bureau of Commerce, has been so far well founded. This conviction was based in a large degree on the opinion that the transition of the industry from a war to a peace footing, involving the utilisation of vast quantities of materials formerly used in the manufacture of explosives, would be so gradual as hardly to affect the cost of manufacture at all. Moreover, the factor of possible German competition seemed slight when the actual conditions in the German industry were taken into consideration. Even granting a huge accumulated stock of dyestuffs prepared during the war, the dimensions of which have gradually dwindled under closer scrutiny, Germany is in no position to flood the world's markets. The demand in near-by and domestic markets is likely to take care of a great deal of the stocks on hand, and even though Germany withheld these stocks from these markets hoping to dump them abroad as soon as production was re-established, the sacrifice would be greater than the reward. Germany's labour costs, taxes, and overhead charges from restricted production will all be higher than in other countries, and these factors will work adversely to German domination of the world's dye markets to anything like the extent enjoyed before the war.

REPORTS OF COMPANIES.

British Glass Industries, Ltd.

An extraordinary general meeting was held in London on Thursday, August 7, for the purpose of increasing the capital of the company.

Mr. C. Williamson Milne, who presided in the absence, through indisposition, of the chairman (Mr. Clarence C. Hatry), said that new capital, in addition to provision for further working capital, was being raised for the purpose of acquiring some extremely valuable interests. The company had secured the whole of the shares of the Queenborough Glass Bottle Works, Ltd., and the business of the British and Foreign Bottle Company, both of which companies had had a most successful career, and had earned very large profits. The earnings from those companies alone at the present time, and under present conditions, would, if fully distributed, be sufficient to provide a substantial dividend on the present share capital of British Glass Industries, Ltd., and it was confidently expected that with the installation of latest automatic machines, which had been ordered for the Queenborough works, those profits would be considerably increased in the future. In addition to those two businesses, the directors had acquired 300,000 8 per cent. cumulative participating preference shares of £1. each in the British Window Glass Company, Ltd. The Chairman formally moved: "That the capital of the company be increased to £600,000, by the creation of 300,000 additional shares of £1. each, ranking for dividend and in all other respects *pari passu* with the existing shares of the company."

Sir Ernest Clark seconded the motion, which was carried unanimously.

DIVIDENDS.

ARIZONA COPPER COMPANY, LTD.—A dividend for the half-year of 9d. per share. The directors, in explaining the reduction of the dividend from 1s. 6d., state that when the war ceased large stocks of copper produced at a high cost were on hand and a situation created which rendered inevitable difficult conditions for some time to come.

PRICE'S PATENT CANDLE COMPANY, LTD.—An interim dividend of 15s. per share for the half-year ended June 30 and a bonus of 5s. per share, less tax.

UNITED TURKEY RED COMPANY, LTD.—An interim dividend for the half-year to June 30 last at the rate of 5½ per cent. per annum on the ordinary shares, free of tax.

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 4, Queen Anne's Gate Buildings, London, S.W. 1, whence further information may be obtained:—

Belgium.

H.M. Vice-Consul at Liège writes that the following goods are in demand in Belgium:—Sulphuric acid, sulphate of soda, calcium chloride, aniline dyes, and china clay.

An agent at Charleroi desires to obtain an agency for United Kingdom paint and varnish manufacturers. (Reference No. 335.)

France.

A firm in Bordeaux wish to represent United Kingdom soap manufacturers in that district. (Reference No. 339.)

Poland.

An agent in Warsaw wishes to get into touch with United Kingdom manufacturers of chemicals who are desirous of appointing an agent for Poland. (Reference No. 342.)

Russia.

A wholesale commission agent, with an office at Petrograd, which is temporarily closed, intends to open branch offices at Moscow, Kharkoff, and other large cities in Russia when conditions permit, and desires to secure agencies for United Kingdom manufacturers of special machinery for oil mills, soap factories, chemical works, etc. (Reference No. 345.)

United States.

A firm of import and export merchants in San Francisco wish to communicate with United Kingdom exporters of oils, rubber, chemicals, metals, and ores. (Reference No. 356.)

Chili.

A firm in Santiago de Chili are desirous of acting as agents for manufacturers of dyes and chemical products. (Reference No. 357.)

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

The specifications of the following applications are not printed by the Patent Office until the complete specifications have been accepted.

July 26th to August 2nd (inclusive).

- Recovery of Fats from Waste Liquids. Blunn, J. 18,982.
 Process for Extraction of Metals from Minerals or Solutions or for Separation or Refinement of Metals. Browning, W. J. 19,028.
 Treating Air or Gases with Liquids, or vice versa. Bulgin, W. J.; Hall, E. A.; and Searle, G. 18,742.
 Coagulating Latex. Burney, T. (Westwood). 18,906.
 Treating Carbonaceous Material for Recovery of Volatile Hydrocarbon Constituents. Bussey, C. C. 18,837.
 Manufacture of Gold-coloured Sulphurs and Vermillions of Antimony. Chailaux, P. 19,085.
 Isolation of Hyocynamine. Chemical Works, formerly Sandoz. 18,686.
 Evaporators. Couche, C. W. 18,949.
 Purification of Nitro-cellulose. Duciaux, J. 19,165.
 Manufacture of Nitric Acid. Henwood, A. 18,847.
 Recovery or Separation of Metals. Hibbert, A.; and Nüranen, W. J. 19,015.
 Non-inflammable and Waterproof Paint. Hutchison, A. 18,726.
 Condensation of Phenolic Bodies with Aldehydic Compounds. Ioco Proofing Company; Nuttall, W. H.; and Vickers, Ltd. 18,827.
 Helical Extrusion Apparatus for Manufacture or for Treating Fatty Substances. Jackson, J. G. 18,977.
 Evaporators. Jackson, W. J. Mellersh. (Criscom-Russell Co.). 18,718.
 Retorts. Low Temperature Carbonisation, Ltd.; and Armstrong, H. L. 18,917.
 Production of Hydrogen Sulphide from Sulphurous Gases. Macleod, J. G. (Browning). 19,027.
 Solutions of Nitrate of Calcium of High Percentage. Nitrum Akt.-Ges. 18,681.
 Vulcanising Dissolved Caoutchouc. Penchev, S. J. 19,132.
 Artificial Resin and Intermediate Products. Resan-Kunstharz-Erzeugungs-Ges. 18,789.
 Catalytic Heating-apparatus. Soc. Lyonnaise de Rechauds Catalytiques Camell, Cochet, Gritte, et Cie. 18,936.
 Subliming Chemical Elements or Compounds. Whitfield, C. 18,854.

August 5th to 9th (inclusive).

- Instantaneously-drying Ink. Airne, C. W. 19,198.
 Agglutinant for Conglomeration of Coal. Ayestarán é Irazusta, L. 19,477.
 Reclaiming Rubber. Benner, W. W.; and Young, J. 19,380.
 Fractional Distillation. Chenuard, E. A. R. 19,318.
 Manufacture of Artificial Silk. Clayton, J. 19,297 and 19,298.
 Drums for Sherardising. Coles, S. O. Cowper-. 19,426.
 Building Up or Growing Iron upon Steel, etc. Coles, S. O. Cowper-. 19,427.
 Electro-deposition of Iron Alloy. Coles, S. O. Cowper-. 19,428.
 Manufacture of Iron Tubes by Electro-deposition. Coles, S. O. Cowper-. 19,429.
 Electro-deposition of Iron. Coles, S. O. Cowper-. 19,430.
 Recovery of Iron from Scrap Tinned Steel. Coles, S. O. Cowper-. 19,431.
 Recovery of Tin. Collins, J. J. 19,585.
 Reducing Solid Fats to Liquid. Damin, J. B. 19,246.
 Extracting Oil from Shale, Coal, etc. Edwards, H. 19,650.
 Manufacture of Alcohol. Elektrizitätswerk Lanza. 19,573.
 Continuous Still for Evaporation or Distillation and Fractionation of Liquids. Gulliver, G. W. 19,543.
 Recovery of Nitrate of Soda from Solutions. Hobshawm, I. B. (Gripioni, partly). 19,391.
 Aromatic Arylsulphonyl and Arylenedisulphonyl Derivatives of 1:4-naphthylenediamine and Its Sulphonic Acids. Imperial Trust for the Encouragement of Scientific and Industrial Research; and Morgan, G. T. 19,392.
 Concentrated Solutions. Junquera, B. 19,639.
 Petroleum Reduction. Kormann, F. A. 19,421.
 Material for Manufacture of Electrodes. Olsen, O. R. 19,383.
 Wool-scouring, etc., Preparations. Plowman, W. W.; and Rose, D. G. Cameron-. 19,606.
 Indicating at a Distance Level of Liquid in a Tank. Ratti, G. 19,295 and 19,508.
 Electrodes. Read, F. W. 19,567.
 Purification of Petroleum, etc. Richardson, J. C. 19,238.
 Treatment of Coal to Obtain Bituminous Constituents. Rütgerswerke Akt.-Ges. 19,574.
 Solidifying Oleaginous Substances. Seobel, B. 19,286.
 Transforming Alkaline Monochromates into Bichromates or Chromic Acid. Soc. Industrielle de Produits Chimiques. 19,388.
 Gas-analysing Apparatus. Svenska Aktieförbundet. Mono. 19,518.
 Manufacture of Basic Sulphate of Zirconium. Wale, H. (Pennsylvania Salt Manufacturing Co.). 19,601.
 Tar Extractors and Scrubbers for Gas. Wells, J. 19,478.
 Ammonium Sulphate. Wynne J. S. 19,282.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 6d. in stamps to the Comptroller, Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane, W.C.

1913.

- Reducing Agents. Goldstein. 29,628.

1917.

- Acetyl Cellulose. Stevenson, W. J. 19,049. 130,029
 Diaphragms for Electrolytic Cells. Chemische Fabrik Weissenstein Ges.; and Walter, R. 19,082. 112,446
 Acetic Acid from Acetaldehyde. Dreyfus, H. 19,353. 130,035

1918.

- Concentrating Nitric Acid. Cocking, A. T.; and Kynoch, Ltd. 117. 130,038
 Synthesis of Ammonia. Maxted, E. B. 660. 130,063
 Manufacture of Ammonia. Parsons, R. C.; Jenkins, H. C.; and C. I. (1914) Syndicate. 703. 130,069
 Effecting Exothermic Chemical Syntheses Taking Place Under Pressure and at a High Temperature. L'Air Liquide Soc. Anon. pour L'Etude et L'Exploitation des Procédes G. Claude. 1,007 and 1,072. 130,086 and 130,087
 Separation of Gaseous Mixtures, and Particularly the Extraction of Hydrogen from Gaseous Mixtures. L'Air Liquide Soc. Anon. pour L'Etude et L'Exploitation des Procédes G. Claude. 1,278. 130,092
 Explosive Materials. Landrin, P. 1,349. 130,093
 Nitric Acid. Norsk Hydro-Electrisk Kvaestofaktieselskab. 6,769. 116,495
 Dextrine. McLaurin, W. W. 10,532 and 10,533. 130,119 and 130,120
 Manufacture of Acetaldehyde. Imray, O. (Society of Chemical Industry in Basle). 12,008. 130,138
 Treatment of Suitable Clay or Aluminium Compounds for the Production of Aluminium Intermediate Products and Bleaching Powder. Welford, R. 12,232. 130,164
 Preventing Danger of Explosion in the Preparation and the Handling of Dangerous Explosive Substances. Harrison, G. (Soc. d'Etudes Chimiques pour l'Industrie). 12,368. 130,166
 Separation of Carbonates and/or Hydrates of Potassium and Sodium. Distillates, Ltd.; and Jarmain, G. G. 12,646. 130,173
 Evaporators. Reavell, J. A.; and Kestner Evaporator and Engineering Company. 12,862. 130,181
 Purifying Camphor. Du Pont de Nemours and Co., E. I. 13,077. 124,704
 Synthetic Production of Cyanides and Nitrides. Lindblad, A. R. 15,113. 119,243
 Explosives. James, T. C.; Jones, J. I. M.; and Lewis, R. I. 1,517. 130,357
 Compressed Hydrogen. L'Air Liquide, Soc. Anon. pour L'Etude et L'Exploitation des Procédes G. Claude. 1,553. 130,358
 Separation of Oils and Pitch from Tar. Lessing, R. 1,635. 130,362

- Conversion of Synthetic Ammonia into a Solid Product Applicable for Agricultural Purposes in Conjunction with the Production of Carbonate of Soda. L'Air Liquide, Soc. Anon. pour L'Etude et L'Exploitation des Procédes G. Claude. 1,713. 130,365
 Lubricating Oils. Wells, H. M.; and Southcombe, J. E. 2,055. 130,377
 Producing Materials for Coating Substances to Protect Them or Render Them Non-porous. Cleghorn, C. A.; and Gáyner Pneumatic Co. 2,105. 130,379
 Aluminium Alloys. Naish, W. A. 2,186. 130,381
 Picric Acid. Holliday, L. B.; and Clayton, A. 2,200. 130,382
 Material for Removing Carbon Monoxide from Gases. South Metropolitan Gas Co.; and Somerville, J. M. 2,239. 130,383
 Organic Acid Anhydrides and Chlorides. Boake, Roberts, and Co., A.; and Durran, T. H. 2,733. 130,399
 Cellulose Acetate Solutions. Cellon, Ltd.; Tyrer and Co., T.; and Chambers, P. H.; and Peasey G. T. (legal representatives of the late Tyrer, T.). 2,754. 130,402
 Colloidal Solutions. Müller, J. 6,791. 115,236
 Treatment of Certain Fuels to Improve Their Calorific Value. Bone, W. A. 12,399. 130,455
 Organic Phosphorus-reserve Compound of Green Plants and Salts Thereof. Imray, O. (Society of Chemical Industry in Basle). 12,401. 130,456
 Dopes, Varnishes, Coatings, or Plastic Films with an Acetone-soluble Cellulose Acetate Basis. Grolea, J.; and Weyler, J. L. 12,456. 123,712
 Zinc-melting Apparatus. Aramaki, T. 13,183. 130,483
 Apparatus for Washing and Purifying Sugar. Jacobson, P.; and Wrathall, T. 13,778. 130,492
 Removing Coatings from Metals. Henderson, A. J. 13,932. 130,494
 India-rubber Compositions or Substitutes Thereof. MacDonald, W. F. 19,128. 130,528

1919.

- New Derivatives of Cellulose. Goisset, P. E. C. 2,911. 130,277
 Electrolytic Process for Coating Iron or Steel with Lead or Antimony, or an Alloy of Lead and Antimony. Marino, Q.; and Bowen, C. 10,314. 130,302
 Treatment of Zinc-bearing Ores for the Recovery of Zinc by Electro-deposition. Electrolytic Zinc Company of Australasia. 10,490. 126,296
 Preparation of the Primary Alcohols. Soc. Chimique des Usines du Rhone, anciennement Gilliard, P. Monnet, et Cartier. 217. 122,630
 Zinc Alloy. Soc. Anon. Stabilimenti Blak. 9,012. 125,397

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Lamp-black. E. L. Curbishley, Chendale Hulme, Cheshire. British Patent, 127,770, of 1918.

Lamp-black is rendered dustless by mixing with water to form a paste, adding 2.5 per cent. of resin oil, and then heating to drive off the water.

Treatment of Fatty Oils. W. H. Huxley, Liverpool. British Patent, 128,007, of 1918.

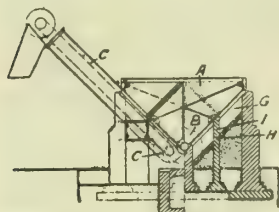
Castor oil is made blendable with mineral oil by the successive operations of treatment with strong sulphuric acid in the cold, agitation, settling, mixing with hot water, passage of an electric current between zinc plates immersed in the oil, and separation of the oil from the zinc sulphate solution produced. Mixtures of the treated oil and suitable mineral oils are used as lubricants for machinery.

Azides. W. R. Hodgkinson, Woolwich. British Patent, 128,014, of 1918.

Salts of hydrazine are diazotised by means of a suitable nitrate, without the use of ethyl benzoate or the like, the reaction mass being kept on the border line between acidity and alkalinity. For example, hydrazine sulphate is treated with sodium nitrate; the sodium azide produced, without being separated, may be caused to react with silver nitrate for the production of silver azide. When lead azide is to be prepared, hydrazine nitrate may be used in place of the sulphate.

Concentrating Brine. Salt Union, Ltd., and G. W. Malcolm, Winsford, Cheshire. British Patent, 127,954, of 1918.

Brine is evaporated in a pan A of triangular cross-section having at its bottom a screw conveyor B which carries the deposited crystals to an elevator C. The pan is heated by furnace gases passing along flues G, H at the sides of the pan separated by partitions I. The gases pass first along the upper flue G, so that the upper parts of the sides of the pan are more strongly heated than the lower. The partitions I preferably stop some way short of that end of the pan at which the elevator C is situated.



Amines. W. Rintoul, J. Thomas, and Nobel's Explosives Company, Stevenston, Ayrshire. British Patent, 127,740, of 1918.

Tertiary amines are separated from admixed primary or secondary amines by treating the mixture with ethylchloroformate to convert the primary or secondary amines into urethanes; the unattached tertiary base is removed from the product by washing with dilute acid, and recovered from the acid solution by treatment with alkali; the separated urethane is hydrolysed to give the primary or secondary amine. An example is given of the treatment of crude dimethylaniline containing monomethylaniline.

Recovering Cyanogen Compounds and Sulphur. W. Anderson, Helensburgh, Dumbartonshire. British Patent, 127,128, of 1918.

The spent oxide which has been used for the purification of coal-gas is treated with solvents in centrifugal apparatus for the recovery of cyanogen compounds, such as sulphocyanides and ferrocyanides, and of sulphur. Steam, for example, exhausted from the steam turbine used in driving the centrifugal apparatus can be passed in first when the soluble sulphocyanides are dissolved in the condensed water. Bisulphide of carbon, with or without benzole, is then admitted, preferably as vapour along with steam, to remove sulphur. The ferrocyanides are recovered by treatment with ammonia, and the ammonium salt may be treated afterwards with alkali for the production of alkaline ferrocyanides.

Hydrogen. H. J. Prins, Zaandam, Holland. British Patent, 128,273, of 1917.

In preparing hydrogen by the action of water or water vapour upon carbon or carbon-containing substances at a high temperature (300-600° C.) in the presence of a catalyst, which causes the simultaneous formation of carbon dioxide and not of carbon monoxide, a suitable catalyst consists of a mixture of one or more substances from each of the following classes: (1) Oxygen-containing inorganic salts of alkalis or alkaline earths, or compounds from which such salts may be formed in the process, such as the oxides or hydroxides, which may absorb carbon dioxide, and (2) inorganic oxides or hydroxides which may act as acids, such as oxides of boron, aluminium, silicon, tin, titanium, zirconium, tungsten, molybdenum, vanadium, and rare earth metals, or compounds from which such oxides or hydroxides may be formed in the

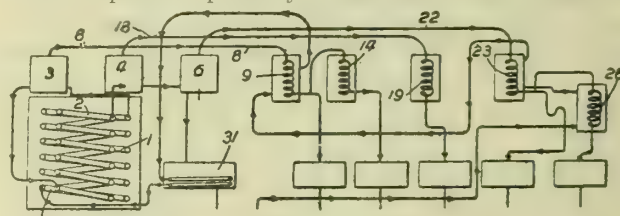
process, such as aluminium or other carbide, or salts such as aluminium or tin chlorides which are hydrolysed by the water vapour, or salts such as sulphates which are hydrolysed after reduction by the carbon. In addition, oxides of iron, chromium, or manganese may be added. In an example, coke, sand, and phosphate of lime are mixed intimately and heated to 400-500° C., and then steam is passed over. The gas is washed with soda-lye to remove carbon dioxide.

Catalytic Production of Nitrogen Oxides. E. B. Maxted and T. A. Smith, Walsall, Staffordshire. British Patent, 127,845, of 1917.

The catalytic oxidation of ammonia is effected with air at increased pressure such as 10.30 atmospheres, and the nitrogen oxides are separated from the products by refrigeration, this separation being effected under a pressure not less than the pressure used in the oxidation. In the Provisional Specification, pressures of 2.30 atmospheres are mentioned for the oxidation.

Dehydrating and Distilling Tar, Etc. T. O. Wilton, Hendon, London. British Patent, 127,700, of 1918.

Tar and other liquids are dehydrated and distilled by passage through a series of units each consisting of a coil in which the liquid is heated to a suitable temperature under pressure, and an expansion chamber in which the pressure is suddenly released so as to produce vaporisation of the lighter constituents. The tar is preheated, and is pumped, under a pressure of 30-50 lb. per sq. in., through a coil 1 heated to 160-190° C. The heated tar enters an expansion chamber 3 through a spring relief valve, and the reduction of pressure causes the water and light oils to vaporise. The vapours escape by a pipe 8 to condensers 9, 14, in which light oils and naphtha respectively are collected. The residues are



pumped, under a pressure of 30-50 lb. per sq. in., through a coil 2 heated to 230-300° C., and enters an expansion chamber 4. The resulting vapours are led by a pipe 18 to a first creosote condenser 19. The residues are led to a vessel 6, in which distillation is effected by free steam of about 300° C. The vapours are led by a pipe 22 to condensers 23, 28, in which anthracene and second creosote respectively are collected. The residual pitch is led to a cooler 31. The tar is preheated by use as cooling-agent for the condensers 28, 23, 9, and the cooler 31. The heating-coils 1, 2 may be arranged concentrically so as to be heated by the same furnace, the hot gases passing over the coils 2, 1 in succession. By-pass arrangements under thermostatic control provide for regulation of the temperature.

Purifying Coal-gas. W. G. Adam, London. British Patent, 127,431, of 1918.

Naphthalene and sulphur compounds are removed from coal-gas by passing it through animal or wood charcoal, preferably in a granulated condition. If it is desired that ethylene and other hydrocarbons shall remain in the gas, the quantity of charcoal used is limited; for example, to purify 12,000 cub. ft. of gas containing 35 grains of sulphur and 6 grains of naphthalene per 100 cub. ft., about 70 lb. of charcoal would be used. The charcoal may be revived by heating to a temperature of about 300° C., and again used.

Chlorinating India-rubber. H. M. Broadhurst and A. Lamble, Liverpool; S. J. Peachey, Davenport, Stockport; and United Alkali Company, Liverpool. British Patent, 127,481, of 1918.

In the production of a substance for use as a substitute for celluloid, leather, or the like by treating a solution of rubber with chlorine, or bromine or chlorine, the rubber is dissolved in benzene or a homologue. Chlorine is passed through the solution until the rubber has taken up approximately twice its weight of chlorine. The presence of catalysts is avoided. The hydrochloric acid produced is removed by heating, or neutralised, for example, by ammonia or lime.

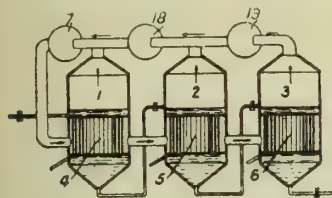
ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Mixing Solids and Liquids. P. A. Mallet, Paris. British Patent, 127,805. Convention date, June 3, 1918.

The air or inert gas under pressure employed as agitating-means in the mixing of two liquids, or in the reaction between a liquid and a solid, is made to operate in a closed cycle, and loss by evaporation is reduced, for instance, in the treatment of hydrocarbons with sulphuric acid or soda.

Evaporation. E. Wirth-Frey, Aarau, Switzerland. British Patent, 127,807. Convention date, June 3, 1918.

In evaporating solutions by means of heat of the vapours generated, after they have been compressed, the pressure at which the evaporation is effected is reduced as the concentration increases, the temperature of the heating-vapour being kept constant. The liquor is concentrated by passage through a series of evaporators 1, 2, 3 in which successively reduced pressures are maintained by compressors 7, 18, 19 arranged in series and each communicating with the vapour space of its respective evaporator. The whole of the vapours generated are thus compressed to the same degree, and pass together from the compressor 7 through the heaters 4, 5, 6 of the evaporators.

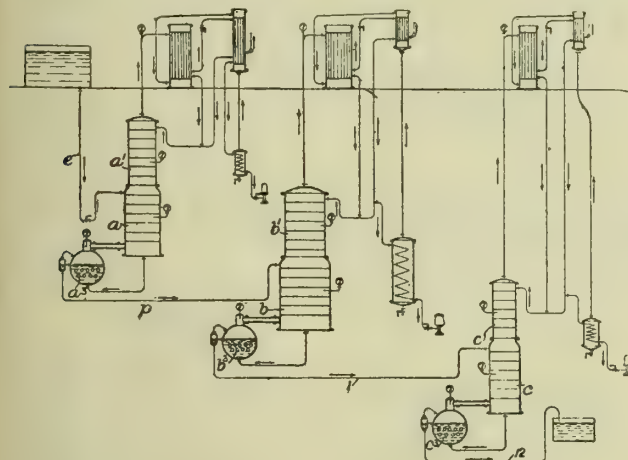


Nitrogen. Elektrizitätswerk Lonza, Basle, Switzerland. British Patent, 127,852. Convention date, June 17, 1916.

Nitrogen is obtained by absorbing the oxygen from air in a solution of ammonium sulphite, which becomes oxidised to ammonium sulphate, in a counter-current apparatus such as a series of spraying-towers, at a temperature of, preferably, 70-75° C. Ammonia carried away by the gas may be recovered. The nitrogen obtained may be used in the manufacture of cyanamides, and the ammonium sulphite may be obtained by the union of ammonia made from cyanamide, and sulphur dioxide made from pyrites, sulphur, gypsum, etc.

Distilling Benzole. Soc Anon. des Etablissements Egrot, Paris. British Patent, 127,853. Convention date, March 1, 1917.

Benzole is rectified by continuous distillation in an apparatus comprising three column-stills *a*, *b*, *c*, through which the benzole is led in succession by pipes *e*, *p*, 1, the distillates obtained from the respective stills consisting of head products, benzene, and toluene. The residue emerging by a pipe 12 consists of solvent. The stills each consist of extraction-columns *a*, *b*, *c* surmounted by concentrating-



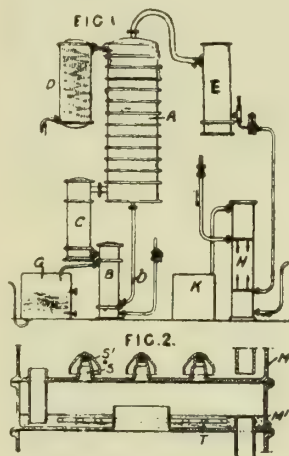
columns *a*, *b*, *c*, and are provided with heating means *a*, *b*, *c* and the usual condensing and refrigerating arrangements. The benzole flows through the plant under gravity; but if the apparatus is derived by modification of an ordinary discontinuous rectifying apparatus, the liquid may be pumped from still to still.

Thorium Compounds. Lindsay Light Company, Chicago, U.S.A. British Patent, 127,555. Convention date, May 29, 1918. Not yet accepted.

The purification or recovery of thorium compounds is effected by first producing the fluoride and then converting this into the anhydrous sulphate by digestion with sulphuric acid at a high temperature. The acid thorium—containing solution resulting from the digestion of, say, monazite sand with acid—is treated, preferably after a preliminary concentration of the thorium, with hydrofluoric acid or a soluble fluoride in the proportions required to precipitate the thorium as fluoride without bringing down any substantial amount of the rare-earth metals present. The filter-cake is heated at 300-400° C. with concentrated sulphuric acid. The resulting sulphate of thorium may then be separated from admixed sulphates of the rare-earth metals by treatment with a solution of sodium carbonate or bicarbonate to dissolve out the thorium as carbonate, or by interaction with sodium, potassium, or ammonium hydroxide, the resulting thorium hydroxide being purified by conversion into a crystallisable salt such as the sulphate.

Sulphonation of Benzene. E. Barbet et Fils et Cie., Paris. British Patent, 127,614. Convention date, May 1, 1916.

Benzene is sulphonated in a continuous manner by bringing a stream of benzene vapour into contact with a continuously-renewed body of hot fuming sulphuric acid, and continuously removing the sulphonic acid formed; the process may be applied to Borneo or Malay petroleum fractions containing benzene, the unattacked petroleum being separated from the sulphonic acid. Using the apparatus shown in Fig. 1, benzene vapour from a heater C is supplied to the bottom of a plate-column A, while fuming sulphuric acid is supplied to the top of the column from a heater D; the sulphonic acid formed flows off by a pipe *b* to a heat-exchanger B, in which it heats the entering benzene and then flows to a tank G; the petroleum vapours pass off to a condenser E, and the condensate is washed with water in a purifier H and collected in a tank K. The plate-column A contains, in addition to the usual plates M, Fig. 2, fitted with bubbling-hoods S, S', a number of plates M' provided with heating-coils T to maintain the temperature of the liquid on the plates; heating-coils may also be provided on the bubbling-plates.



column A contains, in addition to the usual plates M, Fig. 2, fitted with bubbling-hoods S, S', a number of plates M' provided with heating-coils T to maintain the temperature of the liquid on the plates; heating-coils may also be provided on the bubbling-plates.

Electrolytic Zinc. Electrolytic Zinc Company, of Australasia Proprietary, Melbourne, Australia. British Patent, 126,296. Convention date, April 27, 1918.

Solutions obtained from ores are purified by limestone and zinc dust or "blue powder," electrolysed with the addition of glue to counteract the prejudicial effects of cobalt, nickel, and other impurities not removed by these reagents, and again used for treating ore. This cycle of operations is repeated until excessive cobalt—say, more than 200-300mgr. per litre—has accumulated. The solution is then freed from cobalt. After this the cyclic process is resumed. Five pounds of glue per ton of zinc produced are added for solutions containing up to 100mgr. of cobalt per litre, and one pound of glue extra for each additional 50mgr. of cobalt. In one method for removing cobalt the solution is treated, preferably at about 75° C., with zinc dust or blue powder in the presence of arsenic and preferably copper, 12-15 parts of zinc, and 14 parts each of dissolved arsenic and copper being added for one part of cobalt. Addition of zinc is preferably effected in specified stages, a part of the copper and arsenic being kept back and added just before the last part of the zinc. In another method, lead peroxide is added to the solution containing a compound of manganese. Sixty parts of manganese and 6 of peroxide are employed for each part of cobalt. Calcium plumbate may be substituted for the peroxide. This treatment is preferably carried out at 40-50° C.

GAZETTE NEWS.

LIMITED COMPANIES.—Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions, Orders, and Official and Other Notices.

Abbey Chemical Company, Ltd., London, E.C.—Resolved July 28: That the company be wound up. A. H. Hughes, 67, Basinghall Street, E.C., incorporated accountant, liquidator.

Alpertown Rubber Company, Ltd., London, W.—W. H. Golding ceased to act as receiver March 31.

Treburland Wolfram and Tin Company, Ltd.—Claims to T. D. C. Parker, 87, Bishopsgate, E.C., liquidator; by August 30.

DISSOLUTIONS OF PARTNERSHIP.

(Note.—When two dates are given in the following announcements, the first is the date of the dissolution. The date in parentheses is that of the official advertisement.)

Dicks Asbestos Company (Wm. Frdk. Dick and Jno. Alex. Dick), formerly 51, but lately at 47, Fenchurch Street, E.C., asbestos merchants and manufacturers. June 6. Debts by W. F. Dick. (August 1.)

East Goonbarrow China Clay Kaolin Company (Wm. Jas. Adams and Jno. Stephens, as trustees of the will of R. H. Frdk. Stephens, deceased; Wm. Jno. Kelly, Wm. Martin, Thos. Martin, and Saml. Jas. Pascoe as trustees of the estate of Silas Pascoe, deceased), china clay merchants. July 10. Debts due to and owing by the said late firm will be received and paid by H. N. Wright, St. Austell, solicitor liquidator of the firm. (August 1.)

MARKET REPORTS.

TAR AND AMMONIA PRODUCTS

WEDNESDAY.

Benzole: London, 90%, 2s.; North, 1s. 10d. to 1s. 11d.; 50%, 1s. 10d.; North, 1s. 9½d., naked. Carbolie acid, crude, 60%, East and West Coast, nominally 1s. 5d. to 1s. 6d.; crystals, 30-40%, 8½d., f.o.b. Crude tar, London, 45s. to 50s.; Midlands, 44s. to 46s.; North, 45s. per ton, ex works. Pitch, 72s. 6d. to 75s.; East Coast, 65s., f.o.b.; West Coast, 53s. to 55s., f.a.s. Solvent naphtha, naked, London, 90-100%, 2s. 5d.; North, 2s. 3d. to 2s. 4d.; 90-100%, naked, London, 2s. 1d.; North, 1s. 10d. to 1s. 11d. Crude naphtha, naked, 30%, 9d.; North, 7½d. to 8d. Refined naphthaline, £18. to £22.; salts, £6. to £7. Toluol, naked London, 2s. 6d.; North, 2s. 5d. Creosote, naked, London, 6½d.; North, 5½d. to 6d.; heavy oil, 6½d. to 7d. Anthracene, 40-45%, 6d. per unit. Cresylic acid, 95%, 2s. 7d. to 2s. 8d.; 97-99%, 2s. 9d. to 2s. 10d., ex works, London, and f.o.b. other ports. Sulphate of ammonia: Home trade, £19. 10s. per ton; basis 24½%. Nitrate of soda, £21. to £22.

FERTILISER MATERIALS.

LIVERPOOL. THURSDAY

Nitrate of soda: There is no change in either the tone of the market or in the price of this material, and the quotation on spot for 95-96% quality is repeated at £20. 2s. 6d. per ton, net cash, f.o.r., prompt delivery. East Indian bone meal for shipment is without alteration, the nearest value of 4½% ammonia and 52% phosphates, August-October shipment, being £15. per ton, net cash, ex ship Liverpool. On spot Liverpool, holders require £15. per ton, net cash, for 44½% and 45% quality. Mineral phosphates are without alteration, and values are at present only nominal. Dried blood is scarce, the value being about 30s. per unit of ammonia per ton, net cash.

LONDON METAL MARKET.

THURSDAY

Copper: Standard brands, £96. to £96. 5s., cash; £97. to £97. 5s., three months; electrolytic, £103. to £114. Tin: Standard, £270. to £270. 10s., cash; £264. 15s. to £265. three months; Straits, £272.; English, £266. Lead: Soft foreign, £24. 15s.; English, £26. Spelter, £39; hard, £29. to £30. Antimony, English regulus, 90%, £42. Aluminium, £150. Nickel, £205., delivered, packages extra. Quicksilver, £23. to £23. 10s. Bismuth, 12s. 6d. Platinum, 442s. per oz. Wolfram, 30s. per unit.

MANCHESTER CHEMICAL MARKET.

THURSDAY

There is a continued steady improvement in demand for heavy chemicals, both for home and export trade, and values all round are well maintained. Some small resale lots of 70% caustic soda are still offered at £17. 10s. per ton; refined bicarbonate of soda, bags, at £8. 10s.; and 58% alkali at £7. 5s. per ton, all f.o.b. Bleaching powder unchanged at £15., softwoods, on rails. Soda crystals, bags, 82s. 6d. per ton. Roasted saltcake firmly held at 60s. per ton, carriage paid. Chlorates are lower: soda at 6½d. per lb., and potash 1s. per lb. Bichromates steady at recent rates. Recovered rock sulphur quiet at £17., on rails. Commercial hyposulphite of soda steady at £16. 10s. per ton. Pea crystals, £23. per ton. Phosphate of soda quiet at £25. per ton. Concentrated sodium sulphide, casks, £20. per ton. Demand for copper sulphate continues flat, and price is easier at £44. f.o.b. Liverpool. White powdered arsenic is exceedingly scarce, and price nominally £50. per ton. In potash salts,

carbonate, 80-85%, is dearer at £95. per ton; yellow prussiate firm at 1s. 9d. per lb. Soda steady at 7d. per lb. For lead salts there is an improved inquiry, and prices are well maintained: White acetate, at £84.; brown, £75.; and lead nitrate, at £56. per ton. Acetic acid and acetate of soda are unchanged. English brown acetate of lime firm at £10. 10s. to £11. per ton. American grey, £19., ex ship. Borax is scarce, and high prices are offered for near parcels. Copperas is moving off better, but quotations are easy. Oxalic acid quiet at 1s. 2½d. per lb.

SWANSEA MARKET REPORT.

THURSDAY.

Tinplate prices are firmer at 35s. to 36s. per box, on standard basis, f.o.b. Copper prices irregular at £91. prompt and £92. 2s. 6d. three months. Tin in better inquiry, with irregular quotations; some business has been done at £260. prompt and £254. 10s. three months. Lead selling more freely at £24. 7s. 6d. Spanish, and £25. 15s. English. Spelter remains steady at £38. 10s. Zinc sheets, £65., f.o.b., New York. Silver dearer at 58d. per ounce. Quicksilver, £23. 5s. per bottle. Antimony nominal, with English regulus, 90%, at £42. Nickel selling better at £205. per ton, including free delivery to London or equal. Aluminium, £150. Quiet business in oils: Linseed, 116s. per cwt., prompt; rape oil scarce and nominal; palm oil in better supply, Lagos and softs nominally £92., Benin £87. 10s. per ton. Turpentine quiet at £6. 5s. per cwt. Sulphate of copper rather dull at £43. 7s. 6d. per ton, f.o.b. Sulphate of ammonia steady; sales at £19. 10s. for delivery over current quarter. Nitrate of soda quiet and steady at 21s. 6d. per cwt., in bags. Petroleum very firm and dearer, American refined fetching 1s. 6½d. per gallon, in casks, at ship. Oxalic acid, 1s. 2½d. per lb. Arsenic dull at £48. per ton for white powdered, f.o.b. Pitch is considerably dearer at 53s. per ton, f.o.b., and supplies are scarce. Bone meal, 16s. per cwt. Galvanised sheets in better request at £28. to £29. per ton for 24g., in bundles, f.o.b.

TURPENTINE MARKET REPORT.

Messrs. James Watt and Son, Ltd., of 101, Leadenhall Street, London, E.C. 3, report that the stocks of turpentine on August 9 were: American, 29,547 barrels, compared with 7,330 barrels at the corresponding date of 1918; French, 46 barrels (14 barrels); and Spanish, 688 barrels (1,503 barrels). Deliveries during the week ended August 9 were 1,524 barrels, against 870 barrels last year, and since January 1, 43,303 barrels, compared with 15,720 barrels in 1918. The price on Saturday last was 126s. per cwt., compared with 118s. at the corresponding date of last year. September-December delivery was quoted at 127s. 6d., and January-April (1920) 129s.

LIVERPOOL CHEMICAL MARKET.

THURSDAY.

Business conditions have become more settled than they were last week, and inquiries have come more freely to hand. Bleaching powder has been quiet, the season conducing to this. Prices are £14. 10s. to £15. per ton, free on rail or conveyance, in buyer's packages, and £17. per ton for export. Chloride of calcium has been more in request, and is £8. to £11. per ton, in casks, f.o.r. Caustic soda has been in fairly active demand, and is £24. per ton for 76%, £22. per ton for 72%, and £19. per ton for 60 to 62%. Nitrate of soda has been rather more inquired for, and is £20. 10s. to £21. 10s. per ton. Saltcake has been in fair request, and is

£6. 10s. per ton, in casks, f.o.b. Soda crystals have been steadily called for, and are £5. per ton, in 2cwt. bags, f.o.r. at works. Bicarbonate of soda has again been in fairly active demand, and is £7. 5s. to £10. per ton, according to terms of delivery. Borax has met with a rather free inquiry, and is £42. per ton for ordinary, and £44. per ton for powdered, in bags. Ammonia alkali has been in good demand, and is £6. to £6. 5s. per ton, f.o.r. at works. Hyposulphite of soda has been more in request, and is £17. per ton for ordinary and £22. per ton for pea crystals. Sulphite has been quiet, and is £11. per ton for ordinary and £18. to £19. per ton for pea crystals, in 1cwt. kegs. Bichromate of soda has been in slightly better request, and is 9d. per lb. Phosphate of soda has been in moderate request, and is £25. per ton. Sulphide of sodium has been quiet, and is £20. per ton, in casks, and £22. per ton, in drums. Chlorate of potash has been quiet, and is 1s. 1d. to 1s. 3d. per lb. Permanganate of potash has been rather more in demand, and is 3s. 6d. per lb. Sulphate of potash has been but little inquired for, and is £40. per ton. Carbonate of potash has been in quietly steady demand, and is £85. to £90. per ton for 80 to 85%. Caustic potash has been in fair request, and is £90. to £100. per ton for 35° Bé. Nitrate of potash has been more inquired for, and is £54. to £60. per ton, and £40. per ton for ordinary. Canadian potashes have been but little in request, and in very small supply. Montreal first quality are £200. to £220. per ton, and second quality £190. to £210. per ton. Bichromate of potash has been rather more in demand, and is 1s. 6d. to 1s. 7d. per lb. Yellow prussiate of potash has been in fair request, and is 1s. 9d. to 1s. 10d. per lb. Sal ammoniac has been in quietly steady demand, and is £80. per ton for lump, £75. per ton for seconds, and £5. extra per ton for ground. Sulphate of ammonia has been in moderate request, and is £19. 10s. per ton, less traders' discount of 10s. per ton, free to nearest wharf or railway station, to September 30. Carbonate of ammonia has been in quietly steady demand, and is 6½d. per lb. Muriate has been but little in request, and is £50. to £60. per ton, according to quality. Magnesia has again been in fair demand. Carbonate is £3. 10s. per cwt., and sulphate £10. to £16. per ton, according to grade. Alum has been rather freely inquired for, and is £18. 10s. per ton for the home trade and £18. 10s. to £19. 10s. per ton for export. Aluminoferric has been very quiet, and is £8. 10s. to £12. per ton, according to quality. Sulphate of alumina has been more inquired for, and is £12. to £17. per ton, according to grade. Sulphur has been in very fair request, and stocks are still small. English kinds are: Flowers, £32. per ton; roll, £28. per ton; and rock, £22. per ton, in bags, f.o.r. Sicilian grades are: Flowers, £28. per ton; roll, £22. 10s. per ton; and rock, £17. 15s. per ton. Cream of tartar has sold more readily, and is £11. 5s. to £11. 10s. per cwt. Tartaric acid has been in very fair request, and is 3s. 1d. per lb. Boracic acid has been more inquired for, and is £72. per ton for crystals and £74. per ton for powdered. Oxalic acid has been in quietly steady demand, and is 1s. 3d. per lb. Citric acid has been in very fair request, and is 4s. 4d. per lb. White acetate of lead has again been very quiet, and is £85. to £90. per ton. Arsenic has been rather more in request, and is £48. to £50. per ton. Sulphate of copper has been more inquired for, and is £45. per ton for farm purposes in the United Kingdom; and £47. to £48. per ton, less 5%, in casks, f.o.b. at Liverpool.

TYNE CHEMICAL REPORT.

TUESDAY.

Business in heavy chemicals continues steady, and for home consumption caustic soda and bleaching powder are in good demand. Soda crystals locally are steady at £5. per ton, 2cwt. bags. Sulphur is scarce and firm at £23. 10s. to £24. per ton, net.

The following prices are per ton, net:—Bleaching powder, softs and hards, £15.; caustic soda, 74-77%, £23. 5s.; do., 70%, £22.; do., 60%, £20.; recovered sulphur, 2cwt. bags, £24.; hyposulphite of soda, 5-7cwt. casks, £19.; do., 1cwt. kegs, £25.; sulphite of soda, 5-7cwt. casks, £12.; do., 1cwt. kegs, £20.; silicate of soda, 75° Tw., £9. 12s. 6d.; do., 100° Tw., £10.; do., 140° Tw., £10. 10s.; soda crystals, 2cwt. bags, £5.; sulphate of soda (saltcake), in bulk, £3. 10s.; pure white sulphate of alumina, 14-15%, £19. 10s.; blanc fixe, £22.; chloride of barium, £27.; sulphide of sodium, crystals, £18.; do., refined concentrated solid, 60-62%, £25.; hydrate of barium, crystals, £56.

COALS.—Market here is very firm, with a strong demand. Work throughout the northern counties, Northumberland and Durham, is proceeding more satisfactorily. The supply of tonnage is ample, and the output is readily moved off. Prices nominally:—Best Northumbrian steam, 85s. to 90s. per ton; do., small, 45s.; do., seconds, 40s.; best Durham gas coals, 70s. to 72s. 6d.; do., seconds, 67s. 6d.; bunker coals, 60s.; do., seconds, 58s.; foundry coke, 70s. to 75s.; gas coke, 78s. 6d.

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Wednesday.

During the past week prices of the different chemicals in the West of Scotland market remained on a firm level, and there are no quotable changes worth mentioning. Business on the whole was fairly good, but the present unsettled industrial conditions are tending to retard progress in various directions. Most orders being put through continue of somewhat small bulk, but the tendency is towards betterment. Current quotations are:—Arsenic, £42. per ton net, Glasgow; bicarbonate of soda, £8. 15s. and £10. per ton for 6-8 casks and 1cwt. kegs, Liverpool; boracic acid crystals, English refined, £72. for 2cwt. bags, and borax crystals, £39. for 2cwt. bags, carriage paid; caustic soda, white, 70-72%, £24. per ton, net, Glasgow; chlorate of potash, 1s. 1d. per lb., net, Glasgow; chlorate of soda 9d. per lb., net, Glasgow; citric acid, 4s. 4d. per lb., 5%, Glasgow; cream of tartar, 88%, £11. 5s. per cwt., net, Glasgow; sal ammoniac, £80. and £75. per ton, net, any port for first and second lump respectively; sal ammoniac crystals £5. 5s. per ton, net, Glasgow; saltpetre, £3. 4s. net, Glasgow; tartaric acid, 3s. 1d. per lb., 5%, Glasgow.

In the sea oil section the chief feature is the scarcity of the different products, and only one variety among the whale oils is now quoted. This is black, which is still going into the hands of buyers at 78s. Pale, yellow, and brown are now quite off, and the same remark applies to Newfoundland cod, pale seal, and Menhaden.

Conditions in the Glasgow coal market are almost back to normal again after the holidays, and work at the pits is now fully resumed. Outputs continue to move off, without much difficulty, but business for export is still being carried on in a very limited way. Home demands are keeping steady, and prices are without change.

IMPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

GLASGOW.

Week ending August 9.

CARBON BLACK—
New Orleans, 144 cs.CITRIC ACID—
Italy, 20 cks.DYESTUFFS—
Chestnut Extract
Italy, 500 cs.Sumac
Italy, 500 bgs.Tartar
Bordeaux, 110 cks.GLUE—
Montreal, 20 bgs.

MANGANESE—

Montreal, 593 bgs.

OCHRE—

Bordeaux, 235 cs.

PYRITES RESIDUE—
L'Orient, 500 t.

ROSIN—

Bordeaux, 430 cks.

SOAP—

New Orleans, 400 brls.

SULPHUR

Italy, 1,500 bgs.

TARTARIC ACID—

Italy, 18 brls.

GOOLE.

Week ending August 9.

NIL.

GRANGEMOUTH.

Week ending August 9.

NIL.

GRIMSBY.

Week ending August 9.

DYESTUFFS (otherwise undescribed)
Dieppe, 82 cks.

HULL.

Week ending August 9.

BARYTES—
Montreal, 636 brls.COAL PRODUCTS—
Creosote
Bilbao, 1 brl.CREAM OF TARTAR—
Bordeaux, 20 brls.

DYESTUFFS

Sumac
Palermo, 2,000 bgs.

LITHOPONE

Rotterdam, 40 cks.

ROSIN—
Bilbao, 30 brls.

SULPHUR—
Catania 100 bgs.

LEITH.

Week ending August 9.

NIL.

LIVERPOOL.

Week ending August 9.

ACETO SALICYLIC ACID—
New York, 8 cs.

AMMONIA—
New York, 1 sk.

BEE'S WAX—
Calcutta, 70 cs.; Rotterdam, 10 cs.

BISMUTH ORE
Yokohama, 112 bgs.

CANDELILLA WAX—
New York, 64 bgs.

CARNAUBA WAX—
Ceara, 50 bgs.; Maranhão, 31 bgs.; Tutorga, 1,769 bgs.

CHEMICALS (otherwise undescribed)
New York, 1 cs.

CREAM OF TARTAR
Bordeaux, 25 cs.

DENTRINE
New York, 1,760 bgs.

DYESTUFFS—
Argols
Bordeaux, 433 bgs.
Bark Extract
Philadelphia, 150 brls.
Cutch
Singapore, 500 cs.
Myrobalan Extract
Calcutta, 900 pkgs.
Myrobalans
Calcutta, 6,789 pkgs.
Quebracho Extract
Buenos Ayres, 18,702 bgs.
Tanning Extract
Bordeaux, 281 cs.

INDIGO—
Cristobal, 35 pkgs.

LITHOPONE
New York, 1 brl.

MAGNESITE—
Limni, 1,627 t.; 1,467 bgs.;
Madras, 3,548 bgs.

MANGANESE ORE—
Madras, 1,805 t.

MINERAL ORE—
Almeria, 79 bgs.

MINERAL WHITE—
Bordeaux, 200 bgs.

NICKEL OXIDE
Montreal, 235 brls.

POTASH—
Constantinople, 104 brls.

POTASSIUM CHLORATE
Havre, 22 cs.

POTASSIUM MURIATE—
Rotterdam, 1,000 bgs.

ROSIN—
Bordeaux, 925 pkgs.; New Orleans, 3,746 brls.; New York, 500 brls.; Vera Cruz, 1,000 brls.

SHEEP DIP—
New York, 5 bxs.

SOAP
New York, 160 brls.

SOAPSTONE—
Bordeaux, 1,024 bgs.

TALLOW—
Halifax, 100 tes.; New York, 400 tes.; Philadelphia, 500 tes.

TAR—
Gothenburg, 10 cs.

TAR (PINE)—
Philadelphia, 300 brls.

TARTAR—
Bordeaux, 107 bgs.; New York, 200 cs.

TURPENTINE—
Gothenburg, 10 cs.

TARTRATE OF LIME—
Bordeaux, 165 bgs.

VEGETABLE TALLOW—
Yokohama, 1,000 pkgs.

WHITE LEAD—
New York, 145 kgs.; Philadelphia, 360 brls.

LONDON.

Week ending August 9.

ACETATE—
Canada, 40 t.

ARSENIC—
Belgium 2 t.

BARYTES—
Belgium, 1,100 bgs.; Spain, 786 cs.

BORATE OF LIME—
Chili, £4,880.

CARBON BLACK—
U.S.A., 25 cs.

CITRIC ACID—
N.S.W., 57 pkgs.

CREAM OF TARTAR—
France, 15 pkgs.

DYESTUFFS—
Aniline
Belgium, 275 pkgs.; Switzer-land, 1 pkg.
Argols
Italy, 24 pkgs.
Chestnut Extract
U.S.A., 475 pkgs.
Gambier
Straits, 126 pkgs.
Indigo
India, 99 chests.
Mimosa
Natal, 5,960 pkgs.
Myrobalans
India, 7,970 pkgs.
Saffron
Spain, 1 pkg.
Sumac
Switzerland, 6 pkgs.
Tanners Bark
Natal, 126 pkgs.; Turkey, 50 t.; W. Australia, 60 t.
Tartars
Italy, 1,355 pkgs.
Wattle Extract
Natal, 80 pkgs.

FISH OIL—
Japan, 600 cs.

FORMALDEHYDE—
U.S.A., £2,300.

GELATINE—
France, £1,378.; Holland, £1,185.

GLUE—
Holland, £237.

HEXAMETHYLENETETRAMINE
U.S.A., £220.

KAINIT—
Holland, £2,125.

LITHOPONE—
U.S.A., 250 brls.

OCHRE—
Spain, 100 brls.

OXALIC ACID—
Holland, £654.

PARAFFIN SCALE—
U.S.A., 63 t. 17 c.

PARAFFIN WAX—
Morocco, 12 c.; U.S.A., 35 t. 14 c.

PLUMBAGO—
Italy, 40 bgs.; U.S.A., 8 kgs.

POTASSIUM IODIDE—
Japan, £4,249.

POTASSIUM PRUSSATE—
Holland, 49 pkgs.

RED OXIDE—
Spain, 86 brls.

ROSIN
France, 960 cs.; U.S.A., 1,350 brls.

SOAP—
Spain, £183.

TALLOW—
N.S.W., 46 t.; N.Z., 566 t. 9 c.; Queensland, 35 t. 3 c.; Victoria, 6 t.

TAR—
Norway, 100 brls.; Sweden, 137 brls.; U.S.A., 500 brls.

TARTARIC ACID—
Italy, 8 pkgs.

ZINC OXIDE—
U.S.A., 2,400 brls.

MANCHESTER.

Week ending August 9.

LITHOPONE—
Rotterdam, 800 cs.

OXALIC ACID—
Rotterdam, 40 cs.

STEARINE—
Rotterdam, 136 pkgs.

MIDDLESBROUGH.

Week ending August 9.

NIL.

NEWCASTLE-ON-TYNE.

Week ending August 9.

BARYTES—
Antwerp, 200 bgs.

KAINIT—
Rotterdam, 10,000 kgs.

MANGANESE ORE—
Calcutta, 1,500 t.

TAR—
Gothenburg, 150 brls.

N. & S. SHIELDS.

Week ending August 9.

NIL.

STOCKTON-ON-TEES.

Week ending August 9.

NIL.

SWANSEA.

Week ending August 9.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

BRISTOL.

Publication of Official Returns Suspended.

GLASGOW.

Week ending August 9.

AMMONIUM SULPHATE
Yokohama, 500 t.

BEE'S WAX
Antwerp, £45.

BITUMASTIC SOLUTION—
Bangkok, 1 t.

CAUSTIC SODA—
Calcutta, 4 drms.

CHEMICALS (otherwise undescribed)
Antwerp, 3 t. 2 c.; Calcutta, 17 pkgs.; Busrah, 15 cs.; Delagoa Bay, 741 pkgs.; Kobe, 25 t.; Mauritius, 1 pkg.; Natal, 1 pkg.; Singapore, 30 t. 6 c.; Vera Cruz, 145 t.

COAL PRODUCTS (otherwise undes.)
Buenos Ayres, £681.; Monte Video, £630.

COAL PRODUCTS—
Carbolic Acid
Calcutta, 1,000 gals.
Tar
Natal, 36,000 gals.

DYESTUFFS (otherwise undescribed)
Calcutta, 18 c.; Persian Gulf Ports, 5 c.

GLUE—
Hong Kong, 5 t.

RED LEAD
B. Ayres, 2 t. 7 c.; Calcutta, 10 c.

ROSIN
Mauritius, £20.

SALAMMONIAC
Busrah, 10 t.

SHEEP DIP—
Delagoa Bay, £900.; Buenos Ayres, 433 t. 4 c.; Jamaica, 12 c.; Natal, 992 pkgs.

SOAP
Antwerp, 24 t. 16 c.; Kingston, 2 t. 18 c.; Persian Gulf Ports, 120 t. 6 c.; Pt. Swettenham, 50 drms.; Singapore, 152 bxs.

SODIUM CARBONATE
Persian Gulf Ports, 4 t. 1 c.

SULPHURIC ACID—
Persian Gulf Ports, 2 t. 5 c.

TAR SUBSTITUTE—
Calcutta, 741 pkgs.

TURPENTINE—
Buenos Ayres, 125 gals.

WHITE LEAD—
Buenos Ayres, 10 c.; Calcutta, 10 c.; Persian Gulf Ports, 10 c.

GOOLE.

Publication of Official Returns Suspended.

GRANGEMOUTH.

Week ending August 9.

CAUSTIC SODA—
Rotterdam, 181 drms.

SODA ASH—
Rotterdam, 200 bgs.

GRIMSBY.

Publication of Official Returns Suspended.

HULL.

Week ending August 9.

BORAX—
Rotterdam, 2 bgs.

CARBON BLACK—
Copenhagen, 10 cs.

CHEMICALS (otherwise undescribed)
Antwerp, 1 cs., 151 brls., 98 cs., 61 brls., 19 drms.; Batoum, 19 cs.; Copenhagen, 58 cs.; Christiania, 30 kgs.; Dunkirk, 15 drms., 6 cs., 191 brls.; Dieppe, 109 cs., 3 drms.; Helsingfors, 5 cs.; New York, 4 cs., 20 cs.; Rotterdam, 2 cs., 29 cs.; Rouen, 12 brls., 9 drms.; Stockholm, 1 cs., 21 bgs., 24 cs., 3 drms., 30 pkgs.

COAL PRODUCTS (otherwise undes.)
Antwerp, 1,020 t.

DISINFECTANTS (otherwise undes.)
Dunkirk, 100 cs.

DYESTUFFS (otherwise undescribed)
Copenhagen, 36 cs.

FATTY ACIDS—
Dunkirk, 148 brls.

GLUE—

Antwerp, 20 bgs.; Copenhagen, 61 bgs.; Stockholm, 40 bgs.

PARAFFIN WAX—

Stockholm, 11 bgs.

SALT—

Copenhagen, 150 cs.

SOAP—

Antwerp, 40 kgs., 2,774 cs., 1,342 bxs.; Copenhagen, 400 cs., 5 t.; Dunkirk, 2 pcls., 10 cs., 40 drms.; Rotterdam, 1,100 cs.; Stockholm, 1 cs.

SODA—

Stockholm, 50 bgs.

TURPENTINE—

Christiania, 10 brls.

WAX—

Batoum, 5 cs.; Dunkirk, 2 cs.

LEITH.

Week ending August 9.

COAL PRODUCTS—

Tar

Faroe Islands, 3 t. 2 c., £1.

CREAM OF TARTAR—

Faroe Islands, 1 t. 6 c., £28.

HYDROCHLORIC ACID—

Faroe Islands, £1.

HYDROCHLORIC ACID AND**SODIUM BICARBONATE—**

Faroe Islands, 1 qr., £2.

POTASSIUM BICHROMATE—

Rotterdam, 20 t. 5 c., £168.

SODA—

Dunkirk, 8 t., £3.; Faroe Islands, 24 t., £6.

SODA CRYSTALS—

Faroe Islands, 18 t., £6.

SODIUM CARBONATE—

Faroe Islands, 2 c.

LIVERPOOL.

Week ending August 7.

ACETATE OF LIME—

Amsterdam, 15 t., £250.

ACETIC ACID—

Bahia, 1 c., £7.; Lisbon, 2 c., £23.; Oporto, 1 c., £6.; Rotterdam, 9 c., £39.; Rio de Janeiro, 2 c., £14.

ALUM—

Bahia, 5 c., £6.; Buenos Ayres, 40 t., £705.; Galatz, 2 t., £37.; Lagos, 1 t., £22.; Madras, 3 t. 13 c., £53.; Piraeus, 3 t., £52.; Patras, 5 t. 15 c., £104.; Rio de Janeiro, 5 c., £32.; Salonica, 2 t., £56.; Smyrna, 1 t. 5 c., £25.; Singapore, 5 t., £100.; Varna, 1 t., £18.

ALUMINA SULPHATE—

Rouen, 2 t. 10 c., £50.

ALUMINOFERRIC—

Calcutta, 10 t. 10 c., £74.; Santos, 20 t., £185.

AMMONIA—

Bahia, 1 c., £7.; Calcutta, 7 c., £31.; Rio de Janeiro, 2 t., £82.; Santos, 2 c., £20.

AMMONIUM CARBONATE—

Bahia, 6 c., £21.; Gothenburg, 1 t., £63.; Lisbon, 12 c., £36.; Manila, 1 t., £66.; Padang, 10 c., £33.; Porto Alegre, 14 c., £25.; Rio de Janeiro, 14 c., £84.

AMMONIUM CHLORIDE—

Buenos Ayres, 4 t., £242.

AMMONIUM MURIATE—

Alexandria, 9 t. 16 c., £643.; Cartagena, 11 c., £20.; Constantinople, 32 t., £1,897.; Genoa, 1 t. 18 c., £93.; Philadelphia, 5 t. 5 c., £231.; Santander, 1 t. 2 c., £40.; Stockholm, 10 t. 3 c., £493.

ARSENIC—

Amsterdam, 1 t., £32.; Bahia, 2 c., £5.; Oporto, 1 c., £2.; Patras 2 c. £7.; Rio de Janeiro, 2 t., £100.

ARSENIC ACID—

Rouen, 1 t. 1 c., £88.

BARIUM CHLORIDE—

Barcelona, 2 t. 19 c., £71.

BLEACHING POWDER—

Alexandria, 10 t. 5 c., £175.; Bombay, 2 t. 12 c., £590.; Calcutta, 2 t. 12 c., £45.; Lisbon, 15 t. 18 c., £221.; Melilla 1 t., £19.; Melbourne, 2 t., £35.; Oporto, 19 t. 15 c., £297.; Rouen, 30 t. 2 c., £354.; Rio de Janeiro, 10 t. 2 c., £212.; Syria, 4 t. 7 c., £134.; Shanghai, 20 t., £320.

BORIC ACID—

Alexandria, 2 c., £15.; Constantinople, 2 t., £150.; Kara Sea, 1 t. 19 c., £148.; Rio de Janeiro, 1 t. 7 c., £122.; Rotterdam, 5 t., £150.; Shanghai, 10 t., £740.; Salonica, 10 c., £36.; Trinidad, 1 c., £5.

BORAX—

Antwerp, 126 t., £2680.; Amsterdam, 20 t., £800.; Anotto Bay, 1 c., £2.; Hamburg, 10 t., £500.; Patras, 1 t. 6 c., £54.; Rio de Janeiro, 2 t. 2 c., £92.; Smyrna, 1 c., £3.; Socrabaya, 5 c., £6.; Samarang, 3 c., £4.; Salonica, 4 c., £8.

CALCIUM CHLORIDE—

Calcutta, 10 c., £5.; Wellington, 2 t. 2 c., £16.

CARBONATE OF LIME—

Buenos Ayres, 285 pkgs.

CAUSTIC SODA—

Adelaide, 840 pkgs.; Alexandria, 75 drms.; Brisbane, 40 drms.; Buenos Ayres, 160 drms.; Bunderburg, 20 pkgs.; Calcutta, 216 drms.; Cadiz, 5 pkgs.; Dunedin, 100 drms.; Melbourne, 69 drms.; Monte Video, 75 drms.; Sydney, 85 drms.; Yokohama, 217 pkgs.

CHINA CLAY—

Bombay, 160 pkgs.; Calabar, 40 cks.; Dunkirk, 5 t.; Maccio, 20 t.

CITRIC ACID—

Rio Grande do Sul, 2 c., £56.; Rio de Janeiro, 10 c., £240.

COAL PRODUCTS—**Carbolic Acid**

Batavia, 5 t. 12 c., £134.; Calcutta, 10 c., £21.; Hong Kong, 2 t. 6 c., £82.; Kobe, 80 t. 5 c., £3,714.; Kara Sea, 1 t. 19 c., £108.; Rio de Janeiro, 3 t. 1 c., £60.; Sydney, 1 c., £4.

Cresote

Christiania, 38 t. 4 c., £340.; Oporto, 76 t. 4 c., £680.

Dyes

Barcelona, 18 c., £120.; New York, 2 c., £148.

Naphthalene

Havre, 10 c., £65.; Kara Sea, 10 t., £610.; Panama, 1 c., £10.; Santos, 1 c., £7.

Tar

Lagos, 1 t. 12 c., £18.; Lisbon, 40 t., £250.; Stockholm, 2 t. 10 c., £41.; Warri, 1 t. 16 c., £13.

COPPER SULPHATE

Bordeaux, 100 t., £6,000.; Buenos Ayres, 10 c., £46.; Smyrna, 2 t. 19 c., £138.

COPPERAS—

Orotava, 28 brls.

CREAM OF TARTAR—

Rio de Janeiro, 10 c., £126.

DISINFECTANTS (otherwise undes.)

Alexandria, 1 c., £31.; Bangkok, 7 t. 16 c., £254.; Beira, 1 c., £10.; Burutu, 6 c., £21.; Batavia, 5 t. 11 c., £139.; Calcutta 4 t., 13 c., £178.; Copenhagen, 1 c., £10.; Galatz, 2 c., £17.; Loanda, 11 c., £23.; Monte Video, 12 c., £15.; Oporto, 4 c., £9.; Rio de Janeiro, 3 t. 11 c., £480.; Secondee, 1 c., £6.; Sierra Leone, 3 c., £7.; Smyrna, 1 t. 7 c., £25.; Socrabaya, 3 t. 14 c., £93.; Warri, 6 c., £12

DYESTUFFS (otherwise undescribed)

Saigon, 10 c., £605.

DYESTUFFS—**Aniline Dye**

Amsterdam, 1 c., £20.; Antwerp, 7 t. 10 c., £2,241.; Barcelona, 1 t. 5 c., £258.; Bordeaux, 30 t. 3 c., £1,727.; Calcutta, 17 c., £565.; Constantinople, 19 c., £122.; Copenhagen, 10 c., £530.; Christiania, 1 c., £110.; Havre, 2 c., £33.; New York, 3 c., £118.; Smyrna, 2 t. 9 c., £842.; Syria, 2 t., £262.; Yokohama, 4 c., £625.

FERRO CHROME—

Philadelphia, 15 t.

FERRO MANGANESE—

Auckland, 2 t.

FORMALDEHYDE—

Barcelona, 10 cks.

GLUE, SIZE, AND GELATINE—

Bombay, 1 pkg.; Melbourne, 13 pkgs.; Montreal, 11 c.

GLYCERINE—

Barcelona, 29 pkgs.; Cape Town, 12 drms.

HYDROCHLORIC ACID—

Calcutta, 8 c., £46.

HYDROSULPHITE ASH—

New York, 40 pkgs.

LACTIC ACID—

Antwerp, 3 t., £246.

LEAD ACETATE—

Genoa, 3 t. 3 c., £310.

MAGNESIA—

Galatz, 137 pkgs.; Manta, 1 pkg.

MAGNESIUM CHLORIDE—

Bombay, 14 t. 8 c., £227.; Calcutta, 6 t. 10 c., £109.; Rouen, 13 t. 4 c., £252.

MURIATIC ACID—

Buenos Ayres, 6 c., £18.

NICKEL SULPHATE—

Antwerp, 28 t. 10 c., £1,310.; Amsterdam, 5 t., £125.; Oporto, 5 c., £16.

NITRIC ACID—

Buenos Ayres, 3 c., £12.

ONALIC ACID—

Genoa, 2 t., £272.; Rio de Janeiro, 1 t., £159.

PHOSPHORUS—

Kingston, 3 c., £40.; Kobe, 6 t. 14 c., £1,438.; Vera Cruz, 1 t. 5 c., £360.

PITCH—

Genoa, 1 t. 16 c., £88.

POTASSIUM BICHROMATE—

Amsterdam, 8 c., £62.; Mar-seilles, 15 c., £115.; Piraeus, 1 t. 18 c., £306.; Rotterdam, 8 c., £64.

POTASSIUM CHLORATE—

Lisbon, 18 c., £99.; Monte Video, 10 c., £56.; Oporto, 2 t. 12 c., £312.; Piraeus, 10 c., £66.

POTASSIUM METABISULPHATE

Algiers, 19 c., £262.

POTASSIUM SILICATE—

Orotava, 200 pkgs.

POTASSIUM SULPHATE

Teneriffe, 12 t. 10 c., £500.

SALAMMONIAC—

Constantinople, 2 t. 10 c., £183.; Genoa, 6 c., £23.; Monte Video, 5 c., £19.; Piraeus, 1 t., £71.; Patras, 10 c., £32.; Smyrna, 2 t. 16 c., £218.; Salonica, 5 t., £327.

SALICYLIC ACID—

Antwerp, 1 t., £225.

SALT—

Accra, 139 t.; Bahia, 30 t.; Belize, 35 t.; Bergen, 245 t.; Buenos Ayres, 11 t.; Burutu, 230 t.; Drontheim, 105 t.; Ghent, 260 t.; Ibi, 50 t.; Manaos, 142 t.; Maranham, 14 t.; Montreal, 810 t.; Nantes, 164 t.; New York, 300 t.; Norrkoping, 134 t.; Para, 124 t.; Pt. Elizabeth, 8 c.; Pt. Gentil, 10 t.; Quebec, 463 t.; Rio de Janeiro, 103 t.; Rouen, 40 t.; Saffa, 5 t.; Santos, 1 t.; Sierra Leone, 131 t.; Stavanger, 10 t.; Trangisvaag, Faroe Islands, 280 t.

SALT—

Trinidad, 125 t.; Valparaiso, 6 t.; Warri, 819 t.

SALTPETRE—

Anotto Bay, 1 c., £4.; Bahia, 5 c., £16.; Helsingfors, 2 c., £7.; Kingston, 1 c., £4.; Madeira, 7 c., £24.

SHEEP DIP—

Auckland, 10 t. 11 c., £394.; Buenos Ayres, 6 t. 1 c., £360.; Cartagena, 5 c., £10.; Dunedin, 10 t. 11 c., £394.; La Guaira, 2 t. 4 c., £157.; Monte Video, 8 t. 19 c., £750.; Varna, 6 t. 12 c., £530.; Wellington, 21 t. 17 c., £814.

SOAP—

Accra, 524 pkgs.; Algiers, 600 pkgs.; Aboina, 225 bxs.; Amsterdam, 1 t.; Antwerp, 23 brls., 555 bxs.; Auckland, 11 bxs.; Bahia, 112 bxs.; Bangkok, 1 pkg.; Barbadoes, 1,000 bxs.; Basra, 100 bxs.; Bathurst, 750 bxs., 8 pkgs.; Bissao, 31 pkgs.; Bombay, 12,533 bxs.; Calabar, 20 pkgs.; Calcutta, 3 bxs.; Cartagena, 50 cs.; Cochín, 600 cs.; Colombo, 8 cs.; Coquimbo, 10 cs.; Cotonou, 6 cs.; Dar-es-Salaam, 2 cs.; Delagoa Bay, 5 cs.; Duala, 20 pkgs.; Dunkirk, 5,313 cs.; Durban, 1 bx.; Gibraltar, 1 cs., 400 bxs.; Gothenburg, 6 brls.; Grand Bassam, 1,010 pkgs.; Guadeloupe, 300 pkgs.; Ibi, 20 cs.; Karachi, 320 cs.; Kingston, 1,250 cs.; La Paz, 3 cs.; Lagos, 70 bxs.; Leghorn, 114 cs.; Linassol, 70 bxs.; Madras, 6 brls.; Malta, 60 bxs.; Malaga, 100 cs.; Malmo, Sweden, 40 cs.; Martinique, 1,500 cs.; Medellin, 3 cs.; Menando, 200 bxs.; Messina, 22 cs.; Mollendo, 11 cs.; Montreal, 78 cs.; Mombasa, 63 cs.; Monrovia, 3 cs.; Naples, 50 bxs.; Para, 1 bx.; Opobo, 106 bxs.; Punta Arenas, 270 pkgs.; Rangoon, 1,117 bxs.; Rio Gallegos, 38 pkgs.; Rotterdam, 559 pkgs.; Sabang, 25 cs.; Saffi, 240 cs.; St. John's, 15 cs.; St. Kitts, 36 cs.; St. Louis, 61 cs.; Salisbury, 7 pkgs.; Secondee, 600 bxs.; Shanghai, 1 kg., 1,500 bxs.; Sherbo, 6 cs.; 100 bxs.; Sierra Leone, 429 bxs.; Singapore, 33 bxs.; Smyrna, 37 cs.; Tangier, 225 pkgs.; Trinidad, 23 pkgs.; Valencia, 280 bxs.; Valparaiso, 197 bxs.; Zanzibar, 50 bxs.

SODA ASH

Buenos Ayres, 124 pkgs.; Dairen, 2,520 pkgs.; Dalmy, 1,008 pkgs.; Durban, 379 pkgs.; Gothenburg, 500 pkgs.; Hankow, 882 pkgs.; Hong Kong, 1,697 pkgs.; Iquique, 50 pkgs.; Kobe, 2,650 pkgs.; Melbourne, 297 pkgs.; Moiti, 514 pkgs.; Norrkoping, 500 pkgs.; Stockholm, 212 pkgs.; Tsingtao, 3,920 bgs.

SODIUM BICARBONATE—

Adelaide, 120 pkgs.; Bombay, 10 pkgs.; Colombo, 30 pkgs.; Durban, 25 pkgs.; Cartagena, 50 pkgs.; Hong Kong, 50 pkgs.; Kobe, 2,615 pkgs.; Montreal, 375 pkgs.; Santa Cruz, 10 pkgs.

SODIUM SILICATE—

Buenos Ayres, 285 pkgs.; Cartagena, 30 pkgs.; New York, 146 pkgs.

SODIUM SULPHIDE—

B. Ayres, 80 pkgs.; Bordeaux, 18 pkgs.; Boston, 434 pkgs.

SULPHUR—

Alexandria, 2 c., £8.; Copenhagen, 10 c., £15.; Ichang, 1 c., £4.; Warri, 1 c., £2.

SULPHURIC ACID—

Buenos Ayres, 7 c., £15.; Colombo, 1 t., £19.; Calcutta, 9 c., £39.

TARTARIC ACID—

Bahia, 2 c., £34.; Porto Alegre, 1 t. 4 c., £398.

TUNGSTIC ACID

Stockholm, 2 c., £16.

WAX

Danzig, 6 bgs.

WHITE LEAD

Christchurch, 1 t.

WOOD PRESERVATIVE

Copenhagen, 11 c., £80.; Socra-baya, 4 t. 8 c., £108.

LONDON.

Week ending August 6.

ACETIC ACID

Adelaide, 2 c., £6.; Antwerp, (F.), 6 brls., £68.; Brisbane, 19 c., £59.; Brussels (F.), 1 ck., £16.; Melbourne, 22 cks., £65.

ACETIC ANHYDRIDE

Copenhagen, 3 c., (pt.), £7.

ACETO SALICYLIC ACID

Beyrout, 1 c., (pt.), £7.; Brisbane, 1 c., £23.; Buenos Ayres, 2 c., £140.; Hong Kong, 1 c., (pt.), £6.; Lisbon, 4 c., (pt.), £33.; Melbourne, 3 c., £205.

ACETONE

Rotterdam, 3 c., (pt.), £113.

ALUM

Madras, 2 cks., £16.

ALUM (CHROME)

Cape Town, 1 ck., £27.; Ghent, 6 c., £33.

ALUMINA HYDRATE

Lisbon, 1 ck., £36.

ALUMINA SULPHATE

Copenhagen, 3 c., (pt.), £8.

AMMONIA

Buenos Ayres, 4 c., £6.; Calcutta, 5 c., £10.; Calais, 41 drms., £391.; Canton, 2 c., £10.; Delagoa Bay, 7 c., £14.; Durban, 13 c., £25.; Kilindini, 4 c., £8.; Pt. Elizabeth, 10 c., £20.; Shanghai, 5 c., £10.; Tientsin, 10 c., £20.

AMMONIA (ANHYDROUS)

Singapore, 40 cybs., £557.

AMMONIUM ACETATE

Durban, 1 c., £7.

AMMONIUM BENZOATE

Rio de Janeiro, 1 c., £16.

AMMONIUM BROMIDE

Calcutta, 1 c., (pt.), 1 c., £16.; Christchurch (F.), 1 c., £8.; Lisbon, 4 c., (pt.), £6.; Rio de Janeiro, 1 c., (pt.), £9.

AMMONIUM CARBONATE

Colombo, 2 c., £10.; Durban, 4 c., £16.; Hiogo, 10 t., £607.; Pt. Swettenham, 2 c., £10.; Raogoon, 3 t. 19 c., £317.; Santos, 1 t., £31.; Sao Paulo, 8 c., £56.; Yokohama, 10 t., £59.

AMMONIUM CITRATE

Colombo, 2 c., £17.

AMMONIUM MURIATE

Antwerp, 10 c., £40.; Bombay, 7 t. 7 c., £532.; Beira, 1 t. 5 c., £80.; Buenos Ayres, 10 c., £40.; Calcutta, 2 c., £7.; Singapore, 2 c., £8.

AMMONIUM SULPHATE

Algiers, 50 t., £1,325.; Boulogne, 77 t. 10 c., £1,936.

AMMONIUM SULPHOCYANIDE

Christiania, 1 c., (pt.), £25.

ANTIMONY PENTASULPHIDE

Copenhagen, 1 kg., £8.

ANTIMONY REGULUS

Copenhagen, 1 t.

ANTIMONY SULPHIDE

Boulogne, 8 cks., £185.; Lisbon, 1 ck., £47.; Montreal, 2 t. 2 c., £243.; New York, 10 cks., £151.

ARSENIC

Buenos Ayres, 10 c., £30.; Calcutta, 1 t., £130.

BARIUM BINOXIDE

Dieppe, 167 drms., £2,486.

BARIUM CHLORATE

Rio de Janeiro, 1 ck., £51.

BARIUM HYDRATE

Dieppe, 17 cks., £92.

BASIC SLAG

Auckland, 750 t., £603.

BENZYL CHLORIDE

Copenhagen, 3 c., (pt.), £6.

BISMUTH

Kobe, 3 t.

BISMUTH CARBONATE

Cape Town, 1 c., (pt.), £11.; Lyttleton, 1 c., (pt.), £6.; Melbourne, 1 c., (pt.), £100.; New Plymouth, 1 c., (pt.), £7.

BISMUTH CITRATE

Melbourne, 1 c., (pt.), £21.

BISMUTH SALICYLATE

Brussels, 1 c., £50.

BISMUTH SALTS

Melbourne, 3 c., £238.

BISMUTH SUBGALLATE

Alexandria, 1 c., (pt.), £9.; Gothenburg, 1 c., £86.

BISMUTH SUBNITRATE

Melbourne, 3 c., (pt.), £10.

BISULPHIDE OF LIME

Bordeaux, 13 cks., £59.

BORAX

Amsterdam, 10 c., £20.; Boulogne, 4 c., £11.; East London, 2 c., £7.; Gothenburg, 2 t. 10 c., £100.; Hong Kong, 2 c., £5.; Ostend, 9 t. 17 c., £389.; Yokohama, 1 t., £38.

BORIC ACID

Amsterdam, 1 t., £73.; Athens, 6 c., £50.; Bangkok, 3 c., £18.; Beyrout, 1 c., £16.; Calcutta, 5 c., £23.; Canton, 1 c., £5.; Durban, 5 c., (F.), £18.; Gothenburg, 1 t. (F.), £73.; Hankow, 2 c., £12.; Hong Kong, 2 c., £10.; Madras, 1 c., £6.; Rio de Janeiro, 9 c., £57.; Sao Paulo, 4 c., £22.; Wellington, 3 c., £39.

CALCIUM CARBIDE

Durban, 4 t. 17 c., £125.; Pt. Elizabeth, 9 t. 14 c., £250.; Secondee, 2 t., £52.

CALCIUM CHLORIDE

Copenhagen, 4 t. 17 c., £50.; Singapore, 1 c., £5.; St. Vincent, 11 c., £6.; Sydney, 1 c., £6.

CALCIUM GLYCEROPHOSPHATE

Melbourne, 1 c., (pt.), £7.

CARBONATE OF LIME

Bordeaux, 72 cks., £286.

CARNAUBA WAX

Gothenburg, 10 c.

CAUSTIC POTASH

Lyttleton, 1 c., (pt.), £8.

CAUSTIC SODA

Antwerp, 32 t., £860.; Shanghai, 4 c., £14.

CERESINE WAX

Antwerp, 3 t. 10 c.; Barcelona, 1 t. 5 c.; Gothenburg, 3 t. 10 c.

CHEMICALS (otherwise undescribed)

Alexandria, 2 c., £22.; Canton, 1 c., £8.; Christiania, 2 c., £50.; Gibraltar, 2 c., £8.; Hong Kong, 5 pkgs., £73.; Penang, 3 c., £24.; Pt. Elizabeth, 1 c., £6.; Pt. Swettenham, 2 c., £12.; Tientsin, 1 c., £13.

CHINA CLAY

Barcelona, 5 t.

CHROMIUM OXYDATE

Copenhagen, 2 pkgs., £43.

CITRIC ACID

Beyrout, 1 c., £16.; Bombay, 1 c., £15.; Brisbane, 1 c., £29.; Hamilton, Ont., 5 c., £113.; Malta, 1 c., £31.; Montreal, 2 t. 15 c., £1,243.; Pt. Elizabeth, 1 c., £113.; Pt. Swettenham, 1 c., £8.; Raogoon, 6 c., £76.; Toronto, 10 c., £226.; Trinidad, 1 c., (F.), £19.

COAL PRODUCTSAniline Dye
Boulogne, 1 kg., £50.; Brussels, 6 pkgs., £17.; Calcutta, 1 c., £31.; Dunedin, 1 ck., £32.; Lyttleton, 6 pkgs., (pt.), £122.; Paris, 32 pkgs., £1,060.**COAL PRODUCTS**

Benzaldehyde

Paris, 1 crby., £21.

Benzonaphthol

Rio de Janeiro, 1 c., (pt.), £27.

Carbolic Acid

Adelaide, 1 c., £16.; Fremantle, 2 c., £16.; Kobe, 150 drms., £890.; Melbourne, 8 c., £52.; Osaka, 138 drms., £550.; Perth, 50 drms., £38.; Sao Paulo, 2 c., £9.

Creosol

Canton, 4 pkgs., £22.

Metacresol

Antwerp, 13 drms., £220.

Myrbane Oil

Melbourne, 20 drms., £125.

Naphthalene

Auckland, 2 cks., £50.; Bordeaux, 49 pkgs., £136.; Calcutta, 1 c., £6.; East London, 15 brls., £40.; Pt. Elizabeth, 22 brls., £60.; Sao Paulo, 2 brls., £10.; Sierra Leone, 2 brls., £5.

Nitrosine

Paris, 1 ck., £79.

Pitch

Sierra Leone, 8 cks., £6.; Vigo, 44 brls., £61.

Tar

Pt. Elizabeth, 100 cks., £9.

Toluylene Diamene

Antwerp, 1 dr., £24.

COBALT OXYDATE

Copenhagen, 1 c., £90.; Kobe, 10 c., £100.

COBALT RESINATE

Antwerp, 1 ck., £15.

COPPER CARBONATE

Copenhagen, 1 ck., £25.

COPPER SULPHATE

Durban, 5 c., £14.; East London, 5 c., £14.; Kilindini, 4 t. 17 c., £198.

CREAM OF TARTAR

Buenos Ayres, 2 c., £24.; Calcutta, 1 c., £14.; Cape Town, 1 c., £14.; Copenhagen, 1 t. 19 c., £461.; Durban, 2 c., £31.; Hong Kong, 2 c., (F.), £6.; Rio de Janeiro, 2 c., £35.; Yokohama, 1 t., £235.

DISINFECTANTS (otherwise undescribed)

Amsterdam, 14 c., £77.; Asuncion, 3 c., £29.; Bermuda, 2 c., £10.; Bombay, 7 t. 16 c., £262.; Brisbane, 4 t. 9 c., £209.; Brussels, 2 t. 3 c., £70.; Buenos Ayres, 1 t., £46.; Christchurch, 2 c., £8.; Cocos Islands, 2 c., £5.; Durban, 4 t. 17 c., £238.; Gibraltar, 7 c., £22.; Grenada, 10 c., £25.; Hankow, 3 c., £17.; Hong Kong, 5 t. 9 c., £163.; Limon, 6 c., £11.; Madras, 1 t. 17 c., £83.; Montreal, 3 c., £28.; Mossel Bay, 9 c., £18.; Penang, 2 t. 11 c., £80.; Perth, 2 t. 9 c., £111.; Pt. Elizabeth, 1 t., £41.; Rotterdam, 17 c., £77.; Shanghai, 1 t. 5 c., £51.; Singapore, 2 t. 10 c., £125.; Toronto, 16 c., £76.; Trinidad, 7 c., £12.; Yokohama, 10 c., £17.

ETHER

Canton, 1 c., £25.; Shanghai, 1 c., £5.; Singapore, 1 c., £6.

ETHYL ACETATE

Copenhagen, 3 c., (pt.), £11.

FLUORIC ACID

Durban, 1 ck., £11.

GALLIC ACID

Melbourne, 1 kg., £31.

GELATINE

Rio de Janeiro, 3 c.

GLUE

Arica, 8 c.; Ghent, 1 t. 5 c.; Odense, 1 t.

GLUE, SIZE, AND GELATINE

Antwerp, 2 t.; Barcelona, 3 t. 13 c.; Bombay, 1 c.; Boulogne, 1 t. 3 c.; Cape Town, 10 c.; Copenhagen, 12 t.; Durban, 1 c.; Hong Kong, 1 c.; Kobe, 2 t.; Lisbon, 6 c.; Montreal, 5 c.; Ostend, 2 c.; Pt. Elizabeth, 3 c.; Sydney, 9 c.; Yokohama, 10 t.

GLYCERINE

Bahia, 2 c., £20.; Bombay, 3 c., £23.; Calcutta, 7 c., £64.; Cape Town, 1 c., £6.; Hankow, 1 c., £10.; Paris, 1 t., £130.; Rio de Janeiro, 5 c., £54.; Sao Paulo, 12 c., £134.

GOLD CHLORIDE

Amoy, 1 c., (pt.), £14.

HYDROBROMIC ACID

Brisbane, 1 c., £6.

HYDROCHLORIC ACID

Shanghai, 5 c., £17.

HYPO ACID

Melbourne, 1 c., £16.

IODINE (RESUBLIMED)

Copenhagen, 2 c., £180.

IODOFORM

Alexandria, 1 c., £32.

IRON AND AMMONIUM CITRATE

Buenos Ayres, 2 c., £30.; Brussels, 1 c., £29.; Melbourne, 1 c., (pt.), £7.; Perth, 1 c., (pt.), £7.; Sydney, 1 c., (pt.), £13.

IRON HYPOPHOSPHITE

Christiania, 1 c., (pt.), £8.

IRON PERCHLORIDE

Sao Paulo, 1 c., £7.

JAPAN WAX

Barcelona, 4 c.

LACTIC ACID

Calcutta, 2 cks., £31.

LEAD ACETATE

Antwerp, 1 ck., £26.; Buenos Ayres, 1 ck., £11.; Gothenburg, 3 cks., £64.; Melbourne, 1 ck., £10.

LEAD CARBONATE

Buenos Ayres, 2 cks., £7.

LITHIUM BROMIDE

Copenhagen, 1 c., (pt.), £50.

MAGNESIA (CALCINED)

Rio de Janeiro, 6 c., £100.; Sao Paulo, 1 c., £14.

MAGNESIUM CARBONATE

Bordeaux, 6 c., £120.; Dunedin, 2 c., £7.; Melbourne, 5 c., £25.

MAGNESIUM CITRATE

Barcelona, 10 c., £120.; Bermuda, 1 c., £14.

MAGNESIUM SULPHATE

Beyrout, 10 c., £10.; Delagoa Bay, 3 c., £7.; Durban, 11 c., £25.; Madras, 4 c., £7.; Montreal, 9 c., £10.

MANGANESE OXIDE

Copenhagen, 2 c., £34.

MANGANESE PEROXIDE

Buenos Ayres, 1 ck., £10.

METHYL SALICYLATE

Brisbane, 1 c., £14.; Bangkok, (F.), 2 c., £48.

MINERAL BLACK

Boulogne, 21 cks., £75.; Santos, 10 cks., £9.

NICKEL SALTS

Shanghai, 6 c., £18.; Yokohama, 30 c., £75.

NITRIC ACID

Bahia, 2 c., £23.; Colombo, 2 c., £5.; Penang, 4 c., £21.; Singapore, 4 c., £17.

OXALIC ACID

Bordeaux (F.), 7 cks., £285.; Paris, 20 cks., £669.

PARALDEHYDE

Pt. Elizabeth, 2 c., £10.

PHOSPHORIC ACID

Melbourne, 5 c., £35.; Rio de Janeiro, 3 cks., (pt.), £7.

PHOSPHORIC AND CITRIC ACID

Cape Town, 2 c., £35.; Dunedin, 2 c., £10.

PHOSPHORUS

Rio de Janeiro, 1 c., £59.

PLUMBAGO

Antwerp, 14 c.; Calcutta, 2 t. 10 c.; Durban, 1 t.; Gothenburg, 1 t. 10 c.; Hong Kong, 3 t. 15 c.; Montreal, 9 t.

POTASSIUM ACETATE

Copenhagen, 1 c., £6.; Colombo, 1 c., (pt.), £5.

POTASSIUM BICARBONATE—

Adelaide, 3 kgs., £25.; Calcutta, 1 cs., £11.

POTASSIUM BICHRIMATE—

Haarlem, 1 ck., £23.

POTASSIUM BROMIDE

Brisbane (F.), 1 cs., £16.; Buenos Ayres, 1 cs., £8.; Lisbon, 4 cs. (pt.), £11.; Rio de Janeiro, 1 cs. (pt.), £26.; Sao Paulo, 5 cks. (pt.), £17.

POTASSIUM CARBONATE

Brussels, 2 kgs., £38.; Rio de Janeiro, 2 pkgs. (pt.), £20.

POTASSIUM CITRATE—

Alexandria, 1 cs. (pt.), £8.; Brisbane, 1 cs., £31.; Christiania, 2 cs. (pt.), £8.; Durban, 1 cs., £15.; Melbourne, 4 cs. (pt.), £55.; Sydney, 8 cs., £160.

POTASSIUM CYANIDE—

Rio de Janeiro, 2 c., £43.; Santos, 8 c., £101.; Sao Paulo, 1 cs., £15.

POTASSIUM HYPOPHOSPHITE—

Christiania, 1 cs. (pt.), £9.

POTASSIUM IODIDE—

Buenos Ayres, 1 cs. (pt.), £38.; Christchurch, 2 cs. (pt.), £77.; Christiania, 3 cs. (pt.), £225.; Foochow, 1 cs. (pt.), £9.; Gothenburg, 2 cs., £375.; Rio de Janeiro, 3 pkgs. (pt.), £112.; Santos, 17 pkgs. (pt.), £50.

POTASSIUM METABISULPHITE

Italy, 9 pkgs., £110.

POTASSIUM NITRATE

Barcelona (F.), 1 t., £51.

POTASSIUM PERMANGANATE—

Christiania, 1 cs. (pt.), £12.; Ipoh, 1 cs. (pt.), £18.; Rio de Janeiro, 31 pkgs. (pt.), £50.

POTASSIUM PRUSSIANE—

Rio de Janeiro, 15 pkgs. (pt.), £311.

POTASSIUM SULPHIDE—

Rio de Janeiro, 4 cks. (pt.), 9 pkgs. (pt.), £44.

POTASSIUM SUPEROXALATE—

Melbourne (F.), 1 kg., £11.

PYROGALLIC ACID—

Amy, 1 cs., £8.; Bangkok, 1 cs. (pt.), £8.; Hong Kong, 1 cs., £15.; Hankow, 1 cs., £15.; Tokio, 2 kgs., £43.

QUININE—

Antwerp, 50 ozs.; Bombay, 358 ozs.; Calcutta, 3,000 ozs.; Grenada, 608 ozs.; Rio de Janeiro, 413 ozs.

RED LEAD—

Hong Kong, 14 t.

SALICYLIC ACID—

Antwerp, 54 kgs., £480.; Brisbane, 1 cs., £12.; Copenhagen, 5 pkgs., £50.; Paris, 40 cks., £606.

SALT—

Antwerp, 1 t.; Auckland, 8 t.; Beira, 3 t.; Buenos Ayres, 6 t.

SALTPETRE

Barcelona, 4 t., £202.; Durban, 15 c., £48.; East London, 4 c., £16.; Lisbon, 5 t. 12 c., £279.; Malta, 2 c., £7.; Pt. Elizabeth, 18 c., £63.; Rio de Janeiro, 2 t. 8 c., £156.; Sao Paulo, 4 t. 18 c., £293.; Singapore, 2 c., £7.

SHEEP DIP—

Buenos Ayres, 14 t. 19 c., £1,200.; Pt. Elizabeth, 5 t. 3 c., £375.

SILVER NITRATE

Colombo, 1 cs. (pt.), £19.; Hong Kong, 1 cs., £75.

SIZE—

Rotterdam, 28 t. 15 c.

SOAP—

Adelaide, 11 c.; Alexandria, 10 c.; Amsterdam, 1 t.; Antofagasta, 4 c.; Antwerp, 123 t. 7 c.; Auckland, 7 c.; Bangkok, 7 c.; Barcelona, 1 t. 5 c.; Bombay, 3 t. 16 c.; Boston, 1 t.; Boulogne, 166 t. 14 c.; Brisbane, 5 c.; Buenos Ayres, 1 c.; Calcutta, 1 t. 14 c.; Cape Town, 3 c.; Christiania, 2 c.; Colombo, 1 c.;

SOAP

Copenhagen, 2 c.; Cuba, 4 c.; Dantzig, 10 t. 19 c.; Dieppe, 1 c.; Djibouti, 2 c.; Durban, 6 c.; East London, 3 c.; Foochow, 3 c.; Ghent, 3 t. 5 c.; Genoa, 1 t. 3 c.; Gibraltar, 5 c.; Gothenburg, 1 c.; Hankow, 1 c.; Hong Kong, 14 c.; Italy, 1 c.; Karachi, 12 c.; Lyttleton, 2 c.; Madras, 1 c.; Melbourne, 1 c.; Monte Video, 16 c.; Montreal, 9 c.; Odense, 6 c.; Ostend, 12 c.; Perth, 3 c.; Pt. Elizabeth, 1 c.; Pt. Swettenham, 4 c.; Punta Arenas, 13 c.; Rangoon, 1 c.; Rotterdam, 12 c.; Salonica, 3 c.; Shanghai, 1 c.; Singapore, 16 c.; Sydney, 5 c.; Toronto, 2 t. 2 c.; Trinidad, 12 c.; Valparaiso, 12 c.; Wellington, 1 t. 6 c.; Yokohama, 12 c.

SODA ASH—

Genoa, 9 t., £150.; Ostend, 1 t., £8.

SODIUM BENZOATE—

Brussels, 2 kgs., £55.; Christchurch, 1 cs. (pt.), £17.; Rio de Janeiro, 3 pkgs. (pt.), £63.

SODIUM BICARBONATE

Canton, 4 c., £5.; Cayenne, 5 c., £5.; Copenhagen, 5 t. 1 c., £55.; Durban, 7 c., £12.; Gothenburg, 1 t., £18.; Lisbon, 10 c., £8.

SODIUM BROMIDE—

Copenhagen, 1 cs. (pt.), £18.; Lisbon, 4 cs. (pt.), £5.

SODIUM CARBONATE

Athens, 2 cks., £6.; Calcutta, 3 cks., £9.; Gothenburg, 13 cks., £56.

SODIUM CHLORATE

Rio de Janeiro, 1 cs., £10.

SODIUM CITRATE

Alexandria, 1 cs. (pt.), £7.; Durban, 1 cs., £6.; Melbourne, 3 cs. (pt.), £29.; Sydney, 2 cs., £24.

SODIUM GLYCEROPHOSPHATE

Bordeaux, 5 cs., £280.; Copenhagen, 1 cs., £18.

SODIUM HYDROSULPHIDE

Gothenburg, 20 kgs., £336.

SODIUM HYDROSULPHITE

Brussels, 2 cks., £39.; Genoa, 26 kgs., £324.; Melbourne, 10 kgs., £173.; Sydney, 20 kgs., £350.

SODIUM HYPO

Copenhagen, 16 c., £21.

SODIUM HYPOPHOSPHITE—

Christiania, 1 cs. (pt.), £7.

SODIUM HYPOSULPHITE

Bombay, 1 t., £23.

SODIUM PHOSPHATE—

Delagoa Bay, 10 t. 1 c., £317.

SODIUM SALICYLATE

Calcutta, 1 cs. (pt.), £11.; Colombo, 1 cs., £13.; Montreal, 2 cs. (pt.), £8.; Perth, 1 cs. (pt.), £7.; Sydney, 2 cs., £37.; Sao Paulo, 1 cs., £5.

SODIUM SULPH.

Colombo, 4 c., £5.

SODIUM SULPHATE (GLAUBER

SALTS): Alexandria, 4 c., £8.; Rio de Janeiro, 10 c., £8.

SODIUM SULPHITE—

Hankow, 5 c., £6.

SODIUM TARTRATE—

Brisbane (F.), 2 cs., £20.; Melbourne, 1 ck., £10.

SULPHUR

Bahia, 1 t., £40.; Gothenburg, 3 t. 10 c., £198.; Lisbon (F.), 3 t., £83.; Rio de Janeiro, 10 c., £15.

SULPHUR (FLOWERS)—

Cape Town, 18 t. 18 c., £506.; Lisbon, 3 t., £96.

SULPHURIC ACID

Ascension, 2 t. 17 c., £100.; Singapore, 1 c., £13.

SULPHUROUS ACID—

Valparaiso, 2 cybs., £29.

STOCKHOLM TAR—

Canary Isles, £6.

TANNIC ACID

Brisbane (F.), 1 cs., £20.; Gothenburg (F.), 2 cks., £158.; Shanghai (F.), 1 cs. (pt.), £7.

TARTARIC ACID—

Cayenne, 1 cs. (F.), £7.; Copenhagen, 5 c. (F.), £95.; Durban, 2 c., £34.; East London, 3 c., £57.; Hamilton, Ont., 1 t., £310.; Madras, 1 c., £21.; Montreal, 3 t., £930.; Perth, 1 c., £16.; Toronto, 1 t., £310.

TERPINE HYDRATE—

Stockholm, 4 kgs., £27.

THEOBROMINE—

Buenos Ayres, 1 cs., £55.; New York, 2 cs., £250.

TIN OXIDE—

Sydney, 1 ck., £8.

WAX—

Osaka, 2 t.; Ostend, 10 c.

WHITE LEAD

Antwerp, £1,491.; Boulogne, £142.; Calcutta, £59.; Cape Town, £47.; Christchurch, £28.; Jamaica, £73.; Ostend, £315.; Rio de Janeiro, £14.; Santos, £10.; Shanghai, £97.

ZINC SULPHIDE

New York, 2 cks., £90.

ZINC SULPHOCARBONATE—

Melbourne, 1 cs. (pt.), £5.

MANCHESTER.

Week ending August 9.

ALUM (AMMONIA)—

Alexandria, 62 brls.

ALUMINA SULPHATE

Antwerp, 59 cks.; Bombay, 121 cks.

AMMONIUM MURIATE

Alexandria, 15 cs.; Montreal, 17 cks.

BASIC SLAG

Montreal, 2,500 bgs.

CAUSTIC SODA

Alexandria, 248 drms.; Rotterdam, 22 brls.; Rouen, 11 drms.

COAL PRODUCTS—

Tar: Alexandria, £2,375.; Genoa, £7,118.; Havre, £128.; Rotterdam, £187.

DISINFECTANTS (otherwise undes.)

Montreal, 26 cs.; Rotterdam, 25 cks.

DYESTUFFS (otherwise undescribed)

Alexandria, 20 drms.

DYESTUFFS—

Logwood Extract: Bombay, 1 cs.; Rotterdam, 1 ck.

Tanning Extract: Rotterdam, 150 brls.

FORMALDEHYDE

Antwerp, 56 brls.

GLYCERINE—

Alexandria, 15 cs.

HEMATINE CRYSTALS

Bombay, 10 drms.; Genoa, 7 brls.

MAGNESIUM SULPHATE—

Alexandria, 20 kgs.

MANGANESE ORE

Philadelphia, 400 t.

MANGANESE RESINATE—

Antwerp, 2 cks.

MANGANESE SULPHATE—

Antwerp, 1 ck.

POTASSIUM BICHRIMATE—

Alexandria, 3 cks.

POTASSIUM CARBONATE—

Montreal, 2 cks.

SALAMMONIAC

Alexandria, 10 brls.

SALT

Antwerp, 5,297 pkgs.; Montreal, 7,200 sks.; Quebec, 1,600 sks.

SOAP

Alexandria, 1,625 cs.; Lyttleton, 38 cs.; Montreal, 29 pkgs.; Rotterdam, 80 pkgs.

SODA ASH—

Alexandria, 50 bgs.; Genoa, 1,997 bgs.

SODIUM BICARBONATE

Alexandria, 30 kgs.; Antwerp, 100 bgs.

SODIUM BISULPHITE—

Alexandria, 4 cks.

SODIUM CARBONATE—

Genoa, 100 bgs.

SODIUM HYDROSULPHATE—

Bombay, 3 cs.; Philadelphia, 60 kgs.

SODIUM HYDROSULPHITE—

Genoa, 3 cs.

SODIUM NITRATE—

Bombay, 1 kg.

SODIUM PRUSSIANE

Genoa, 5 cks.

SODIUM SILICATE

Alexandria, 80 cs.

SODIUM SULPHIDE

Havre, 4 cks.; Rouen, 24 cs.

TALLOW—

Alexandria, 36 brls.

ZINC MURIATE

Bombay, 175 drms.

MIDDLESBROUGH.

Week ending August 9.

AMMONIUM SULPHATE

Kobe, 80 t., £1,317.; Yokohama, 318 t. 18 c., £5,428.

BLEACHING POWDER

Rouen, 25 t. 2 c., £330.

COAL PRODUCTS—

Benzole: Dieppe, 50 t. 5 c., £1,173.

Naphthalene: Dieppe, 107 t. 19 c., £3,287.

Pitch: Antwerp, 811 t. 10 c., £2,635.

MAGNESIA (CALCINED)

Dieppe, 9 c., £59.

MAGNESIUM CARBONATE—

Dieppe, 14 c., £48.; Rouen, 10 t., £391.

NEWCASTLE-ON-TYNE

Week ending August 9.

ANTIMONY—

Antwerp, 2 t.

BARIUM BINOXIDE—

Antwerp, 9 c.

BLEACHING POWDER—

Gothenburg, 7 t. 3 c.

CAUSTIC SODA—

Gothenburg, 10 t. 3 c.

LITHARGE—

Antwerp, 19 c.

SOAP—

Antwerp, 1 t. 8 c.

SODIUM CARBONATE—

Antwerp, 1 t.

SODIUM SULPHIDE—

Gothenburg, 4 t. 15 c.

WHITE LEAD—

Antwerp, 3 t. 2 c.

N. & S. SHIELDS.

Week ending August 9.

CHEMICALS (otherwise undescribed)

Christiania, £250.

STOCKTON-ON-TEES.

Week ending August 9.

NIL.

SWANSEA.

Week ending August 9.

NIL.

PRICES CURRENT.

THURSDAY, August 14, 1919

PREPARED BY MESSRS. HIGGINBOTTOM AND CO., 21, SPRING GARDENS, MANCHESTER.

The values stated are F.O.R. at makers' works, or at usual ports of shipment in U.K., unless otherwise specified
The prices in different localities may vary

Acids:—

		£	s.	d.
*Acetic 40% and 60%	per cwt.	31/-	&	47/-
* " Glacial	per ton	85	0	0
Arsenic, S.G. 2,000°	per ton	55	0	0
Boric, Crystals	per ton	72	0	0
*Fluoric	per lb.	0	0	0
*Muriatic (Tower Salts), 28° Tw.	per carboy	0	6	0
*Nitric, 80° Tw.	per ton	31	0	0
Oxalic	per lb.	0	1	2
Phosphoric, 1,750°	per ton	0	1	0
*Sulphuric (fuming, 70%)	per ton	—	—	—
* " (Pyrites, 168°)	per ton	7	18	0
* " (" 140°)	per ton	4	10	0
* " (free from arsenic, 144°)	per ton	5	7	0
Tannic (commercial)	per lb.	0	2	6
Tartaric (crystals)	per ton	0	3	1
*Acetone	per ton	80	0	0
*Alum, loose lump (delivered)	per ton	17	0	0
Alumina Sulphate (pure)	per ton	17	0	0
Aluminoterric (in slabs)	per ton	8	10	0
Aluminium (Ingot Metal, 98/99%)	per ton	150	0	0
*Ammonia, Anhydrous	per lb.	0	1	10
* " 880	per ton	33	0	0
* " 920	per ton	20	0	0
" Carbonate	per lb.	0	0	6½
" Muriate (grey)	per ton	50	0	0
" (sal ammoniac) 1st & 2nd, per cwt.	per cwt.	80/-	&	75/-
" Nitrate	per ton	60	0	0
" Phosphate	per ton	110	0	0
" Sulphate (grey), London, net	per ton	—	—	—
" " " Hull	per ton	—	—	—
" " " Manchester	per ton	—	—	—
*Aniline Oil (pure)	per lb.	0	1	2
Aniline Salt	per ton	0	1	2
Antimony	per ton	45	0	0
" (tartar emetic), 43/44%	per lb.	0	3	4
" (golden sulphide)	per lb.	0	1	3
Arsenic, white powdered	per ton	5	0	0
Barium Chloride (in casks)	per ton	24	0	0
" Carbonate (native), 92/94%	per ton	11	10	0
" Sulphate (native levigated)	per ton	£ 7 to £ 14		
Baryta Chlorate	per lb.	0	1	3
*Bisulphide of Carbon	per ton	55	0	0
Bleaching Powder, 35%	per ton	15	0	0
* " Liquor, 7%	per ton	6	0	0
Casein (commercial)	per ton	85	0	0
Chromium Acetate (crystals)	per lb.	0	1	6
Calcium Chloride	per ton	8	0	0
China Clay (at Runcorn), in bulk	per ton	70/-	to	90/-

Coal-tar Products and Dyes:—

Alizarine (artificial), 20%	per lb.	0	2	0
Magenta	per lb.	18/-	to	35/-
Anthracene, 40/50% A, f.o.b., L'don, per unit,	per unit	6	to	7
Benzol, 90's (naked)	per gal.	0	2	0
" 50/90's	per gal.	0	1	10
Carbolic Acid (crude, 60°)	per lb.	0	1	5½
" (crystallised, 40°)	per lb.	0	0	8½
" Acid (pale liquid, 97/98%)	per gal.	0	2	9
*Creosote (ordinary), naked	per ton	0	0	6½
*Crude Naphtha, 30% at 120°C.	per ton	0	0	9
*Grease Oils, 18° Tw. (naked)	per ton	6	10	0
Pitch, f.o.b., Liverpool or Garston	per ton	2	14	0
*Solvent Naphtha, 90% at 160°	per gal.	0	2	1
Copper	per ton	96	5	0
" Sulphate	per ton	44	0	0
" Oxide (copper scales)	per ton	85	0	0
Dross Salts	per ton	39	0	0
*Glycerine (crude), 80%	per ton	72	0	0
* " (industrial, S.G. 1,260)	per ton	110	0	0
*Iodine	per oz.	0	1	0
*Iron Nitrate, 80° Tw.	per ton	12	0	0
" Sulphate (copperas), delivered	per ton	4	10	0
" Sulphide	per ton	7	15	0
Lead (Foreign Pig)	per ton	25	0	0
" Litharge Flake	per ton	4	0	0
" Acetate (white), (ex ship)	per ton	84	0	0
" (brown)	per ton	75	0	0

Lead, Carbonate (White lead), pure	per ton	£	s.	d.
" Nitrate	per ton	51	0	0
Lime, Acetate (brown)	per ton	56	10	0
" (grey), 80% (ex ship)	per ton	10	10	0
Magnesium Chloride	per ton	19	0	0
" Carbonate (light)	per cwt.	15	10	0
" Calcined Magnesite	per ton	3	0	0
" Sulphate (Epsom Salts) (coml.)	per ton	22	10	0
" (druggists)	per ton	11	0	0
Manganese, Sulphate	per ton	16	0	0
" Borate	per ton	80	0	0
" Borate	per ton	109	0	0
*Methylated Spirit, 64° (industrial)	per gal.	0	5	7
*Naphtha (Wood), Solvent	per ton	0	10	0
" Miscible, 60° p.	per ton	0	10	0

Oils:—

*Cottonseed	per ton	135	0	0
*Linseed	per ton	135	0	0
Stearine, 115-120° M.P.	per ton	95	0	0
Potassium, Bichromate	per lb.	0	1	6
" Carbonate, 80/82%	per ton	95	0	0
" Chlorate	per lb.	0	1	0
" Cyanide, 98%	per ton	—	—	—
" Hydrate (Caustic Potash) 90%	per ton	160	0	0
" " 75/80%	per ton	140	0	0
" Potash Hydrate Liquid, 38° Bé	per ton	70	0	0
" Nitrate (refined)	per ton	60	0	0
" Permanganate (B.P. crystals)	per lb.	0	3	9
" Prussiate (yellow)	per lb.	0	1	9
" (red)	per lb.	0	5	6
" Sulphate, 90% (ex ship)	per ton	40	0	0
" Muriate, 80%	per ton	30	0	0
Silver (metal)	per oz.	0	4	10½
Sodium (metal)	per lb.	0	1	3
" Acetate	per ton	52	0	0
" Arseniate, 45%	per ton	50	0	0
" Borate (Borax), Crystals	per ton	39	0	0
" Bicarbonate (1 cwt. kegs)	per ton	9	10	0
" Bichromate	per lb.	0	1	11
" Carb. (Caustic Soda-ash), 48%	per ton	12	10	0
" (Alkali), 58% (bags)	f.o.r.	6	0	0
" (Soda Crystals), (bags)	wks.	4	2	6
" Chlorate	per lb.	0	0	6½
" Cyanide (100% basis)	per ton	0	0	10
" Hydrate (76% C. Soda) (f.o.r.)	per ton	24	0	0
" (74% C. Soda)	per ton	23	5	0
" (70% C. Soda)	per ton	22	0	0
" (60% C. Soda)	per ton	21	0	0
" (pure liquid, 90° Tw.)	per ton	10	2	6
" 77/78% Powdered (99%) Hydrate	per ton	24	10	0
" Hyposulphite (commercial)	per ton	16	10	0
" Manganate, 25%	per ton	65	0	0
" Nitrate, 96%, reifd., f.o.r., L'pool	per ton	21	0	0
" Nitrite, 100%	per ton	58	0	0
" Phosphate	per ton	25	10	0
" Prussiate	per lb.	0	0	7½
" Silicate (glass) Alkaline	per ton	12	5	0
" (liquid, 100° Tw.)	per ton	9	10	0
" Sulphate (Saltcake), delivered	per ton	3	0	0
" (Glauber's Salt)	per ton	3	10	0
" Sulphide (conc.), 60/65% casks	per ton	19	0	0
" Sulphite	per ton	9	0	0
Sulphocyanide, Ammonium, 95%	per lb.	0	2	1
" Barium, 95%	per lb.	0	1	4
" Potassium	per lb.	0	2	4
" Calcium, 70%	per lb.	0	4	4
Sulphur, (Flowers)	per ton	23	0	0
" (Roll Brimstone)	per ton	21	0	0
" Brimstone (best thirds)	per ton	—	—	—
" (ex ship)	per ton	14	10	0
Tallow	per ton	100	0	0
Tin Crystals	per lb.	0	1	10
" English Ingots	per ton	267	0	0
Titanium, Potass. Oxalate	per lb.	0	1	6
" Titanous Chloride	per cwt.	4	10	0
" Zinc (Spelter)	per ton	40	0	0
" Powder, 88/92%	per ton	70	0	0
" Chloride (solution, 102° Tw.)	per ton	23	0	0
" Sulphate, Crystal	per ton	22	0	0

* Packages extra or returnable unless otherwise specified. Prices usually include packages.

THE CHEMICAL TRADE JOURNAL AND CHEMICAL ENGINEER.

No. 1683.

LONDON, SATURDAY, AUGUST 23, 1919.

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EDITORIAL NOTICES.

Communications for the Editor, if intended for insertion in the current week's issue, should reach the office not later than Wednesday morning.

Articles, reports, and correspondence on all matters of interest to the chemical and allied industries, home and foreign, are solicited. Correspondents should condense their matter as much as possible, write on one side only of the paper, and in all cases give their names and addresses, not necessarily for publication. Sketches should be sent on separate sheets.

Readers are invited to forward items of intelligence, company reports and balance-sheets, or cuttings from local newspapers of interest to the trades concerned.

CURRENT TOPICS.

THE GOVERNMENT AND TRADE.

AS was to be expected, the Prime Minister's statement on the future trade and industrial policy of the Government has pleased nobody in its entirety. Perhaps the chemical and the optical glass and lenses industries have the most reason to be satisfied, although we are still very much in the dark as to the nature of the proposals which are to be put into force for their protection. Let us first of all express the hope that the warning of the Prime Minister as to under-production will be taken seriously to heart, although if we read human nature aright, it will be ignored, as have so many previous warnings, until dire personal necessity drives the malcontents to see the folly of their ways. That was sufficiently demonstrated in the Yorkshire coal strike. At the same time, the coal problem promises to play a leading part in the political and industrial situation. The Government's decision not to nationalise the mines in the way the miners have been agitating for has clearly ruffled the tempers of the leaders of the men, but we are doubtful whether a strike to force nationalisation upon an unwilling Government and—leaving out the miners and a few other extremists—an unwilling country, would have the support of the rank and file, having regard to recent events in Yorkshire. We are inclined to think that the responsible section of labour is beginning to realise that it has pressed demands which have reached not only the limits of the capacity of the industries with which they are concerned, but also the limits of the patience of the remainder of the community, and that they will pause before attempting any further extreme measures.

We now come to the Government's proposals for dealing with imports, dumping, and key industries. We are told that after September 1 all restrictions on imports will be removed, but it does not appear that any settled policy is to take its place. Anti-dumping legislation is promised on the lines already adopted in some of the Colonies, but it must be remembered that they all have

a high protective tariff, and it is doubtful if such action would be effective when attempted in connection with "free trade," which, it would appear, the Government are still afraid to abandon. In any case the proposals are at present too vague for anything more than general criticism. We notice that an effort is to be made to prevent the importation of goods at very low prices owing to the position of the exchange rates between this country and Germany. It is admitted on all sides that an increased export trade by Germany will have the effect of making the exchange more favourable to that country. Is it, therefore, seriously proposed that as Germany's wealth and foreign trade increase we should lower our trade defences? No country has ever yet had so insane a trade policy, and we hesitate to believe such a scheme will be put into practice. As to "key industries," a term almost impossible to define, confusion has been added to the question by describing some industries as "unstable industries." If an industry is essential to the needs of the country it must be encouraged, and the lessons of the of the war will be lost if we depend in future for essential products on foreign countries. It seems to us that any attempt to deal with this subject on a narrow basis, such as appears to be the case, and to neglect the all-round security of our main industries, is to court disaster.

The details of the proposals we have yet to see. Whether they will carry out what appears to be intended is another matter. Much depends upon who will have the responsibility of making the many important decisions which will have to be come to. The synthetic dyes and optical glass and lens industries were specially mentioned by the Prime Minister as industries which he thinks need protection, and the experience of the past five years shows there can be no question of that. For the rest, the speech was a long and somewhat overdrawn condemnation of the policy Labour is pursuing, and of the profligacy of expenditure of the individual members of the public, together with a perfectly truthful picture of the ruin to which the country is fast approaching if it does not mend its ways, but hardly a word of practical suggestion was made of economy of public expenditure, and we venture to think that it is that which caused Mr. Lloyd George's speech to have such a bad "Press" throughout the whole country.

CELLULOSE ACETATE.

THE Committee appointed by the Government twelve months ago to inquire into the allegations contained in the fifth report of the Select Committee on National Expenditure regarding the circumstances of the formation and financial arrangements of the British Cellulose and Chemical Manufacturing Company, Limited, and their relations with Government Departments, have at last issued their report. With the financial part of the inquiry we are not greatly concerned. The conclusion of the Committee in respect of the share capital of the company, which at the time of the Committee's appointment mostly closely excited public interest, is that "the contrast between the nominal capital of the original company and that of the present company is indeed so glaring that, for much of the criticism to which they have been exposed, we think that the promoters and others concerned with the Company's financial arrangements have only themselves to thank." From the point of view of the British chemical industry, however, the most important part of the report is that which relates to the refusal of the responsible Department of the Ministry

of Munitions to allow British manufacturers to undertake the manufacture of cellulose acetate. The facts of the situation are carefully summarised by the Committee, and it is difficult to reconcile with these facts their opinion that the officials of the Supply Department were justified in confining the source of supply to the one concern. At least two important British firms commenced negotiations, but their offers to erect plant for the manufacture of the material were rejected. The position in regard to the supply of cellulose acetate was very grave indeed, and the Department refused outside offers of assistance on account of the delay which would necessarily arise before deliveries could commence. It is necessary to observe that the first proposal of the United Alkali Company was made in May, 1916, and the second in October of the same year, whilst the British Cellulose Company commenced deliveries, "and then at first only on a small scale," in April, 1917. The statements of the Committee that "the War Office relied on somewhat sanguine anticipations expressed by Dr. Dreyfus which were not realised," and that "the Company had disappointed the anticipations formed as to the date when it would begin its British manufacture," are sufficient proof that matters were anything but satisfactory. Yet in the face of such a situation the offers of British manufacturers were turned down, and the country exposed to the risk of further "disappointment" with all its consequences.

NATIONAL EXPENDITURE.

THE long overdue outcry against the waste of national expenditure has a very distinct interest for the industries of the country, for the reason that this waste constitutes, in the inevitable taxation which must follow, a very heavy burden upon all our industries. The heavy drain of taxation during the war was a constant cause of complaint on the part of those responsible for maintaining our industries in as efficient a state as possible with a view to after-war developments, but with peace signed and our daily expenditure still going on of some 60 per cent. of the maximum war-time expenditure, it is high time that industrialists took a hand in the game and lent the weight of their protest and influence to that of the very few economists in Parliament who have the courage to say what the general public has long been thinking and discussing. Some of these economists, too, have acquired the habit of facing both ways judging by the recent occasion on which they thoroughly condemned certain Government proposals and then voted for them. So far as the general position is concerned, it is perfectly true that the excess profits tax has been reduced by one half, and that no increase was made in the last Budget in income tax, but that was admittedly a policy adopted to give time to watch the trend of events. Since then the whole tendency of public expenditure has been to create more than a possibility that very heavy increases will have to be made in national taxation, and these, coming on the top of the large additional levies that are being made all over the country in local taxes, will have a most damaging effect industrially. For industry to develop as freely as it should do under the exceptional prevailing conditions even the 40 per cent. excess profits tax should be removed, instead of which we are faced with additional demands in some form or other. All this, at a time when so many people are holding their hands because of the uncertainty as to the future trade policy of the country, does not suggest that the Government have really got a grip of the essentials of the situation.

THE PROGRESS OF ANALYTICAL CHEMISTRY.*

By C. AINSWORTH MITCHELL.

THE decrease in the number of papers which characterised this branch of chemistry last year has been still more pronounced during the past twelve months. As was to be expected, there have been relatively few contributions from German sources, whilst American journals have again been responsible for a large proportion of the published work.

Owing to the intensified shortage of materials, further attention has been given to the recovery of expensive reagents after use in analysis, and to devising apparatus and methods for which cheaper or more available substances are required. For example, an alloy of about 11 per cent. of platinum with 89 per cent. of gold has been used as a substitute for platinum for chemical apparatus, and it has been shown that manna can replace glycerol in the titration of boric acid.

Physical Methods.

Attention was directed in last year's report to certain sources of error in the methods of determining viscosity by means of the standard instruments, and to some of the suggestions which have been made to overcome these drawbacks. To obviate the effect of variations in the pressure due to the height of the column of liquid over the orifice, an apparatus has been constructed in which the liquid is driven at a definite temperature through the opening by means of measured centrifugal force, and the viscosity is expressed in terms of the acceleration due to gravity (g). In this connection, mention may also be made of a modified form of "mercurial viscosimeter" intended for volatile liquids. In this instrument, an equal excess pressure is produced by means of an attachment above and below the column of liquid.

There have been several further applications of the use of the spectroscope to analytical work. For example, a definite weight of a mineral containing a particular element is vaporised, and a screen in which is a horizontal slit is made to travel vertically at a measured velocity in front of the vapour. From the length of time during which a given ray of the element remains visible, the quantity of that element may be calculated.

Another quantitative spectroscopic method has been used for the estimation of rubidium and caesium in plant ash. The potassium, rubidium, and caesium are separated as platinum-chlorides and converted into chlorides, and the solution is compared spectroscopically with standard solutions of the chlorides of the same elements prepared under the same conditions.

An accurate means of titrating the acidity of coloured solutions has been based on the difference of the absorption spectra of certain indicators in acid and alkaline solutions. Equal quantities of an indicator are added to water and to the liquid under examination, and alkali is run in until the characteristic absorption band, observed with a pocket spectroscope, is seen in the same position in each case.

The spectroscopic method affords a sensitive test for boron, being capable of detecting 1 part in 10,000.

An optical method of estimating potassium and sodium has been based on the difference between the refractive indices of the respective chlorides in a 20 per cent. solution at 25°, that of sodium chloride being 1.36829, and that of potassium chloride 1.35992. Hence the relative proportion of the two salts in admixture may be calculated from the refractive index of the solution.

For the estimation of malic and tartaric acids in the presence of each other, advantage has been taken of the fact that the optical rotation of *l*-malic acid and of *d*-tartaric acid is increased by uranyl acetate, whereas the rotation of *l*-malic acid is reversed by ammonium molybdate. By plotting the optical rotations of each acid in solutions up to 1 per cent. in one case activated with uranyl acetate and in the other with ammonium heptamolybdate, two series of curves sloping in opposite directions are obtained. The points of intersection of each correlated pair of curves will show the amount of tartaric acid on the abscissæ and that of the malic acid on the ordinates.

An optical method to which, of late years, increasing attention has been given is that termed nephelometry, or the measurement of the light reflected from a colloidal precipitate in suspension. The method is useful for the estimation of pre-

cipitates of light colour, those of dark colour being more suitably measured colorimetrically. Substances which may conveniently be estimated in this way include nitrogen, phosphorus, calcium, fats, and proteins. The term "nephelometric value" is suggested as a convenient description of the amount of turbidity produced by a given quantity of a substance in a definite time in comparison with that produced by a standard substance under the same conditions. This value varies with the concentration of acid in the suspension and alters with the change of turbidity on keeping, but for each substance there is an optimum acid concentration which produces the greatest turbidity with the least change within a definite period of time.

The detection of potassium by the flame test may be rendered much more sensitive by coating a glass plate with a gelatine film containing a mixture of two dyes, preferably patent-blue and tartrazine, in specified proportions. As seen through this screen, the potassium flame appears bright red with a border of yellowish-green. Only rubidium gives a flame of similar colour.

A new application of a physical phenomenon as an indicator in acidimetry has been described. A measured quantity of a mixture of vaseline oil and oleic acid is made to issue from a jet just below the surface of the acid liquid, and the number of drops is counted. On repeating this after successive additions of standard alkali, a sudden increase in the number of drops will be observed when neutrality is reached. The method thus depends on the measurement of the alteration in tension at the separation zone of two immiscible liquids.

Gas Analysis.

The catalytic absorption of hydrogen from a mixture of gases by means of sodium oleate containing metallic nickel in suspension cannot be recommended as an analytical process, since, apart from the difficulty of protecting the reagent from oxidation, the absorption of hydrogen is much too slow for quantitative work.

A method of estimating benzene vapour in gases has been based on the increase in volume which occurs when a measured quantity of the gas is introduced into a special apparatus containing benzene vapour. By determining the increase in volume which would have been produced by gas free from benzene, the necessary data for the calculation are obtained. Since, as a general rule, the vapour pressure of a liquid is independent of the nature of an inert gas above it, it is possible to estimate the amount of vapour, such as benzene, toluene, or xylene, in a gas, such as air, by determining the difference between the pressure of the mixture and that of the same gas completely saturated with the vapour. For this purpose two flasks are connected with a manometer, one of them containing the mixture, the pressure of which must be less than corresponds with complete saturation, and the other the gas by itself. Small bulbs containing the vapour are broken within each flask, and from the difference between the readings the pressure corresponding with the amount of vapour in the original mixture may be found.

In using the "chlorate pipette" for the absorption of hydrogen from gaseous mixtures, it is essential that all carbon monoxide should be removed, since otherwise the catalytic oxidation is retarded. In the case of pure hydrogen, the "relative absorption velocity" is fairly constant, or increases slowly until half of the gas has been absorbed, whilst traces of carbon monoxide cause a rapid reduction in the rate of absorption. Hence, by using a standardised pipette and constructing a curve showing the rates of absorption up to this point (half-volume) with different minute quantities of carbon monoxide, it is possible to estimate the proportion of the latter in the gas.

To obtain trustworthy results when using the Rayleigh interferometer in gas analysis, the gas chamber should be at least 1 meter in length, the gases compared must be at the same temperature and free from moisture, and the refractive index must be determined with great accuracy.

Agricultural Analysis.

The dearth of potassium salts, mainly due to the stoppage of German supplies, has caused attention to be directed to other possible sources of supply, such as felspar, dust from cement kilns, siliceous rocks, and the like. Hence the neces-

* Abstracted from the Chemical Society's "Annual Reports on the Progress of Chemistry for 1918."

sity for the accurate estimation of potassium is of paramount importance, and the various methods hitherto proposed have been subjected to critical examination during the past year.

There are little differences in the methods used for the extraction of soluble potassium salts from various materials, but in the case of substances, each as siliceous rocks, from which the potassium cannot be extracted by the citric acid process, various processes have been proposed. Trustworthy results are obtained by decomposing the material with pure hydrofluoric and sulphuric acids. After removal of iron, aluminium, manganese, and sulphuric acid, the alkalis are converted into chlorides, and the potassium is separated by the platinichloride or perchlorate method. One objection to the hydrofluoric acid method is that very thorough washing is required to remove all potassium from the barium sulphate precipitate. The Lawrence-Smith method, in which the material is heated with a mixture of calcium carbonate and ammonium chloride, then digested with water, freed from calcium, and the alkalis estimated in the filtrate, has the advantages of simplicity and of requiring reagents more readily obtainable than hydrofluoric acid in the pure condition; but, on the other hand, it leaves about 1 per cent. of potassium unattacked, and a second treatment is required to decompose this. If, however, the heating is continued for two hours at 170°C, the decomposition is complete in one operation. For the estimation of the potassium, the perchlorate method is quite trustworthy, although it is usually regarded as less accurate than the platinichloride method. The cobaltinitrite method is fairly satisfactory for materials containing 1 to 2 per cent. of potassium, but is liable to be erratic, and may yield too low results. A gravimetric modification of the method which is suitable for the estimation of potassium in soils, fertilisers, etc., has been devised. The method of calculating the proportions of potassium and sodium from the amount of chlorine in a weighed mixture of the chlorides has the drawbacks of most indirect methods. If the McLean-Van Slyke method is used for estimating the chlorine, the probable error in the amount of sodium increases with the decrease in the proportion of sodium to potassium, and is usually about 1 per cent. In another indirect method, the potassium is calculated from the amount of platinum in the potassium platinichloride.

The methods of estimating phosphoric acid in fertilisers, plant ash, etc., have been subjected to further critical examination during the year, and several new methods have been devised. In one of these methods, intermediate precipitation of phosphoric acid as molybdate is avoided. The ash is dissolved in acetic acid, the calcium separated as oxalate, and the phosphoric acid precipitated as magnesium ammonium phosphate, citric acid being used to prevent the precipitation of iron and aluminium. An analogous method has been recommended for the estimation of phosphoric acid in superphosphates. Another method is to precipitate the phosphoric acid as a basic compound of mercury by the addition of yellow mercuric oxide, to decompose the latter with sodium sulphide, and to precipitate the phosphoric acid as ammonium magnesium phosphate.

A precipitate of constant composition, $MgNH_4PO_4$, may be obtained by causing ammonia to diffuse slowly into the acid solution containing magnesia and phosphoric acid in the presence of ammonium chloride. In Schultze's method of adding ammonia to the hot solution containing ammonium chloride, the precipitate which separates on cooling is not pure. A second solution and reprecipitation give more trustworthy results.

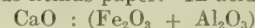
The presence of ammonia interferes with the accuracy of the results obtained by titrating the phosphomolybdic precipitate with standard alkali when phenolphthalein is used as indicator. This may be obviated by precipitating the phosphoric acid as potassium phosphomolybdate. By adding a specified amount of ammonium nitrate to the solution before the addition of the ammonium molybdate, the precipitate will contain phosphoric oxide and ammonia in proportions corresponding with the triammonium compound, and the ammonia may be estimated by distillation with alkali and calculated into the corresponding amount of phosphoric acid.

A method of estimating inositol-phosphoric acids in feeding-stuffs and the like has been described. It seems probable that inositol-pentaphosphoric acid, $C_6H_7(OH)(H_2PO_4)_5$, is the only inositolphosphoric acid in the common feeding-stuffs.

Ammonia in soil extracts may be estimated by Folin's aeration method, the extract being mixed with magnesium oxide and aerated in the cold for three hours. The ammonia is absorbed in acid towers, and the acid subsequently distilled with alkali. Before estimating nitric nitrogen in the extract, it is necessary to eliminate proteins, which yield

ammonia when heated with sodium hydroxide. For this purpose the liquid is treated with copper hydroxide and filtered, and the nitric nitrogen in the filtrate estimated by reduction with Devarda's alloy and distillation of the ammonia.

A study of soil acidity and the hydrolytic ratio in soils has shown that there appears to be a definite relationship between the proportion of iron and aluminium compounds in a soil and its reaction towards litmus paper. In acid soils, the ratio



was found to exceed 1 : 1.3, and the amount of lime required to neutralise such a soil may be found by calculating the quantity required to be added to the acid-soluble calcium oxide to bring the ratio to 1 : 1.3.

Organic Analysis.

Qualitative.—There have been few additions during the year to the methods of identifying groups of organic compounds. The principal new general method of examination has been based on the use of an acetic acid solution of chromic acid as an oxidising agent, which under specified conditions oxidises organic compounds with the liberation of acetone and aldehydes. These products may be separated by distillation and identified by conversion into their *p*-nitrophenylhydrazones, which are relatively insoluble. By means of this test, methylpentoses, such as rhamnose, may be identified in the presence of pentoses.

It has been shown that the colour reaction given by lactic acid with thiophen and sulphuric acid is due to the formation of formaldehyde, and a sensitive test for aldehydes has been based on this fact. The shade of the red coloration given by aldehydes on treatment with an alcoholic solution of thiophen in the presence of concentrated sulphuric acid varies with the particular aldehyde. The test is capable of detecting 1 part of formaldehyde in 100,000.

Formic acid may be detected by heating the liquid with a concentrated solution of sodium hydrogen sulphite, and, after cooling, pouring a dilute solution of sodium nitroprusside on to the surface. In the presence of formic acid, sodium hyposulphite is formed from the sodium hydrogen sulphite, and this reacts with the nitroprusside to produce a blue or green ring, due to the compound $Na_4Fe_2(CN)_6$, whilst hydrocyanic acid is liberated.

A test for tartrates has been based on the solubility of cupric hydroxide in alkaline solutions of alkali tartrates. Although, by using potassium ferrocyanide for the detection of copper in the filtrate, this test is capable of detecting 0.2 milligram of tartrate, it cannot be regarded as distinctive, since other salts, including arsenites, borates, and phosphates, give a positive result in the absence of tartrates, whilst other compounds, including chromates, nitrites, and acetates, interfere with the reaction.

A distinctive reaction for acetylcarbinol is produced by boiling its solution with *o*-aminobenzaldehyde, cooling the liquid, and treating it successively with acid and with excess of sodium hydrogen carbonate. A blue fluorescence is obtained, and, on extracting the liquid with ether and evaporating the extract, 3-hydroxy-2-methylquinoline is left as a white residue, which gives a red coloration with an alcoholic solution of ferric chloride.

A sensitive reaction for mercury fulminate depends on the fact that it yields pararosaniline by heating with phenylhydrazine, subsequently diluting the liquid with alcohol, and adding a dilute acid.

Quantitative.—It is perhaps in this division of analytical chemistry more than in any other that the reduced amount of research is indicated. There have been very few contributions to the methods of elementary analysis. In using cerium dioxide and cupric acid as a catalyst in association with a mixture of lead peroxide and minium for a series of combustions of substances containing nitrogen, it is essential to ensure complete decomposition of cupric nitrate after each combustion.

In estimating nitrogen by Kjeldahl's method, the results are too low in the case of certain compounds, such as pyridine, piperidine, quinoline, and sometimes nicotine, possibly owing to the formation of sulphonic derivatives. To obtain accurate results for pyridine by the Arnold-Gunning modification, the heating should be continued for several hours after the solution has become clear. The results obtained by Kjeldahl's method are too low when the decomposition has been effected by means of sulphuric acid and mercury, and to obviate this it is necessary to add zinc-dust or potassium sulphide, followed by zinc turnings, prior to the distillation of the ammonia.

A modification of Denigès's colorimetric method of estimating methyl alcohol has been described in which the liquid is oxidised by means of potassium permanganate, and the resulting formaldehyde is estimated by means of Schiff's reagent (magenta decolorised with sulphurous acid) under the same conditions as standard solutions of formaldehyde.

A method of estimating formic acid has been based on its oxidation by means of chromic acid and measurement of the volume of carbon dioxide evolved in the reaction. Carbonates and oxalates, if present, are previously precipitated by means of calcium chloride, whilst acetates are not oxidised by chromic acid. The methods of estimating the lower aliphatic acids have been critically examined, and a new method of separating acetic, propionic, and butyric acids has been based on the fact that light petroleum (b. p. 150° to 300°) will extract most of the butyric acid and some of the propionic acid from the solution after saturation with calcium chloride and the addition of a small amount of potassium chloride. The acidity of the original solution and of the petroleum fraction, and the weight of sodium salts, dried at 200°, obtained from both liquids, give the data for the calculation. Butyric acid gives a red coloration when treated with hydrogen peroxide, ferrous ammonium sulphate, and sulphuric acid, and then with sodium hydroxide solution, sodium nitroprusside, and a slight excess of acetic acid. This colour reaction has been made the basis of a colorimetric method of estimating butyric acid.

A comparative study of the methods of estimating acetone has shown that Messenger's method, which depends on the formation of iodoform, gives incorrect results, whilst no improvement is effected by substituting arsenious acid for thiosulphate in the titration. Kebler's modification of Robineau and Rollin's method has been found the most trustworthy.

The work done in connection with the subject of oils and fats has been mainly concerned with the characteristics of individual fats, and few new methods of analysis have been introduced. For example, the composition of butter fat has been once more investigated by modern methods, including esterification, with results differing considerably from those previously recorded.

The measurement of the optical dispersion of oils from an analytical point of view has been studied, and it has been found that most of the common oils have very similar dispersions (0.0186 to 0.0207), with the exception of coconut oil (0.0167) and tung oil (0.0371).

Twitchell's method of estimating resin in soap is not applicable to resins other than colophony, and has the drawback that it causes pure fatty acids to show an apparent resin content. These objections are obviated by a method based on the fact that nitrated resins are insoluble in light petroleum, whilst the fatty acids after the nitration may be quantitatively separated from the solution.

A method of estimating phenol in the presence of the three cresols is based on the determination of the specific gravity and solidifying point of the mixture, the necessary data for the equation having been obtained empirically from the results given by mixtures of the pure substances.

Pyridine or pyridine bases in ammonium salts or ammonia solution may be estimated by precipitation with iodine in excess from a solution acidified with sulphuric acid. The excess of iodine is removed by means of thiosulphate, and the periodides are titrated with standard alkali, first with methyl-orange and then with phenolphthalein as indicator. The amount of pyridine sulphate is calculated from the difference between the two titrations. The sensitiveness of the method and completeness of the precipitation are increased by adding sodium chloride to the solution.

(To be continued.)

SOUTH AFRICAN INDUSTRIES.—The Standard Bank of South Africa reports in its monthly review that a large and increasing business is being done in cattle dip manufactured at Salisbury, Rhodesia. The price at which this can be sold compares favourably with that of the imported article, and a plant to manufacture from 6,000 to 12,000 gallons per month has recently been completed. The manufacturers contemplate extending their operations to the Union where it is intended to lay down similar plant which will also provide for the manufacture of arsenite of soda from the white arsenic produced at Odzi. The market in fertilisers is steadier, and brisk business is anticipated in connection with the requirements of the Transvaal and the Orange Free State for next mealie season, and of the fruit farmers in the Western Province.

GERMAN CHEMICAL INDUSTRY.

WORKS PREPARED FOR PEACE OPERATIONS.

DR. EDWARD C. WORDEN, the explosives chemical expert of the United States Bureau of Aircraft Production, Washington, who has just returned to London from a tour of the chemical industry in Germany, in a statement which appeared in *The Times* on Tuesday, said that Germany had solved the problem of the fixation of nitrogen as a commercial undertaking on a gigantic scale. In future, from the point of agricultural fertilisers, she would be independent of any blockade. Furthermore, the plant used in the process could be turned at the shortest notice to the manufacture of high explosives.

"Speaking generally," said Dr. Worden, "the chemical industry of Germany is, and has been since the Armistice, just as prepared for peace operations as though war had never interfered with it. The technical staffs of the great concerns are at their maximum numbers. The skilled workers seem as numerous as ever. If these men were engaged on war work it was either as clerical workers or as assistants of Government undertakings. They certainly never saw the trenches. The dye and pharmaceutical industries are in as strong a position as ever, if not a stronger. But the greatest achievement of the German lies in their working of a process for the successful fixation of nitrogen on a great commercial scale. The headquarters of this new industry is the Haber plant of the Badische Anilin and Soda Fabrik at Oppau, near Ludwigshafen, on the Rhine, to which the German Government since the Armistice has lent nearly 200 million marks.

"Begun since the Armistice, built with reinforced concrete, this factory has now between 8,000 and 9,000 actively employed. When completed it will have a storage capacity of 350,000 tons of ammonia ready to be turned into ammonium salts and a daily capacity of 2,800 tons, an amount sufficient, with potash and phosphates, to give an abundance of fertilisers for all German agricultural purposes. This building is only one of seven now in course of construction, and its one storage shed is equal in area to the whole of St. Pancras Railway Station. A few months ago the site was an ordinary marsh, but to-day the building contains such an intricate piece of plant as I have never before seen in all my experience. Up to the present about £150,000 has been expended upon it. The machinery is automatic throughout, the plant is practically duplicated in every part, there are four tracks between each set of buildings, and each building contains overhead automatic conveyances, while there are 3,500 telephones at work efficiently.

"Moreover, there is not the slightest trace of any odour of ammonia, which proves that in the manufacture of nitrogen there can be practically no loss. The success of the method employed—without going into any technical details—is due to the exceptional conservation of heat, the adoption of automatic calorimetric instruments throughout, and an extensive knowledge of critical temperatures and pressures in the most important stages. A small illustration will give an example of the German belief in this plant. A short time ago the French authorities wished to investigate. The management replied: 'Yes. Come by all means. See anything you wish to see. You could not duplicate the plant if you wished. You could not run it if it were yours.'

"But if Germany has secured a great success from an agricultural point of view, it must be remembered that she has achieved even more at the same time. Nitrogen is the central factor of all modern explosives. Not merely will the Germans henceforth be enabled to manufacture it on an unlimited scale for fertilising purposes, but, almost at a moment's notice, they will be in a position to utilise it for the manufacture of munitions on an enormous scale. Moreover, under the present process, their consumption of electrical energy per pound of nitrogen is very low."

Dr. Worden proceeded to give instances of German readiness as regards the chemical industries to enter the fields of international competition. "To take one example," he said, "the Bayer Company of Leverkusen, has substantially 3,000 tons of dye stuffs, chemicals, and pharmaceutical products ready for export now, either as finished products or in hand or in process.

"In all these factories," Dr. Worden proceeded "the employees are working in two shifts of 12 hours each. Apparently there is no difficulty either in regard to working hours or the amount of production. I fear," he said, "that both Great Britain and the United States will find themselves faced with

very severe competition from Germany in the chemical industries in years to come. The Germans have in their favour a general standard of fairly high education. In our countries we have a considerable number of exceedingly brilliant men; but we have also a vast majority of sub-normals as regards both education and intelligence.

"Moreover," he continued, "the policy of the Government during the war and since the Armistice is to advance sufficient sums to industry to compensate for their lack of raw materials—the present great weakness of the manufacturers—until their normal productive capacity is resumed. At the present time their settled project is to manufacture the articles whereof other countries are most in need and whereon the highest net profit can be realised."

EXPLOSIVES INSPECTORS' ANNUAL REPORT.

THE annual report for 1918 of H.M. Inspectors of Explosives states that eight new factories have been licensed during the year, making a total of 73 added since the outbreak of war, and as eight have become extinct in the last 12 months, the total number remains the same as at the end of the previous year, viz., 183. Now that special war work is at an end there is every probability that the number will be materially reduced during the present year.

The total number of accidents reported during the year shows a satisfactory decrease as compared with the two previous years, being 526 as against 701 in 1917 and 641 in 1916. The decrease is, moreover, especially marked in respect of accidents which have occurred in manufacture. This improvement is probably due to the increased experience of workers and supervisors. Of the 44 fatalities, 20 were due to two accidents, and it is somewhat remarkable that in neither case was there any explosion, nor was the material involved of an explosive character. The earlier of the two, by which seven persons were killed and two others seriously injured, occurred at the factory of the Standard Fireworks Company, of Huddersfield, in a building in which the mixing of composition for "deck flares" was carried on. The building was licensed for two persons only, but for some unascertained reason no less than nine persons were assembled there at the time of the accident. No machine mixing was in progress, and it is difficult to imagine how the fire could have been caused by the operation of hand mixing. In the other case the accident occurred during the manufacture of incendiary bombs at the Wood Lane factory of Messrs. W. E. Blake and Company, and resulted in the death of 13 persons. The ingredients of the composition, which is called "thermalloy," used in the manufacture of these bombs are finely powdered aluminium, oxide of iron, and sulphur, so that it is actually the well-known welding material "thermite," with the addition of sulphur; and although, as already stated, quite non-explosive, its combustion temperature is so intense that the consequences of an ignition may, in certain circumstances, be as serious as those following an explosion. It is noteworthy that in both these accidents the material which ignited contained aluminium as one of its ingredients, and that, although under test these compositions are by no means super-sensitive, accidents with them have been somewhat frequent. Having regard to the very high temperature of combustion, there is nothing surprising in the rapidity with which the fire spreads, but the reasons for the primary ignition, which is apparently due on occasion to very slight causes, are extremely obscure.

In February, 1918, a fire occurred at Messrs. Nobel's factory at Ardeer in connection with a solvent recovery plant, and this was followed on March 6 by a somewhat similar accident at Messrs. Curtis's and Harvey's works at Cliffe, one life being lost in each case. In the case of the Cliffe accident, the fire spread almost instantaneously to no less than 103 cordite drying compartments in two ranges some 30 yards apart. These accidents emphasise the special risks attaching to recovery plants owing to the presence of inflammable vapour and point to the necessity of installing efficient flashtraps in every main and branch pipe liable to contain inflammable vapour.

In the conveyance of explosives, no accident of any kind came to notice.

The number of accidents under the heading "Use and Miscellaneous" is 233, as compared with 293 in 1917 and 274 in 1916. By these accidents 27 persons were killed and 256 injured, as compared with 40 and 309 in 1917. Of these accidents, 85 were due to gunpowder, causing eight deaths

and injuries to 88 other persons, and 66 were due to gelignite, causing 12 deaths and injuring 61 others. Detonators were responsible for 27 accidents, 13 of which were due to playing with these dangerous articles.

From August 4, 1914, to November 11, 1918, the aggregate number of accidents occurring during the manufacture of all classes of explosives, was 1,277, involving the loss of 325 lives and injuries to 1,316 persons. In the following table are given particulars of a number of classes of explosives, together with the number of casualties and the approximate quantity of each class of explosive produced in the period mentioned. The remaining accidents arose out of the manufacture of ammunition, fireworks, etc.

Class of Explosive.	Nature of Explosive.	Quantity Produced.	No. of Accidents.	No. of Persons.	
				Killed.	Injured.
Class 1.....	Gunpowder	1 tons.			
" 2.....	Nitrate mixtures.....	66,094	61	7	19
" 3.....	Ballistite and cordite (including pastes)	7,552	5	-	3
	Picric acid, tri-nitro-toluol and other coal-tar derivatives	181,712	98	35	50
	Other nitro-compounds	107,713	69	177	368
" 4.....	Chlorate mixtures	62,048	79	31	91
" 5.....	Fulminates	440	17	2	15

Two fatal accidents due to the explosion of so-called empty drums which had contained petroleum were reported during the year. In one case the drum had but recently been emptied, but in the other steps had been taken to remove all trace of petroleum by thoroughly washing out and rinsing the drum. The victim of the explosion, an experienced chemist, then put a light to the bung-hole, either to prove that no inflammable vapour remained, or to burn out the residue, and a violent explosion followed. This accident is one more indication of the difficulty of rendering safe a vessel which has contained petroleum spirit, owing (1) to the density of the vapour, which is about two and a half times as heavy as air, and (2) to the very small proportion of vapour required to make an explosive mixture with air.

ANALYSIS OF ANTIMONY SALTS.

THE oldest methods of determining the amount of free sulphur in antimony pentasulphide depended upon the extraction of it by carbon disulphide, using a Soxhlet's apparatus, and it has recently been found that the pentasulphide is practically unattacked in the cold, and even on warming only about 0.4 per cent. is reduced. Benzene or acetone can be used as solvent, but if benzene is used the pentasulphide must previously be thoroughly dried. Acetone is not to be recommended, for it dissolves a small quantity of the sulphide in addition to the free sulphur. Another method of determining the impurities depends upon the fact that antimony pentasulphide is completely soluble in warm ammonia, and the other substances present can be filtered off and determined in the usual way. To estimate the total sulphur the sulphide can be dissolved in a solution of pure potash and then subjected to the action of chlorine, when all the sulphur is transformed into sulphuric acid and the antimony into antimonic acid. Fuming nitric acid can also be used to convert the sulphide into sulphate, which can be estimated as barium sulphate in the usual way, and hydrogen peroxide acts similarly. If the sulphide is dissolved in pure sodium sulphide the percentage of antimony present can be determined by electrolysis, platinum electrodes being employed; but this process cannot be recommended, for the values obtained are always too high. By treating a solution of the sulphide with soda and hydrogen peroxide and adding alcohol, a precipitate of sodium antimonate is obtained after thirty-six hours' standing. From the weight of this precipitate the amount of antimony present can be deduced. In an alternative process the antimony is determined as tetroxide, Sb₂O₄. A given weight of the sulphide is heated over a water-bath with hydrochloric and nitric acids. The solution is evaporated to dryness, taken up with hydrochloric acid, diluted, and filtered. The precipitate consists of silica and calcium sulphate. The antimony is contained in the filtrate, which is decomposed by HCl and oxidised to give Sb₂O₄.—*Revue des Prod. Chem.*

CELLULOSE ACETATE CONTRACTS.

REPORT OF COMMITTEE OF INQUIRY.

THE British Cellulose Inquiry Committee, composed of Lords Sumner, Inchcape, and Colwyn, appointed "to inquire into and report upon the formation and financial arrangements of the British Cellulose and Chemical Manufacturing Company, Ltd., and associated companies and upon their relations with Departments of the Government" have now issued their report. It is explained that the delay in issuing the report is due to the fact that it was not until the end of July that the committee secured the attendance of Dr. Camille Dreyfus.

The nominal share capital with which the company was first registered was £4,000., divided into 160,000 shares of 6d. each. Subsequently the parent company was registered as a private company on March 20, 1918, with a nominal capital of £3,500,000., divided into £1. shares, and allotted as follows:—To two shareholders subscribing the memorandum of association of the company and to the shareholders in the existing company at the rate of £14. 10s. per 6d. share, less fractions, 2,319,998 to the Explosives Syndicate in respect of £355,000. cash found by it, and of £100,000. additional cash provided by Nobels 780,000.

Value of the Company's Shares.

After dealing in detail with the formation of the company and the financial arrangements and associated companies, the report says:—

What the parent company's shares are really worth is a matter of complete uncertainty. Neither of the companies has ever had its shares quoted on any Stock Exchange. There were during 1917 and 1918 a number of dealings in the 6d. shares at prices ranging from £1. to as much as £10. 10s. per share. We have investigated the transactions chiefly in order to see whether they contained any ground for suspecting that persons, whose influence might be supposed to be useful to the company, were being illicitly propitiated, or that the persons who put such value on the shares did so because they believed that the company would have the benefit of such illicit influence. We have failed to discover any grounds for such suspicions. Again, and for a similar purpose, we thought it right to press for a specific explanation of the fact that the company's shares were of so small a denomination as sixpence, and to inquire why sixpence was pitched upon in preference to any other amount. In fact, there seems to have been a change from an earlier plan for shilling shares, and the adoption of a capitalisation on a sixpenny basis was as sudden as it is unexplained. The answer to our questions was always the same—namely, that this denomination of shares was selected for the purpose of "defining the interests," but this explains nothing, for it must always be so. To us the matter remains unexplained, though not, we think, inexplicable, but its relevance for the purpose of our inquiry appears to be confined to the two points mentioned.

If there are persons who have reason to complain of representations made to them, or of the way in which they were induced to acquire their shares, or to part with their interests, they have their ordinary legal remedies, and the matter does not concern us. We have been unable to discover any evidence that the capitalisation of either company was used to procure undue influence for the company, or that the company, in fact, enjoyed the benefit of any undue influence thereby, nor do we think that any material inference can be drawn from the great contrast between the nominal amounts of these shares or between the nominal amount of the original shares and the prices at which they were dealt in.

Sources of Supply.

At the outbreak of the war the use of cellulose acetate in the manufacture of "dope" was not widely known. After the outbreak of war, however, its value was more fully realised, and with the increasing growth in the aeronautical programme the question of supply became important. There were three well-known sources of supply—namely, the Bayer Company of Germany, the Usines du Rhône of France, and the Cellonite Company (Dreyfus and Co.) of Basle, Switzerland, of which the Bayer Company was obviously not available to this country, whilst France would naturally have the first call on the output of the Usines du Rhône.

The first connection of the Swiss firm with the War Office dates from September, 1914, when their agent in England offered supplies. This was followed by a period of investigation by Mr. A. E. Turner, the officer then in charge of the Aero-

nautical Contract Branch of the War Office, who ultimately in July, 1915, issued a form of tender for 100 tons of cellulose acetate of British manufacture to three firms, including that of Dr. Camille Dreyfus. These three firms were the only concerns with which up to that time Mr. Turner had come in contact, except Cellon, Ltd., which had passed on certain tentative proposals for manufacture by two Frenchmen resident in Germany at the outbreak of the war, whom the French Government employed on their return to France after disposing of their German patent rights. Dr. Camille Dreyfus alone returned the tender, accompanying it with a letter, in which he made certain stipulations, and reserved the right to deliver 50 per cent. of the total quantity from Switzerland at a reduced price. This being the only tender, it was accepted.

The company, having been registered in March, 1916, ultimately secured a site for its factory, and after a period during which plans of the proposed factory were prepared, commenced its erection in August, 1916. In the following October, negotiations were undertaken by the company for a supply contract, and on January 26, 1917, after samples of its products had been obtained, and the Inspection Department had reported that from this material "dope" of good quality and (given uniformity) economical in solvent could be made, the company secured its first direct contract. This was for the supply of 40 tons of cellulose acetate, deliveries to be up to one ton per day, commencing when the factory was ready. By this time the aeronautical programme of the British Government and of the Allies had undergone very large expansion, with the result that it had become urgently necessary to safeguard future supplies. In the following April the company began deliveries of cellulose acetate under its January contract, at first on a small scale, but subsequently in considerable and increasing quantities.

Further anxiety was caused in the Department by the anticipation of a shortage of acetone, a very important solvent used in the manufacture of "dope" from cellulose acetate. The company also appears to have anticipated difficulty in obtaining solvents, the main ingredient of which is acetic acid. In April, 1917, the company put before the Ministry proposals for the manufacture of methyl acetate, as an alternative solvent for acetone, and at the same time expressed its willingness, if supported with priorities and sufficiently large contracts, to lay down plant for the production of synthetic acetic acid, which would involve the erection of carbide and electric power plant. At this date there appears to have been some doubt in the minds of the officials whether acetone or methyl acetate would be the more suitable solvent, and, accordingly, when a contract was made on June 6, 1917, for 2,500 tons of solvents, it provided for the supply of definite quantities of methyl acetate and acetone, the balance in both to be in the Government's option, and it stipulated that the Inspection Department was to be satisfied of the suitability of the material for the manufacture of "dope." When this contract was obtained, the proposed experiments in the manufacture of acetic acid were abandoned, and the Explosives Syndicate was committed to an expenditure of £300,000. on the full scheme.

In May, 1917, the company's original cellulose acetate unit appears to have been almost completed. In that month the company pointed out that with deliveries of one ton per day, the forty tons contract would last for a little over a month, and pressed for a new contract for 300 tons, and on June 6, 1917, it obtained a contract for twenty-five tons a month, terminable on notice and at a slight reduction in price, as compared with the previous cellulose acetate contract.

Increasing Output.

For some time past the outlook in regard to the supply of cellulose acetate had been critical, and in order to meet the "dope" requirements, recourse was had to supplies of acetate which had previously been rejected. Hitherto, apart from the comparatively small quantities provided by the factory at Spondon, the Aircraft Department had been obtaining its supplies partly from the Basle Company, and partly through the British Aviation Commission in Paris from the Usines du Rhône. The quantities obtainable from this latter source were always limited, and in June, 1917, broke down altogether in consequence of the increased demand of the French Government. The still further expansion of the aeronautical programme in this country increased the difficulties of the position.

To cope with this situation the Aircraft Department secured in July, 1917, the assistance of Brig.-General William Alexander, and appointed him Director of Supply. The whole

range of supply was divided into sections, and the section dealing with "dope" chemicals was assigned to Mr. John Radcliffe. Having ascertained that the Usines du Rhône could not be relied upon for his requirements, General Alexander summoned the directors of the company to a conference, at which they answered his complaints of their slow progress by the explanation that they were unable to obtain necessary materials. He thereupon informed the company that he would have their works inspected to ascertain the facts, and that if he found that they were unable to deliver the supplies required, he would obtain them by means of a Government factory. Mr. Radcliffe was sent to inspect, and his report was considered on August 16, 1917, at a conference attended by Lord Weir, General Cormack, General Alexander, Mr. A. E. Turner, and Mr. Radcliffe. This conference also considered the aeroplane programme, which was to be almost doubled by the following January and trebled by the following June, and after Mr. Radcliffe had explained that the company had arranged to enlarge its plant to meet the increased programme, Lord Weir gave instructions that the work was to be proceeded with and that all necessary priorities were to be given.

Between the dates of these two conferences the company had applied to the Contract Officer, Mr. Turner, for a loan of £200,000. on the proposed power plant, and had pressed for an additional contract for cellulose acetate commensurate with the proposed extensions, explaining that these, when completed, would give a daily output of four tons. Mr. Turner referred this matter to General Alexander, who informed him of the decision arrived at by the second conference to sanction the scheme for an ultimate daily output of four tons of cellulose acetate, including the power and carbide units, and left with him the question of a further contract. In the result a loan of £200,000. on the power plant was authorised and was duly made, and a contract was given to the company for a further 700 tons of cellulose acetate. Up to June, 1918, this loan of £200,000. represented the only public funds, other than payments for supplies, which had been received by the company, and of this £200,000. over £35,000. had by June 30, 1918, been recovered in accordance with the agreed terms for securing the loan.

Every effort to secure the needed output from the Spondon works was made by General Alexander and his staff, who, in addition to obtaining the assistance of the Lands Branch to secure the land desired by the company, intervened with the Trench Warfare Department to obtain the necessary supplies of acetic acid, supported the company's application for building licences, and appointed officials to report on the progress of the company's works, with a view to assisting it with priority and to securing provision of labour, etc.

The entry of the United States into the war had placed a further strain on the Supply Department, for, apart from the British requirements, which were increased, it was proposed that American machines should be "doped" in this country. The company was informed of these additional demands, and writing on December 20, 1917, to Sir Arthur Duckham, then Director-General of Aircraft Production, stated that arrangements were being made for the ultimate supply of cellulose acetate at the rate of eight tons per day. The company applied for fresh contracts for the supply of cellulose acetate and methyl acetate on a scale commensurate with the proposed additional extensions, and these contracts were the subject of negotiations between the company on the one hand and the Supply and Contracts Departments on the other, but were never completed, for reasons which will hereafter appear. No deliveries of methyl acetate had up to this time been made under the contract of June 6, 1917.

Revised Financial Arrangements.

The company in the beginning of 1918, during the negotiations for the new contracts, put forward a claim for increased prices in consequence of the increased cost of labour and of acetic acid and other ingredients. It desired an advance of 50 per cent. on the original contract prices for cellulose acetate, and a similar price under the proposed new contracts, but, as the Ministry declined to accept this figure, matters came to a practical impasse. A conference was held on April 13, which considered the history of the company and its position in relation to the Ministry, and arrived at the conclusion that, having regard to the proposed extensions and the difficulties about contract prices, it was desirable that the original financial concession of November, 1916, should be cancelled. Accordingly a Committee of Officials was appointed to negotiate with the company. Meetings took place between the Ministry officials and certain directors of the company, with the result that new terms were ultimately agreed upon, and after

investigation were sanctioned by the Treasury. These terms were embodied in heads of agreement dated June 27, 1918, which provided for the cancellation of the financial concession and of all the existing supply contracts, for the abandonment by the company of all claims for increased cost of wages and material under the cancelled contracts, and for fresh supply contracts on the basis of periodical average cost, plus a fixed profit and a proportion, after the first six months, of any saving in cost, fixed rates of depreciation on building and plant being allowed for the purpose of ascertaining the average cost. By this agreement the Ministry undertook to make loans to the company against its expenditure on electric plant, and also to lend a fixed percentage of the company's approved war capital expenditure on buildings and other plant up to the end of 1918, such loan to bear interest at 1 per cent. above bank rate, with a minimum of 5 per cent. per annum, to be repayable within five years from the date of the agreement. Pursuant to these provisions, the Ministry had, up to the date of our appointment, advanced the sum of £485,000., and up to October, 1918, the sum of £900,000.

Undoubtedly, after the contract of July, 1915, was placed, the War Office was anxious to ensure the manufacture of cellulose acetate in this country, and relied on somewhat sanguine anticipations expressed by Dr. Dreyfus, which, however, were not realised. As previously stated, the factory was commenced in August, 1916, but the first deliveries under the company's initial contract of 1917 only took place in April, 1917, and then at first only on a small scale. The excuse put forward to us on behalf of the company was the difficulty in obtaining the necessary material, and some support is lent to this explanation by the fact that deliveries began in the third month after official assistance was provided for the company. Considerable delay was also experienced in prosecuting the extensions consequent on the increased supply contracts, and this may to a large extent be accounted for by the difficulty the company found in securing the necessary labour and materials, a difficulty due to war conditions and by no means uncommon.

British Firms Offer to Manufacture.

A considerable part of our inquiry related to complaints made in the interest of the British chemical trade that, instead of having recourse to British manufacturers, or at least giving them an opportunity of sharing in the supply of the desired British product, the Department favoured foreign chemists, entrusted to them the exclusive supply of cellulose acetate, and disregarded the fact that there were numerous objections taken both to the quality of their product and the great delay in the fulfilment of their promises. At the outset we think it right to observe that such complaints appear to us to be natural under the circumstances.

We have received the statements of the British manufacturers with sympathy and have examined them with care, but it seems to us that at the bottom of the whole question lies the dominant fact that an adequate supply of cellulose acetate for war purposes under new and urgent conditions had at all costs to be assured. The responsibility for the course pursued was at its height when General Alexander took charge in the middle of 1917, and we examined him closely as to his reasons for adopting the course chosen. We feel bound to say that he frankly recognised the weight of the comments made and met them from his own point of view with equal frankness. The matter stood thus:—

Down to the summer of 1917, the Government demand for supplies of cellulose acetate had increased, and the opportunity of satisfying that demand from established sources of supply had diminished. The company had disappointed the anticipations formed as to the date when it would begin its British manufacture. It was to manufacture not only with a process of foreign origin, but to a considerable extent for the benefit of foreign interests. The Messrs. Dreyfus themselves, as well as the process, had attracted opposition, and it was quite certain that British chemical manufacturers would claim, and would powerfully support their claim, to be just as capable of manufacturing a commercial cellulose acetate as any foreign chemist, and would expect to have their share of this new trade. To select a moment when the Government programme was to be largely increased as the moment at which to close the door to British enterprise and to invest the company, in spite of its shortcomings and its connections, with a position so favoured as to amount almost to a monopoly, was a decision of such gravity, and the risks involved were so obvious, that the officials responsible for taking such a course could not possibly shut their eyes to the criticism which they must incur, or fail to weigh the arguments for it very care-

fully. When those arguments come to be examined they are undoubtedly weighty.

Reasons for Rejection.

Between a general, and even a practical, knowledge of the manufacture of such a chemical product and the experience and special knowledge which are needed if it is to be turned out in considerable quantities with reasonable uniformity and with a regularity that can be relied upon, there is a considerable difference. That British chemical manufacturers could have overcome the difficulties and have attained the necessary skill and experience in no very long time we need not and do not doubt, but to the time so required there had to be added the further time requisite for equipping the necessary plant on a sufficient scale in the middle of the war. Experience showed that in the case of this kind of plant, as of so many others, that further time would be long. The policy of the Government generally was to discourage the duplication of plant or the erection of anything that was not strictly necessary. The inquiries made by the Department showed that no chemical concern possessed a plant in being which could have been utilised more rapidly for the production of any considerable quantity of cellulose acetate, and, although several were confident that they could have reached the manufacturing stage quickly, there was only too much risk that they might be disappointed. Several factories were inspected, and we have taken evidence as to the results of the inspection. The responsible officials came to the conclusion that, if contracts were placed with new manufacturers, there would be much delay in obtaining deliveries, and we are satisfied that they had materials before them from which such an opinion might reasonably be formed, nor have we sufficient grounds for holding that opinion to have been wrong. Another point, in respect of which the course pursued by the Department has been open to criticism, is that the Government was made exclusively dependent for its supplies of acetate upon a company of whose prior production complaints had been made, and that no provision was made for a spare or emergency source of supply of cellulose acetate. This point, again, was too obvious to be overlooked, and in fact it was weighed with care. There had been great delay and much disappointment connected with the completion of the company's Spondon works. There has been complaints of the cellulose acetate delivered, and some of it had been rejected. There were officials connected with the Department's Technical Branch whose attitude towards the whole Dreyfus scheme, personnel, process, and product was adverse, not to say hostile.

There is, however, less in all this than might appear at first sight. Since July, 1915, the Government had been more or less committed to the Dreyfus product. Whatever objections had been taken to it when supplied from Switzerland, we were told that the cellulose acetate made at Spondon was favourably reported upon and proved to be satisfactory. In some cases of objections taken, the evidence suggests serious doubt whether they were justified at all. The delays in getting the Spondon factory to work had come to an end, and from the middle of 1917 onwards supplies came forward regularly and in increasing quantities. The works themselves were inspected and reported on as being well designed and laid out, and equipped with all precautions against destructive accidents, and accordingly the risks incident to the decision to draw the whole supply from one place of manufacture were reduced to a minimum. In addition to the objections to erecting fresh works and plant at all, it was by no means clear that persons who had had no manufacturing experience of the process would be able to work it successfully, and extension of the existing works presented advantages as against resort to a new source of supply. No ill effect appears to have resulted from the policy adopted, and we recognise that the situation was one in which some risk had to be faced, however the Department might decide.

Again, it was a natural result of this policy that the concern which succeeded in getting the position of sole supplier of cellulose acetate during the war would in fact obtain a highly favoured position after the war. It received priorities and other assistance, which enabled it to construct a large and well-equipped factory at a time when other chemical manufacturers could not do the like. It gained experience and trained a staff ready, on the return of peace, to take up the manufacture on a commercial scale, and we are given to understand that the future of cellulose acetate is, to say the least of it, promising, for its uses are many and the start thus obtained over other competitors was of real and perhaps of

great value. This advantage lends itself readily to a charge of favouritism, and if there were any ground for believing that the officials who adopted a policy involving such a result were not disinterested or were lacking in good faith, we should feel that they had a very serious case to answer.

Of the subsequent offers to manufacture, the majority did not, in the circumstances, appear to merit very serious attention; but two exceptions may be specifically noticed, namely, those of the United Alkali Company and Courtaulds, Limited. The first United Alkali Company offer was made to the Admiralty in about May, 1916, in the shape of a tentative proposal to manufacture under the du Rhône process, if a promise of contracts were made. It was communicated by the Admiralty to Mr. Turner; but as the latter had already arranged with Dr. Dreyfus for all requirements of his Department then anticipated, and was given to understand that early deliveries from the company might be expected, he felt himself unable to guarantee to the United Alkali Company any orders, and left it to the Admiralty to give them such encouragement as it thought fit. The United Alkali Company was at this time prepared to co-operate with Dr. Dreyfus, but negotiations came to nothing.

A further proposal was made by the United Alkali Company to the Admiralty in October, 1916, in which the company asked for a minimum guarantee of one hundred tons per annum for five years, subject to "write-off" and depreciation allowances during the war, but the proposals struck Mr. Turner as being so extensive that, if accepted, they would mean the closing down of the Cellulose Company's works, and the substitution of the United Alkali Company, which was not then manufacturing, had not yet definitely secured the right to use the proposed process, and admitted that it would probably take six to nine months for the erection of the plant. This seems to have been a reasonable view.

Subsequent proposals were made by the British Enamellite Company in conjunction with the United Alkali Company to manufacture under the same process, and these came before General Alexander and were declined, on the ground that investigation was being made into the possibility of making cellulose acetate at a Government factory, and that if the Department decided to adopt this process, they would dispense with intermediaries. Lord Weir, who was then Controller of Supplies, was advised accordingly.

The offer of Courtaulds Limited appears to have been invited by an official in the Technical Department, who held strong views as to the unsuitability of the Cellulose Company's product. The interview between the Technical Officer and the company's representative took place on October 26, 1917, and on October 29 the latter wrote intimating his directors' willingness to entertain the matter. On November 5 the papers were passed to General Alexander's immediate subordinate officer, who in a minute dated the following day declined the proposals, in view of the very large increase of plant which would be needed, and of the arrangements already made. In the course of a few days the proposal was referred back through the Chief Officer of the Technical Department and the Director of Aircraft Equipment to the Supply Department, when General Alexander confirmed his subordinate's decision, and remarked on the large amount of capital expenditure, machinery, plant and labour involved, to all of which, unless absolutely essential, the Munitions Works Board took exception. Early in October, 1917, Lord Weir had instructed General Alexander not to consider further extensions without reference to him, and shortly afterwards formal instructions were communicated to Heads of Supply Departments that, in view of the growing difficulty in connection with building, and the supply of labour and materials, and the serious shortage of steel, no further extensions should be undertaken unless vitally urgent in the national interest. This was some months before the proposed deliveries could have been made in any case.

No Preferential Treatment.

We are of opinion that nothing amounting to favouritism of the company has been shown by the Aircraft Department. It is, undoubtedly, the fact, as has been shown above, that from the commencement Dr. Dreyfus, and subsequently the company, received support and assistance from Government officials, and became, in fact, the sole source to which the Service looked for supplies, but we think that the reasons for this are adequate. In this connection it is worthy of comment that, notwithstanding the transfer of the Aeronautical Department from the War Office to the Ministry of Munitions, and the subsequent change of official personnel, the same

policy was adopted, namely, to develop to the utmost capacity the resources of the company's works.

In conclusion, we will refer to the criticisms made upon the Company last year, which were the origin of the present inquiry. Whether or not the Sub-Committee on the Ministry of Munitions, which was appointed by the Select Committee on National Expenditure, directed its attention to the supply of cellulose acetate simply in the course of its own investigations, or in consequence of any special representations made to it, we do not know; but, after the publication of the Select Committee's Fifth Report, it is plain that criticism was particularly attracted to the two facts, that the company had received much official support, including loans of public money, priorities, contracts and an Excess Profits Duty concession on the one hand, and on the other, that its sixpenny shares appeared to be assumed to have become quickly worth £14 10s. each. Hence a connection between these facts was strongly suggested, which alike involved the personal credit of the managers of the company's affairs and of the Departmental officials concerned. The contrast between the nominal capital of the original company and that of the parent company is indeed so glaring that, for much of the criticism to which they have been exposed, we think that the promoters and others connected with the company's financial arrangements have only themselves to thank. In other respects, however, less than justice has been done them. If all the facts, which we have sifted with so negative a result, had been available last year to the critics of the company and its proceedings, we think that their conclusions would, to say the least, have undergone large modification. It is satisfactory to be able to report that, in our opinion, there has been neither favouritism nor corruption, and that the official action taken has been throughout such as appeared to the Departments concerned the best that was open to them under the circumstances.

DETERGENT ACTION OF SOAP.

THE detergent action of soap, according to S. U. Pickering (*Chemical Society Transactions*), must be attributed partly to its power of emulsifying oil, the globules of which become coated with a pellicle which prevents them from rendering adjacent objects oily; partly to the low surface tension between the soap solution and the oil, and possibly in part to the acid soap produced in the hydrolysis forming a colloidal compound with the dirt. The experiments cited show, however, that the main factor is that soap will dissolve oils, including paraffin oil, forming soluble compounds, some of which contain approximately equal proportions of oil and soap. In order to prevent the emulsification of a portion of the oil, the globules of which then become coated with a pellicle which prevents further combination with the soap, it is necessary to have a considerable excess of oil, if the soap is to combine with the maximum quantity of oil. The addition of water in excess does not decompose the oil-soap compound, but preliminary dilution of the soap solution causes more oil to be emulsified, with the result that a much smaller proportion combines with the soap.

In the incorporation of oil with soaps three stages may be observed. For example, in the case of potassium stearate paste and benzene, the paste first becomes thickened owing to the oil being incorporated to form a coarse sort of emulsion; then the mixture becomes limpid owing to the formation of a soluble compound between the oil and the solid stearate; and, thirdly, this liquid rapidly solidifies to an opaque stiff mass owing to the globules of oil, through combination with the stearate, becoming sufficiently reduced in size to form a true emulsion. The extent to which these stages occur depends on factors such as the proportion of emulsion formed, the viscosity of the reagents, etc.

The proportions of oil and soap which will unite depend both on the chemical and on the physical character of the reagents. For example, in the case of three samples of purified paraffin oils, the volumes dissolved of the oil boiling at 257° C. were intermediate between the volumes dissolved of the oils boiling at 98° C. and 198° C. respectively. Changes of temperature take place during the combination of the soap and oil, the nature and extent of the change depending upon the character of the oil. It is probable that the combination is invariably exothermic in character, but that the heat absorbed in the fusion of the solid stearate or semi-solid soap usually more than counterbalances the heat evolved. Naph-

thalene dissolves to a limited extent in soap, but partly separates out in crystalline form on cooling or diluting the solution. Soap will dissolve less paraffin oil in the presence of naphthalene.

GERMAN POTASH INDUSTRY.

THE NEW REGIME.

THE preliminary or constituent assembly of the German "Imperial" Potash Board was held in July, and was followed by the first business meeting at the beginning of August. It is to the Potash Board, erected under the law for the socialisation of the potash industry, that the control of the future destinies of the industry has been entrusted. The board is composed of 30 members (with an equivalent number of deputy members), representing the interests of producers, merchants, the Potash Syndicate, the potash miners and officials, agriculturists and the potash products' manufacturing branch, together with a Government official. The representatives of the employers and the workmen combined form a majority of the board, so that their joint decisions can override, if thought necessary or advisable, all the other departments embodied in the board. Herr D. Richter, Under-Secretary of State and president of the Potash Syndicate, has been elected chairman of the Potash Board, with vice-chairman in the person of Herr Sachse, miners' leader and president of the old Social Democratic Miners' Union. As a first result of the establishment of the board the inland prices for potash have been increased by 50 per cent. as compared with the higher prices which were originally fixed under the Socialisation Bill, the increase being prompted by the very unfavourable financial situation of the industry.

The Potash Syndicate, in anticipation of the assumption of activity by the Potash Board, forwarded to the latter in July a petition setting forth in detail the unsatisfactory position of the industry, and to that petition is due the higher prices which were brought into operation on August 1. Quoting from the petition it is first mentioned that the prices authorised by the law for the regulation of the potash industry of April 24, 1919, would by no means correspond to the growing costs of production. The Syndicate calculated in March that the extra expenditure of a normal potash works amounted to £50,000 per annum, without taking into consideration the decline in the workmen's efficiency and the new demands put forward at that time by the officials for higher wages. Between November 1, 1918, and March 31, 1919, the potash works in operation, exclusive of those in Lorraine, experienced a total loss of £2,286,000, against which could be set profits of a few works amounting to £93,000; the net loss of £2,200,000 in round figures was equivalent to an average loss of £21,600 per works, and no improvement has taken place since that time. Dealing with working expenses in the matter of materials, it is shown that the price of lignite rose from 110 marks per 10 tons on January 1, 1919, to 223 marks on April 2, 1919; and explosives increased by 41 per cent. in the same period, whilst the efficiency of the miners in, for instance, the district of Halle fell from an average of 122 tons of crude salts in the first quarter of 1918 to 34 tons in the first three months of the present year. This statement is now confirmed by the Halle State Mining Administration.

The turnover made by the Potash Syndicate in the first half of 1919 amounted to 380,000 tons of K₂O, and the total for the whole year is estimated at 800,000 tons, of which 200,000 tons will represent exports. It is estimated that the increase in prices by 50 per cent, which has been sanctioned, will just cover the additional working expenses, without making any change in the situation of those works which are being operated at a loss. It is unofficially stated that large profits on export business, which in peace times contributed so largely to the prosperity of the potash industry, cannot be reckoned with in the near future, particularly in the case of the United States, where the dear native product seems to be preferred to the German article. It is thought too that the quantity of potash which the Americans finally will require, will be procured from the Alsatian mines, so that the prospects for Germany appear to be by no means favourable at present.

LODERS AND NUCOLINE, LTD.—A final dividend on cumulative preference shares at rate of 6 per cent. per annum for half-year to August 31, less income tax.

PARLIAMENTARY NEWS.

Import Restrictions on Chemicals.

In the House of Commons Mr. Raffan asked the President of the Board of Trade whether the licensing Sub-committee (Dyes Department) of the Import Restrictions Department has the power, before granting permission for the importation of medicinal chemicals said to come within their province, to demand the name of the actual manufacturers as well as that of the consignors and to demand the original invoice and to levy a charge of 1 per cent. on the said invoice, estimated at the rate of exchange at the time of granting permission to import?

Mr. Bridgeman: Chemicals of kinds which are intermediate materials for the manufacture of dyestuffs can be imported only under licence and must be consigned to the Central Importing Agency, which is entitled to levy a charge of 1 per cent. to meet expenses incurred. This arrangement has been made by the licensing Sub-committee of the Trade and Licensing Committee equally representative of dye-makers and dye-users established under the Government scheme for the encouragement of the dye-making industry, and has met with the general approval of all the interests concerned. The name of the actual manufacturer is necessary in order to prevent the indirect importation of German dyes and materials, and the invoice value for the purpose of calculating the agency fee. Chemicals suitable only for medicinal purposes are not included within the scope of the arrangement. The Licensing Sub-Committee of the Dyes Department is distinct from the Import Restrictions Department. No fees are charged by the latter.

Mr. Raffan asked whether the Department of Import Restrictions is asking why the requirements of chemical firms for such chemicals as diethyl barbituric acid, methyl sulphonal, and santoinine cannot be satisfied in this country, notwithstanding the fact that these chemicals are not manufactured in Great Britain to any appreciable extent?

Mr. Bridgeman: No inquiry as to the chemicals named can at present be traced, but it is a usual matter of routine to inquire of applicants for licences whether their wants cannot be satisfied from home sources. When it is agreed that chemicals which are needed are not manufactured in this country to any appreciable extent licences to import them are freely issued.

Mr. Raffan asked whether the Licensing Sub-committee (Dyes Department) of the Import Restrictions Department has the power, under Proclamation No. 29, to prohibit the importation of such chemicals as antipyrin, amidopyrin, and phenacetin, notwithstanding the fact that these chemicals are used entirely for medicinal purposes, and are not in any sense intermediary dye products?

Mr. Bridgeman: The three products named are undoubtedly intermediate coal tar products, but for the reason stated in the question the duty of issuing licences for them has, by interdepartmental arrangement, been transferred from the licensing sub-committee of the Dyes Department to the Department of Import Restrictions.

Mr. Raffan asked whether the importation of vanillin into this country has been entirely prohibited in spite of the fact that the entire output of British manufacturers has been sold up to the end of September; and whether the effect of this prohibition has been to increase the market price of vanillin from 45s. to 80s. per pound?

Mr. Bridgeman: The importation of vanillin is not prohibited entirely; it is restricted to 50 per cent. of 1915 imports. I am not prepared to accept the suggestion in the later part of the question.

Muriate of Potash.

Mr. John Dennis on Monday asked the President of the Board of Trade (1) whether a licence to import 200 tons of muriate of potash has been applied for by the West Norfolk Farmers' Manure Company, Limited, a farmers' co-operative association; whether such licence has been refused, the applicant being referred to the British Potash Company; whether any valid reason exists for the restriction of trade liberty in the importation of this fertiliser; and whether, in the event of the applicant being forced to buy from the rival concern named, he will undertake that the cost of this fertiliser in King's Lynn to the applicant shall not exceed its contract price with the Alsace-Lorraine Trading Company for the 200 tons in question; (2) the Parliamentary Secretary to the Board of Agriculture whether he is aware that muriate of potash is required

for the manufacture of compound root manures; whether the West Norfolk Farmers' Manure Company, Limited, whose output is 20,000 tons of manure per annum, is not permitted to import muriates for their manufacture; whether, in order to get the required production for next year's crop, its manufacture must be at once proceeded with; and whether any shortage in production must have a detrimental effect on the 1920 crops of potatoes and other roots; (3) The Minister of Labour whether he is aware that the West Norfolk Farmers' Manure Company, Limited, of King's Lynn, is unable to employ its plant and men owing to its inability to obtain a licence to import muriate of potash already contracted for and now awaiting shipment at Rotterdam; whether its works are on the point of being closed down in consequence, entailing a large number of men being thrown out of employment; and whether he can take any steps to avert this calamity?

Sir A. Geddes: The application from the company was dated August 11, and has not yet been replied to. The requirements of the company will be filled by the British Potash Company, who hold a licence for the higher grade of potash salt referred to. The Alsace-Lorraine Trading Company do not import the higher grade salts, and if the West Norfolk Farmers' Manure Company, Limited, have contracted to buy an import-prohibited article they should have first assured themselves that a licence would be issued. At the same time, it is probable that the muriate, which will arrive in the course of the next day or two, will be delivered at a price at least as favourable as that at which it could be obtained from the Alsace Company. That price will be the f.a.s. price at Rotterdam, as fixed by international agreement, plus incidental expenses.

Mr. Dennis: Will the price added to the f.a.s. price Rotterdam be the freight price direct Rotterdam to King's Lynn, or will it be freight Rotterdam to London plus freight from London? Cannot it be imported direct to King's Lynn?

Sir A. Geddes: I should require notice of that before answering with absolute certainty, but I know of no reason why it should not be brought direct to King's Lynn.

Queensferry Government Factory.

Mr. Kellaway, replying to Mr. Rose, said: The capital expended on the building and equipment of H.M. Explosive Factory, Queensferry, has been £4,150,000. The amount expended in wages, including the payment of the supervisory staff, has been approximately £1,673,000. The average number of employees from 1915 to 1918 was, approximately, 2,500 men and 2,500 women, though 4,000 men were employed while the factory was under construction. The value of the total production of the factory is estimated at £19,800,000., and at £33,000,000. at American contract prices. The future of the factory is still under consideration.

GAZETTE NEWS.

LIMITED COMPANIES.—Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions, Orders, and Official and Other Notices.

British Coalite Company, Ltd.—Meeting of creditors 62, London Wall, E.C. (August 20.)

Coalite, Ltd.—Meeting of creditors 62, London Wall, E.C. (August 20.)

Grays Chemical Works, Ltd., London, E.C.—H. V. Thurgood, 11, Queen Victoria Street, E.C., F.C.A., appointed receiver July 25.

Spanish Copper Company, Ltd.—Resolved July 16, confirmed August 6: That the company be wound up. H. R. Yglesias, 6, Old Jewry, E.C., liquidator. Meeting of creditors at liquidators, August 21.

DISSOLUTIONS OF PARTNERSHIP.

(Note.—When two dates are given in the following announcements, the first is the date of the dissolution. The date in parentheses is that of the official advertisement.)

Single Rose China Clay Company (Wm. Jas. Adams and Jno. Stephens, as trustees of Rchd. Frdk. Stephens, deceased; Wm. Jno. Kelly, Wm. Martin, Thos. Martin, Hart Nicholls, sen., Hart Nicholls, jun., as trustees of Tom Nicholls, deceased; and Arthur Maunder Richards, as nominee and agent of Rchd. Richards and Sons), St. Austell, China clay merchants. July 1. Debts will be received and paid by H. N. Wright, St. Austell, solicitor, liquidator of the firm. (August 8.)

CRYSTALLOLUMINESCENCE AND TRIBOLUMINESCENCE.

WHEN a solution of potassium sulphate in water is evaporated until crystals begin to form and is then poured off into another vessel and cooled slowly without agitation, flashes of bluish light are seen to shoot through the liquid while it turns into a mass of crystals. More striking still is the phenomenon when arsenic acid is dissolved in hydrochloric acid, and the solution is placed in a freezing mixture at $-50^{\circ}\text{C}.$; as soon as sparks appear, the crystals fall out rapidly. Another way of performing such experiments is to add hydrochloric acid to a solution of sodium chloride; the precipitation of the salt is associated with a luminescence. This is known as crystalloluminescence, and is not a rare phenomenon; it is shown by the bromide and iodide of potassium, e.g., not by the same sodium salts, however. Triboluminescence is the luminescence observed when crystals are crushed or split and is fairly common. In this latter case the suggestion, made in 1820 by Henrich, that the sparking is due to frictional electricity, seems very plausible. But there are other explanatory suggestions. Schneider rubbing diamonds together found no connection between frictional electricity and tribo-electricity; W. J. Pope could not establish any connection of triboluminescence with pyro-electricity; others considered the phenomena as thermal or chemical; Trautz observed that freshly-prepared crystals lose their triboluminescence with age. The suggestion of chemi-luminescence has recently found an advocate in Professor Harry B. Weiser, of Houston, Texas (*Journal of Physical Chemistry*).

Weiser points out that amorphous as well as crystallised substances may be triboluminescent, and that the disturbed crystal symmetry of some scientists is not essential to the phenomena; that may be, but the argument would not disprove the electric character of triboluminescence. Weiser, however, considers with Bancroft crystalloluminescence as a special case of triboluminescence and both due to chemical action. In his opinion the two phenomena, which are usually associated, go together with conditions favouring a high concentration of ions in excess of the equilibrium ionisation; most luminescent substances are also dissociated in these solutions. The addition of a colloid like gelatine diminishes the luminescences, not because it increases the viscosity, but, he argues, because it interferes with the dissociation; cane sugar has little effect on the luminescence, though it also increases the viscosity. Weiser supports this argument by novel spectroscopic observations. The light emitted is too faint for direct spectrometry. By passing the faint light through various colour filters, he ascertains, however, that in the case of the arsenic experiment mentioned above, the light emitted contains neither red nor yellow and very little green, being essentially blue; the same colour he observes in triboluminescent arsenic acid, and when burning arsenic in oxygen or when feeding arsenic compounds into coal gas or hydrogen flames. He made similar colour observations with potassium sulphate. These experiments are certainly interesting, but they can hardly be said to afford much support to the hypothesis that the tribo and crystalloluminescences are due to chemical action, and to the recombination, rather than to the decomposition, of the atoms. Ionisation may play an important part; but so far as we are aware, says *Engineering*, attempts to prove that liberation of electricity accompanies chemical combination have not been successful, and something like that seems to be involved in Weiser's suggestion.

GOVERNMENT DEPARTMENT AND CHEMICAL MANURES.

A White Paper issued on Tuesday by the Board of Agriculture and Fisheries, dealing with the financial results of the principal trading schemes carried out by the Food Production Department, shows that on these schemes there was a net loss of £1,080,529.

On a total expenditure of £91,942, for superphosphate purchased during the season 1917 there was a loss of £28,759. This transaction was undertaken early in 1917, when there was a serious shortage of superphosphate. It may be noted that the expenses are given as not far short of half the value of the superphosphate. It was recognised at the time that loss on the transaction was unavoidable, but the net loss was

considerably heavier than anticipated, owing to rates of freight being finally fixed by the Minister of Shipping at a much higher figure than was originally allowed for. Out of the 18 schemes embarked upon by the Department, 12 show a loss amounting to £1,086,325., five show a profit of £5,796., and one, that for nitrate of soda, balanced. The largest profit was on muriate of potash which for the year ended March 31, 1919, gave a margin of £4,016. income in excess of expenditure.

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 4, Queen Anne's Gate Buildings, London, S.W.1, whence unless otherwise stated further information may be obtained:—

Australia.

H.M. Senior Trade Commissioner in Australia has forwarded copies of the specification, conditions of contract, and tender form in connection with a call for tenders by the Victoria Railway Commissioners for the supply and delivery of sodium acetate (commercial). (Contract No. 32,485.) Sealed tenders, on the proper forms, will be received by the Victorian Railway Commissioners, Spencer Street, Melbourne, up to 11 a.m. on October 29. Samples of the sodium acetate offered must be deposited with the Chief Storekeeper, at Room 109, Railway Offices, Spencer Street, Melbourne, at or before the time of the receipt of tenders. Tenders must be accompanied by a preliminary deposit of $\frac{1}{2}$ per cent. of the total amount of tender. Local representation is necessary. The above-mentioned copies of the specification, etc., may be consulted by manufacturers of sodium acetate at the Inquiry Room of the Department of Overseas Trade, 73, Basinghall Street, London, E.C.2. It will be observed that the time for tenders is limited, and this intimation will therefore be of use only to firms having agents in Australia who can be instructed by cable.

H.M. Senior Trade Commissioner in Australia reports a recent call for tenders by the Deputy Postmaster-General, Melbourne, for the supply and delivery of sulphate of copper (a) in store, (b) in bond. Schedule No. 1,578. Tenders closed on August 5, but in view of possible future requirements, particulars of this contract may be of interest to United Kingdom manufacturers of sulphate of copper, and copies of the specification, etc., may be inspected at the Inquiry Office, Department of Overseas Trade, 73, Basinghall Street, London, E.C. 2.

British India.

A firm in Madras are desirous of accepting agencies, to cover the Madras Presidency and Southern India for motor oils and greases.

British West Indies.

An import merchant at Port of Spain, Trinidad, with business connections extending to the Leeward and Windward Islands, the Barbadoes and British Guiana, wishes to represent United Kingdom suppliers of drugs, chemicals, and soap. (Reference No. 375.)

Egypt.

An agent in Alexandria desires to represent manufacturers of chemical products, and oil paints. (Reference No. 383.)

South Africa

An inquirer in South Africa, with experience of the petroleum trade, desires to represent British firms in that market. (Reference No. 387.)

France.

An important French company, who deal in chemicals, offer to place their services at the disposal of United Kingdom manufacturers. (Reference No. 391.)

Poland.

A representative at Warsaw desires to get into touch with first-class United Kingdom firms dealing in tanning materials. (Reference No. 399.)

Scandinavia.

A sole agency is required by an important organisation in Scandinavia, for large United Kingdom manufacturers of soda ash. References, etc., can be exchanged and full details given to interested firms. (Reference No. 400.)

Spain.

A French merchant in Madrid desires to secure agencies for British manufacturers of chemical products. (Reference No. 351.)

A firm in Madrid desire to secure agencies for United Kingdom manufacturers of chemical products. (Reference No. 352.)

ITEMS OF INTEREST.

GLASSWORKERS' WAGES.—The British Flint Glass Manufacturers' Association have granted a further advance of 10s. per week to glassworkers.

PERSONAL.—Captain J. R. Starkey, M.P., has been appointed on the Committee of Management of the British Sugar Beet Growers' Society, to represent the Nottinghamshire Agricultural Executive Committee.

ASBESTOS WORKERS' STRIKE.—Some 400 workers have come out on strike at the Cape Asbestos Company's works at Barkington, pending a satisfactory reply to their demands, pressed by the National Union of General Workers, for a 48-hour week, a week's holiday with pay, and an increase of 5s. per week for women employees.

NEW ISSUE.—The Reliance Fuel Company has been formed to carry on the manufacture of briquettes and smokeless fuel under a special process, with 365,000 7½ per cent. (free of tax) cumulative participating preference shares of £1. each and 200,000 deferred shares of 1s. each, of which the £1. participating preference shares have this week been offered for subscription at par.

NEW RUBBER WORKS.—Messrs. Potter's Asbestos Co., Ltd., Littleborough, announce their intention to erect a rubber works which will give employment to 1,000 people. They have notified the Littleborough District Council of the project, and the Council have decided to expedite their housing scheme in order to provide accommodation for the people who will come into the district.

ITALIAN IMPORT PROHIBITIONS.—The importation of the following goods into Italy is prohibited with the exception of those destined direct to State Departments or to the Consortia for Supplies: Sulphite, bisulphite, and metabisulphite of calcium, potash and sodium; acetone; perfumery and perfumed soap; sulphur; essences and essential oils; sulphate of copper; and explosives.

GUN-COTTON EXPLOSION.—A verdict of "Accidental death" was returned at an adjourned inquest at Plymouth on Tuesday concerning a gun-cotton explosion at the Royal Naval Ordnance Depot, Bull Point, Devonport, on August 6, as a result of which two men lost their lives and another was seriously injured. The evidence showed that deceased were engaged in removing detonators from depth charges landed from a steamship.

ZINC AND ZINC-DUST PRICES.—The quotation for Australian high-grade zinc dust, 88-92 per cent. metallic zinc purity, remains at £70. per ton, f.o.b. Inquiries have been fairly numerous, and the recent briskness of the market is maintained. The price of Australian electrolytic zinc, containing 99.95 per cent. metallic zinc, is unchanged at £42. per ton, f.o.b. Australia, for direct shipment to New Zealand, India, South Africa, and the Far East.

FUEL ECONOMY.—At the autumn meeting of the Iron and Steel Institute, which will be held at the Institution of Civil Engineers, Great George-street, Westminster, on September 18 and 19, there will be a conference on fuel economy, at which Dr. W. A. Bone, Sir Robert Hadfield, and Mr. A. Hutchinson will present on behalf of the British Association Fuel Economy Committee a report on fuel economy in steel works, and Mr. H. J. Yates, one on fuel economy in foundry practice. Messrs. Cosmo Johns and L. Ennis will also contribute a paper on fuel economy in German iron and steel works, and in addition there will be a number of papers on technical questions relating to steel manufacture.

FUTURE OF PATENTS BILL.—Now that the Patents and Designs Bill has been postponed consideration by the House of Lords until after the recess, there is reason, says the London correspondent of the *Birmingham Post*, for believing that those commercial organisations which are desirous of taking action regarding amendments to the measure will agree as to the final form in which they will ask the Government to frame the operative clauses. The Birmingham Chamber of Commerce at present is content with urging that the Bill should extend the period of existing patents which have not been fully worked during the war for a period of two years from the date of legislation. The London Chamber seeks to have the whole period of the war added to the life of the patent. The Newcastle-on-Tyne Chamber is desirous of stimulating invention in this country to an extent not possible with the present heavy cost of patents here.

BRITISH MOTOR SPIRIT SYNDICATE.—The company issued a circular to the shareholders, which states that negotiations have been concluded with Mr. H. C. Pierce, of the Pierce Oil Corporation, one of America's leading oil companies, whereby Mr. Pierce or his Corporation are to become majority subscribers for cash of the Syndicate's capital of £250,000, and will supply a minimum of 12,000,000 gals. of petrol per annum, for which the Syndicate will act as distributing agents.

SCOTTISH OIL COMPANIES.—It was officially announced on Wednesday at Glasgow that the Anglo-Persian Oil Company have intimated to the directors of the Scottish oil companies that as all but a small proportion of the shareholders have accepted, they are prepared to implement the terms of their offer of July 11, and that the necessary steps are being taken to register the new company to be formed to acquire the shares of the various companies. The offer of the Anglo-Persian Company (in which the British Government have a controlling interest) was to purchase the Ordinary shares of the Scottish oil companies.

UNEMPLOYMENT INSURANCE.—The Ministry of Health wish to direct the attention of employers and others to the fact that by the National Health Insurance Act, 1919, which has just received the Royal Assent, the limit of remuneration up to which persons employed otherwise than by way of manual labour are liable to compulsory health insurance has been raised from £160. to £250. a year. Employers are accordingly required for the future to pay health insurance contributions in respect of persons employed by them under a contract of service as follows:—For non-manual workers, where the rate of remuneration (including any regular bonus, etc.) does not exceed £250. a year; for manual workers, irrespective of the rate of remuneration. A non-manual worker whose remuneration is over £160. a year but not over £250. a year may, within a limited period and under certain conditions, claim a certificate of exemption, and on the grant of such a certificate the employer's contribution (3d. a week) is alone payable. Forms of application for exemption will be obtainable shortly at any Post Office.

BUSINESS NOTICES.—Messrs. Edgar Allen and Co., Ltd., Imperial Steelworks, Sheffield, have issued the first number of the "Edgar Allen News." The publishers state that while the prime reason for its publication is a desire to sell their products, they are, at the same time, endeavouring to give their customers technical and practical information about steel and steel goods.—We are informed that the entire share capital of Messrs. Huntington, Heberlein and Co., Ltd., mechanical, chemical, and metallurgical engineers, has been acquired by Messrs. Henry Gardner and Co., Ltd. The business premises of the former will in consequence be transferred to the registered offices of Henry Gardner and Co., Ltd., at 2, Metal Exchange Buildings, E.C. 3. The board of Messrs. Huntington, Heberlein and Co., Ltd., will consist of Mr. Walter Gardner (chairman and managing director), Mr. H. C. Bingham, Mr. H. J. Bush, and Mr. R. H. Bingham.—The Compagnie Commerciale du Nord has been transformed into a limited company with a capital of 1,000,000 francs, and with registered head office at 21, rue Kipdorp, Antwerp. The new company will continue, as in the past, the exportation and importation of merchandise in general, and chemicals, drugs, and associated products in particular. The London and Paris branches will be carried on as before.

IMPORTS INTO ITALY.—In a letter to *Reuter's* agency regarding the Italian decree of July 24 abolishing all previous restrictions on imports into Italy and instituting a new list of goods for which import licences are necessary, the Italian Commercial Attaché in London writes as follows: "From reports and articles appearing in the Press in regard to the present import restrictions in Italy, I notice that the decree in question has been, to a certain extent, misunderstood, being considered as a prohibitionist measure. On the contrary, the decree re-establishes the principle of freedom of importation, confining the restrictions to certain classes of goods specified in the new lists, whilst, prior to its publication, a license was necessary for any class of goods. I may further add that the goods, which are included in the list of restrictions, are not entirely prohibited—in fact, no license is necessary when they are destined directly for the Consorzi di Approvvigionamenti (Syndicates for Supplies) and State Departments, and licenses may also be granted to private firms. It is a temporary measure, with the purpose of regulating supplies and alleviating the exchange difficulties, and I have authority from my Government to give assurance that any desire which the British may express will receive sympathetic consideration."

DRUG AND CHEMICAL WORKERS' CLAIM FOR HIGHER WAGES.—The dispute between the Amalgamated Society of Pharmacists, Drug and Chemical Workers, and the Master Pharmacists remains unsettled. A scheme was formulated, but it has now been rejected by the men's union. The matters in dispute, which include improvements in wages and hours, will be submitted to arbitration.

AMERICAN F.O.B. SHIPMENTS.—On account of the misunderstandings that have arisen in the past, the definition of the formula "f.o.b." as applied to shipments from the United States of America, has been discussed by the Melbourne Chamber of Commerce. In view of the various meanings read into the term by American exporters, it was felt that something should be done, and ultimately it was decided to suggest to Australian importers that in American contracts they should distinctly state f.o.b. overseas vessels at New York, San Francisco, or as the case may be. Where the port of shipment is left open it is recommended that the contract should run f.o.b. overseas vessel. This, it is felt, should place the meaning of the term beyond doubt.

TECHNICAL ASSOCIATIONS FEDERATION.—A natural corollary to the recent growth of professional associations operating as registered trade unions is the formation of federations of such associations. One such federation has been formed in the Federation of Technical and Scientific Associations, in which are included the National Union of Scientific Workers, the National Association of Industrial Chemists, the Electricity Supply Commercial Association, and the Electrical Power Engineers' Association. The immediate object of the Federation is to secure the recognition of the claims of the executive, administrative, and supervisory grades of the various industries, and to secure united action on matters of general interest affecting these grades. In our advertisement columns will be found particulars of a meeting of the Federation, which eligible associations are invited to attend.

AMERICAN RESTRICTIONS ON IMPORTS OF CHEMICALS.—As amended by a ruling of July 14, General Import Licence PBF No. 37 authorises the importation into the United States from all countries of the world, except Hungary and those parts of Russia under the control of the Bolshevik authorities, of all commodities except those specified below: The following commodities, the importation of which continues to be controlled by reason of existing agreements: Pig tin, and all metal alloys containing tin, including tin drosses, tin oxides, solder drosses, type metals, antifriction metals, waste metals and other metals containing tin, except tinplate and tinplate scrap. Salvarsan, neosalvarsan, arsphenamine, and all substitutes therefor and equivalents thereof. The following commodities, the control of the importation of which by individual import licences is desirable: (a) Dyes and dyestuffs, including dye bases, crudes and intermediates; (b) potash; (c) all drugs and chemicals (except nitrate of soda). It should be noted that the foregoing paragraph, as now amended, provides that hereafter individual import licences will be required for all importations of drugs and chemicals (except nitrate of soda) from every source whatsoever. All applications for licences to import dyes or dyestuffs, including dye bases, crudes and intermediates, must be accompanied by supplemental information sheets giving complete specifications of the character of the dyes or dyestuffs proposed to be imported. American consuls abroad have been instructed to issue certificates of non-enemy origin before certifying invoices covering shipments of potash, dyes or dyestuffs, or drugs or chemicals intended for importation into the United States.

NITROGEN PRODUCTS COMMITTEE.

IT is understood that one reason for the delay in the publication of the report of the Nitrogen Products Committee is the amount of work that has been necessary in the preparation of an index. This is believed to be now nearly complete. The issue of the report is awaiting a definite instruction from the Minister of Munitions. A representative of the *Times* was informed on Wednesday that the report, which is dated May last, deals at length with the project for installing a plant in Great Britain for the fixation of nitrogen from the atmosphere, and that it views as feasible the Haber process. The utilisation of water power for the purpose does not take a prominent place in the recommendations. The report is a final and not an interim one, but it is believed that it contemplates the resumption of investigations into both catalytic fixation and the use of nitrogen products in industry generally.

REPORTS OF COMPANIES.

Ammonia Soda Company, Ltd.

After deducting £9,300. (as against £500.) for the reserve for excess profits duty and nearly £8,000. (in contrast with £7,000.) for depreciation, the accounts for the year to January 31 show an available balance of £35,000., in contrast with £32,305. Twelve months ago the preference dividend was paid for three years, clearing off the arrears, and £5,000. was written off suspense account, reducing it to £15,000. It is now proposed to pay the six per cent. preference dividend, less tax, for the past year, to write off the balance of the suspense account, and to carry forward £15,000., against £10,261. The report states that since the war, in consequence of the heavily increased costs, the decline in demand and market price, and the bad state of the machinery, making manufacture impracticable, work was stopped in March, and to prevent dissipation of assets the voluntary liquidation of the company is now proposed.

United Premier Oil and Cake Company, Ltd.

Statutory report states that the following is an abstract of the receipts and payments to August 7:—Receipts.—Cash received in respect of 376,438 7 per cent. cumulative preference shares, £372,716.; in respect of £400,000. 6 per cent. debenture stock, £383,356.; sundry dividends, £832.; sundry receipts, £49.; total, £756,954. Payments.—On account of purchase consideration, £682,653.; investment, £1,758.; interest on purchase consideration, £17,346.; underwriting commission and brokerage, £38,701.; sundry expenses, £12.; cash at bankers, £16,482. The preliminary expenses, other than underwriting commission and brokerage shown above, were estimated at £25,000, and have been borne by the vendors.

J. and J. Cunningham, Ltd.

The report for the year to June 30 states that the directors have increased the nominal capital to £500,000. by the issue of 10,000 new ordinary shares of £10. each, paid from reserves. The balance of profit, including brought in, amounts to £31,789., and, after paying preference dividend to December 31, 1918, and interim dividend on the ordinary shares and settling £27,000. to reserve, there remains a disposable balance of £44,289. The directors allocate £4,500. for preference dividend to June 30, £16,500. in payment of a further dividend (free of tax) on the ordinary shares, which now amount to £220,000., and in carrying forward £23,287.

DIVIDENDS.

AEERTHAW AND BRISTOL CHANNEL PORTLAND CEMENT COMPANY, LTD.—Interim dividend for the past half-year at the rate of 10 per cent. per annum, free of income tax.

ELECTRO BLEACH AND BY-PRODUCTS COMPANY, LTD.—Interim dividend of $3\frac{1}{2}$ per cent. on the preference shares.

BRADFORD DYERS ASSOCIATION, LTD.—Dividend on ordinary shares for half-year to June 30 last at the rate of 7 per cent. per annum.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

(SPECIALLY CONTRIBUTED.)

THE fact that though Cumberland and North Lancashire hematite pig-iron makers are now in the market to sell their production to the end of the year they have not advanced prices is an indication that the demand for iron is abating somewhat, and that even if requirements are sufficient to enable them to maintain their 26 furnaces in blast the volume of business will not be quite so torrential in character as between April and July. There is not, however, any apprehension entertained that events will compel any reduction in output, and that being so the by-product coke oven industry should be able to remain working at two-thirds of its capacity for the rest of the year. Whether activity in coking can grow any greater depends largely upon the state of the steel rail trade. There is a steady proportion of low phosphorus brands of iron, and East Coast supplies of coke to the Furness district are maintained at 15,200 tons, and to East Cumberland at over 9,000 tons per week. The make of by-products is a trifle smaller this week. Benzole and sulphate of ammonia alone are being fully absorbed; creosote depends to some extent upon new tonnage; pitch is firmer since it began to be exported; and naphthalene is dull. A portion of the chemical works' plant is idle.

FERTILISER NEWS.

(SPECIALLY CONTRIBUTED.)

Spanish Fertiliser Trade.—The movement in Spanish fertilisers is rather peculiar. Both in 1918 and 1919, taking the first four months of the respective years, there was practically no business whatever in superphosphate or Thomas ash and other mineral fertilisers. On the other hand, there is an enormous relative increase in the importation of nitrate of soda. Thus the importations for January-April inclusive, 1918, made only 8,213 tons, but the corresponding figures for this year make 41,978 tons.

Russian Fertilisers.—The Russian Soviet Government are painfully conscious of the lack of manures for the fields and have undertaken a careful inquiry into the requirements on the one hand and the possibilities of satisfying the soil on the other, and have concluded that Russia can neither provide the requisite fertilisers from her own resources nor from the outside within a reasonable time, owing largely to the lack of transport facilities as far as outside supplies are concerned. However, it is stated that they have sent a deputation to the Skoda Works to become acquainted with the Meiner process for producing synthetic nitrogen.

Sulphate of Ammonia.—A substantial drop in coal production occasioned by the recent coal strike has been noted with regret by users of sulphate of ammonia, as it certainly means a temporary reduction in the make of that important fertiliser. Probably the export trade will feel it most of all, and in these days when the foreign exchanges are so heavily against us anything that tends to lower exports is indubitably bad. Financial and business connections at present can ill-afford even a setback of this sort, and the opinion is widely expressed that nothing must happen now to interfere with the manufacture of fertilisers here. Further news from America mentions that there is no difficulty in obtaining what supplies of sulphate of ammonia are needed on the Pacific coast. The situation there is satisfactory and no special activity is expected until after August.

Potash.—Cheap potash manures are reported to be unobtainable in this country although supplies of dearer sorts are offered. Sulphate of potash in particular is declared to be an extremely restricted trade, the price making its application unprofitable for all ordinary crops. With regard to the American potash situation, the market is stagnant at present. The domestic producers in the United States certainly fear unrestricted imports of German potash. If these are allowed, they say, American producers will be forced to abandon their plants and cut their losses. With competition wiped out and the German potash monopoly re-established, Germany will charge for her potash all the traffic will bear and the American potash men are making the most of the propaganda based upon this. It is not held on the other side that the competition of the French-owned Alsatian deposits will force German profits to a reasonable figure. This may happen, say the experts, in years to come, but not yet.

Basic Slag.—This material is in particular request, especially, apparently, the 22 per cent. material at £3. 10s. 0d. per ton. Fears are expressed that the season's production will not be sufficient to satisfy all the agricultural customers who are pressing their orders. Higher prices are looked forward to as likely and it is contended that farmers will pay any moderate advance without resentment in view of the favourable position of their own industry.

Other Fertilisers.—Bone meals have a fair sale. Some pure steamed bone meal is offered at £13. per ton, but East Indian is still very scarce. Large arrivals are promised from India from time to time but they do not mature. Bristol quotes some bone meal at £15. 10s. 0d. per ton. For indifferent qualities as little as £9. has been asked. Dried blood is in short supply with prices firmly held. Shipment figures are given as high as 30s. per unit for ammonia and 2s. 6d. for phosphate. Tankage values are also increasing. For shipment 27s. 6d. per unit for ammonia and 2s. 6d. for phosphate is quoted. Fish meal is in good demand at similar prices. Some supplies of high quality fish guano at £18. per ton are also notified. A new company with a nominal capital of £40,000. has been formed to carry on amongst other vocations, the manufacture of fertilisers in Oxfordshire.

LEGAL INTELLIGENCE.**Bankruptcy Examination.**

At the London Bankruptcy Court on Tuesday last, the public examination was held of Richard Maloney, of 11, Aberdeen Park, Highbury, N. The statement of affairs filed by the debtor showed gross liabilities amounting to £5,293. 15s. 9d. of which £1,468. 15s. 9d. was due to unsecured creditors, and £3,825. to partly secured creditors. The assets amounted to £71., thus leaving a deficiency of £5,222. The Receiving Order was made on July 2, on the petition of creditors, the act of bankruptcy being the failure of the debtor to comply with the requirements of a bankruptcy notice.

In reply to questions put by the Official Receiver debtor stated he was a solicitor by profession, but in March, 1917, he became interested in certain secret processes for the manufacture of glaze and enamel, and in December of that year he agreed to purchase a two-fifths interest in the process for £4,000. The £4,000. was payable as to £3,000. in cash and the balance in fully paid shares in a company which it was proposed to form to acquire one of the processes with a nominal capital of £100,000. He actually paid £2,350. mainly with borrowed money. No company was floated, and he had latterly been employed by another London solicitor at a remuneration of four guineas per week. He attributed his insolvency to loss in connection with the secret processes the value of which he alleged was misrepresented, and to his liabilities for damages and costs in a libel action brought against him in November last. According to his deficiency account he had lost £5,040. in connection with the secret processes, which included £2,425. advanced by other persons. The terms under which he received the money were that he was to assign a portion of his interest in the processes to the lenders, so there was some question as to whether he was liable for those loans. If the company had been successful he would have received £40,000. in shares, and those who had lent him money would have received a substantial bonus. He had never failed before or made any arrangement with his creditors.

The examination was ordered to be closed.

SOUTH WALES NOTES.

(SPECIALLY CONTRIBUTED.)

The outputs of tinplates at the majority of factories operating are very satisfactory and show a slight increase on previous weeks. With cooler weather this improvement should be maintained. Export business is improving and manufacturers are now better able to make quotations for extended deliveries.

Much attention is being paid to the patent fuel business and investigations are taking place with a view to utilising the anthracite coals that abound in South Wales and which have hitherto only been used in small quantities in the manufacture of briquettes. Plant for properly preparing anthracite coal for the purpose is to be put down at several centres. The exports of patent fuel have been very good and it is believed that foreign business can be largely increased. The number of cargoes that have left Swansea—the chief centre of the trade—is much above the average, the principal destinations being St. Nazaire, St. Malo, St. Valery, Buenos Ayres, Havre, Antwerp, Genoa, Dieppe, and Rotterdam.

The demand for coke is much stronger and the ovens with their by-product plants are working well.

Sulphuric acid makers are active and the call for the acid is good. A cargo of 2,070 tons of iron pyrites arrived at Newport for Messrs. Chance and Hunt Ltd.

The progress made in the Clogau gold mines, Bontddu, has been satisfactory and the vein of gold discovered a few days ago is turning out better than was anticipated. Great developments are likely to take place and further miners have been engaged.

Basic slag is in good request. There have been several cargoes sent to Devonshire during the last few days.

FIRE.—Damage estimated at £30,000. was caused by a fire which occurred at Cox's Glue Works, Edinburgh, on Monday. The fire occurred during the dinner-hour, and as a result of it 150 employees will be thrown out of work for a time.

IMPORTS OF CHEMICALS AND ALLIED PRODUCTS.

(Concluded from page 178.)

ARTICLES.	QUANTITIES.		VALUE.		ARTICLES.	QUANTITIES.		VALUE.	
	Month ended		Month ended			Month ended		Month ended	
	July 31st.	July 31st.	July 31st.	July 31st.		July 31st.	July 31st.	July 31st.	July 31st.
	1919.	1918.	1919.	1918.		1919.	1918.	1919.	1918.
OILS :			£	£				£	£
Fish ; Train, Blubber, and Sperm tuns	12,253	8,924	860,447	580,631	SOAP : Soft Soap cwts.	85	—	133	—
Coco-nut, Unrefined cwts.	72,281	160,872	312,021	576,154	Household & Laundry Soap, in bars or tablets..... cwts.	8,971	—	20,543	—
Olive, Unrefined tuns	216	3	25,908	457	Polish'g & Scour'g ..	30	—	39	—
Palm (not including Palm Kernel Oil), Unrefined. cwts.	116,156	166,631	440,989	389,552	Powder	777	—	1,555	—
Petroleum :					Toilet	1,488	45	25,226	383
Crude gals.	23,289	—	355	—	Unenumerated ..	19,586	—	37,984	—
Lamp Oils	14,744,369	10,534,659	543,458	656,708	STARCH, DEXTRINE, AND FARINA OR POTATO FLOUR :				
Motor Spirit	14,419,829	20,584,831	1,129,724	2,057,664	Flour :				
Spirit, other than Motor Spirit ..	—	—	—	—	Rice Starch cwt.	1,253	3,020	3,850	12,016
Lubricating Oils ..	3,959,861	9,047,94	388,797	848,340	Other kinds Starch ..	191,745	9,572	328,133	33,499
Gas Oil	781,000	4,743,992	21,600	283,427	Dextrine, and Farina or Potato Flour ..	90,435	120,360	179,250	45,584
Fuel Oil	20,997,197	51,158,500	499,545	1,665,869	Total	283,433	132,952	511,233	491,099
Other Sorts	—	—	—	—	COPPER :				
Total of Petroleum ..	54,925,545	96,069,376	2,583,479	5,512,008	Regulus & Precipitate :				
Seed Oil :					From Portugal.. tons	—	—	—	—
Castor Oil tons	—	450	—	34,373	Spain	1,013	591	52,250	65,541
Cotton Seed Oil, Unrefined	185	—	15,500	—	U.S.A.	—	—	—	—
Linseed Oil :					Peru	—	—	—	—
Pure	—	—	—	—	Chile	43	22	1,900	1,500
Not Pure	—	—	—	—	Cape of Good Hope ...	—	—	—	—
Rape Seed Oil ..	243	—	31,535	—	Oth'r C'tries ..	6	605	450	59,590
Soya Bean Oil ..	7,356	—	555,909	—	Total	1,062	1,218	54,600	126,631
Other Seed Oils ..	374	—	39,028	—	COPPER ORE :				
Turpentine cwt.	61,269	676	226,321	3,852	From Spain tons	—	43	—	1,000
SOAP STOCK	782	—	1,486	—	Chile	442	16	16,240	1,200
STEARINE :					Cape of Good Hope ...	207	—	6,200	—
From Belgium ..	—	—	—	—	Australia ..	—	—	—	—
Oth'r C'tries..	12,229	92	65,709	414	Oth'r C'tries ..	459	153	16,681	9,580
TALLOW (including VEG-ETABLE TALLOW), Unrefined :					Total	1,108	212	39,121	11,780
From China cwt.	22,853	—	91,970	—	MANGANESE ORE tons	12,679	31,939	132,263	318,996
U.S.A.	5,807	—	21,633	—	PYRITES of Iron and Copper	41,966	98,290	128,999	332,555
Uruguay ..	10,840	—	47,492	—	SILVER ORE val. £	—	—	24,384	12,408
Argentine Republic ..	52,091	2,587	238,148	10,067	TIN ORE :				
Australia ..	147,059	800	612,616	2,879	From S. America tons	891	2,136	100,335	324,318
New Zeal'd ..	51,609	—	219,672	—	Brit. S.A.	—	—	—	—
Other C'tries ..	1,672	—	6,440	—	Oth'r C'tries ..	850	468	100,357	68,249
Total	291,931	3,387	1,237,571	12,946	Total	1,741	2,604	200,692	392,567
GUM :					LEAD, PIG and SHEET :				
Arabic cwt.	17,423	42,501	53,225	167,779	From Spain tons	2,394	—	82,363	—
Kauri	7,214	—	22,505	—	U.S.A.	3,795	9,423	112,177	308,553
Lac-dye, Seedlac, Shellac, and Sticklac ..	9,615	9,482	186,108	113,132	Mexico ..	29	—	690	—
ROSIN	30,310	38,479	50,859	90,462	Australia ..	3,460	2,786	78,757	80,921
CEMENT for Building and Engineering purposes tons	3	—	81	—	Oth'r C'tries ..	3,302	16	102,221	480
GLUE, SIZE, and GELATINE..... cwt.	6,301	4,895	40,803	48,622	Total	13,480	12,225	376,208	389,954
OIL-SEED CAKE, not sweetened :					QUICKSILVER lbs.	381,987	—	106,764	—
Cotton-seed Cake tons	10,583	—	100,738	—	TIN, in Blocks, Ingots, Bars, and Slabs :				
Linseed Cake ..	6,176	—	143,829	—	From Straits Settlements tons	1,938	758	478,966	258,170
Unenumerated ..	411	—	8,183	—	Australia ..	155	—	38,610	—
Total	17,170	—	352,750	—	Oth'r C'tries ..	36	—	8,425	—
PARAFFIN WAX . cwt.	109,320	109,273	241,424	327,183	Total	2,129	758	526,001	258,170
					ZINC :				
					Crude in cakes ..	6,831	2,340	280,772	122,698

NEW COMPANIES.

Simplex Construction Company, Ltd.—Registered August 2. Capital £120,000., in 200,000 ordinary shares of 10s. each and 400,000 deferred shares of 1s. each. Objects: To enter into an agreement with J. Thame, the Chemical Engineering Corporation, Ltd., and O. R. Mounsey, and to carry on the business of contractors, builders, civil, electrical, constructional, mechanical, chemical, mining, and general engineers, etc. Registered office: Parliament Mansions, Victoria Street, S.W.

Western Development Company, Ltd.—Capital £25,000., 5s. shares. Object: To treat and deal in lead, zinc, copper, silver and other ores, metals and mineral substances, etc. Registered office: Broad Street House, Old Broad Street, E.C.

Antoine Chiris, Ltd.—Private company. Capital £20,000., £1. shares. Perfumers, soap makers, etc. Office: 3, Draper's Gardens, E.C.

Baltic Wharf Chemicals, Ltd.—Private company. Capital £15,000., £1. shares. Object: To acquire from the East Stratford Works, Ltd., the benefit of certain existing inventions in relation to improvements in the manufacture of permanganates, etc. The directors are to be appointed as follows: One by the East Stratford Works, Ltd., one by the Saccharin Corporation, Ltd., and one by Spencer, Chapman and Messel, Ltd. Office: 36, Mark Lane, E.C.

Chas. Orme and Co., Ltd.—Private company. Capital £16,000., £1. shares. Drysalers, manufacturers of and dealers in polishes, paints, driers, colours, oil, varnishes, distempers, etc. Solicitors: Venn and Woodcock, 14, South Square, Grays Inn, W.C.

Colmans, Ltd.—Private company. Capital £2,000., £1. shares. Chemists, druggists, drysalers, oil and colourmen, etc. Registered office: 9, Brunswick Street, Cheetham, Manchester.

Eastern Counties Bone Products Company, Ltd.—Private company. Capital £20,000., £1. shares. Directors: A. G. Shirling-Rooke and W. T. Powling. Registered office: Duxford Works, Duxford, Cambs.

Hemingway's Chemical Processes Company, Ltd.—Private company. Capital £30,000., £1. shares (25,000 6 per cent. non-cumulative preference). Objects: To carry on the business of colour, paint, and varnish manufacturers at Marsh Gate Lane, Stratford; also to carry on the business of chemical and insecticide manufacturers, copper makers, tin and other metal recoverers, metallurgists, electric depositors, etc. Qualn £500. Registered office: 15, Seething Lane, E.C.

John Peak and Co., Ltd.—Private company. Capital £30,000., £1. shares. Object: To take over the business carried on by J. Peak and H. Peak at Bridgewater Chemical Works, Wigan, as "John Peak and Co." Registered office: Soho Street, Newtown, Wigan.

London Polish Company, Ltd.—Private company. Capital £5,000., £1. shares (4,800 ordinary and 200 management). Office: 104, Great Russell Street, W.C.

Philippe Lentendu and Co., Ltd.—Private company. Capital £800., £1. shares. Manufacturers of and dealers in drugs, chemicals and anatomical, orthopaedic and surgical instruments, etc. Registered office: 3-4, Chichester Chambers, Chichester Rents, Chancery Lane, W.C.

Poli-varn, Ltd.—Private company. Capital £4,000., £1. shares (1,500 preference). Object: To take over the business of manufacturers of and dealers in "Poli-varn" boot, furniture, and linoleum polishes, "Scourine," "Scouto," metal polish, soap pastes, and other preparations. Registered office: Rear of 46, John's Hill Grove, Battersea, S.W. 11.

Printers' Bronze Powder Company, Ltd.—Private company. Capital £10,000., in 5,000 6 per cent. cumulative preference shares of £1. each and 100,000 ordinary shares of 1s. each. Solicitors: James Turner and Sons, Dunedin House, Basinghall Avenue, E.C.

Sulphus Chemical Company, Ltd.—Private company. Capital £5,000., £1. shares. Object: To acquire from T. B. Greenwood the benefit of certain inventions in relation to the "Sulphus" ammoniated wool scours, soap and disinfectants, chemical manures and soda ash, etc. Office: Manor Works, Eccleshill, Bradford.

A. Macaulay and Co., Ltd.—Private company. Capital £6,000., £1. shares. Object: To acquire and take over the business of A. Macaulay and Co., metal merchants and refiners, Moorpack Smelting Works, Renfrew.

(Advs. continued from page v.)

Plant, Apparatus, and Materials For Sale.—continued.

HORIZONTAL Air Compressor, Ingersoll-Sergeant, duty 342 c.f. of free air per minute at 100lb. pressure; also Horizontal Belt-driven Compressor, 12in. x 24in., with fly-wheel and outer bearing.—Harry H. Gardam and Co., Limited, Staines.

WOODEN Vessels of every description, New or Second-hand; all shapes, dimensions, and capacities. We have on hand the largest stock in England, and firms requiring anything in this direction are kindly invited to write for particulars, etc., to Henry Roberts and Co., Vat and Back Makers, Atlantic Wharf, Stratford, London, E.

PLANT and Machinery of every description in stock at our works and for immediate delivery, including Boilers, Steam, Gas, and Oil Engines, Generating Sets, Dynamos, Motors, Pumps, Tanks, etc.; and firms requiring plant at once should address their inquiries to Harry H. Gardam and Co., Ltd., Engineers, Staines. Telephone: Staines 98.

THREE Cochrane Vertical Boilers, 11ft 3in. x 5ft. diameter, 150lb. working pressure; brand new as delivered from makers, and for immediate delivery.—Harry H. Gardam and Co., Ltd., Staines.

HORIZONTAL belt-driven Vacuum Pump, cylinder 18in. x 18in. stroke; fast and loose pulleys, 5ft. diameter; done little work.—Box "F.C.C.," Chemical Trade Journal Office, 265, Strand, London, W.C. 2.

TWO Horizontal Mixers, by Christy and Norris, 7ft. 6in. long, 8ft. 9in. deep, by 4ft. 6in. wide, constructed of jin. steel plate, with heavy mixing gears, fitted fast and loose pulleys, 34in. by 6in. face; almost new.—Box "E.V." Chemical Trade Journal Office, 265, Strand, London, W.C. 2.

Plant, Apparatus, and Materials For Sale.—continued.

STEAM-DRIVEN Centrifugal, by Manlove, Alliott, 54in. basket; also small 26in. belt-driven Centrifugal.—Box No. "8,178," Chemical Trade Journal Office, 265, Strand, London, W.C. 2.

TWO Oil Engine-driven Compressor Sets, each comprising a 33B.H.P. Campbell Vertical Engine, coupled to Broome and Wade Air Compressor, 100c.f. at 500lb. pressure, with complete set of spares for engines and compressors in each case; brand new, as delivered from makers; exceptional opportunity, as these sets are available for immediate delivery, and will be offered below actual cost; full particulars on request.—Harry H. Gardam and Co., Ltd., Staines.

CARRAGHEEN (IRISH) MOSS.—Stocks always on hand in English warehouses.—Samples and particulars from J. W. Cumming and Sons, Clonliffe, Dublin. Telegrams: "Cumming, Dublin."

Miscellaneous.

GRINDING of every description of Chemical and other materials for the trade, with improved mills.—Thos. Hill-Jones, Ltd., "Invicta" Mills, Bow Common Lane, London, E. Telegrams: "Medikaster, London." Telephone: 3653 East.

George Ellison FOR **ELECTRIC CONTROL GEAR**
BIRMINGHAM

CHEMICAL PROCESSES

DEVELOPED.

Suitable Plant

Designed,
Erected and
Started

BY EXPERT STAFF.

DAVIS BROS.,

66, Deansgate, Manchester.
265, Strand, London, W.C. 2.

CHINA CLAY,

Barytes, French Chalk,
Whiting, Ground Chalk, &c.

WINNER & CO., 312, Deansgate, MANCHESTER.

EXPORTS OF CHEMICALS AND ALLIED PRODUCTS.

(Concluded from page 179.)

ARTICLES.	QUANTITIES.		VALUE.		ARTICLES.	QUANTITIES.		VALUE.	
	Month ended		Month ended			Month ended		Month ended	
	July 31st.		July 31st.			July 31st.		July 31st.	
	1919.	1918.	1919.	1918.		1919.	1918.	1919.	1918.
OILS, Refined :			£	£	OIL-SEED CAKE, not			£	£
Coco-nut cwt.s.	1,870	—	5,330	—	sweetened :				
Cotton-seed tons	8	—	1,182	11	Cotton-seed Cake tons	—	10	—	180
Olive tuns	6	—	2,004	—	Linseed Cake .. "	3	—	65	—
Palm cwt.s.	1,620	—	4,327	—	Rape-seed Cake .. "	—	—	—	—
Palm Kernel ... "	—	—	—	—	Soya Bean Cake .. "	—	—	—	—
Total val. £	—	—	12,843	11	Unenumerated .. "	2	—	31	—
OILS, Unrefined :					Total "	5	10	96	180
Coco-nut cwt.s.	4	—	10	—	PARAFFIN WAX . cwt.s.	16,479	—	47,276	—
Olive tuns	—	—	—	—	SOAP :				
Palm cwt.s.	4,028	—	11,229	—	Soft Soap cwt.s.	9,269	827	25,410	2,014
Palm Kernel ... "	17,526	—	46,962	—	Household and Laun-				
OIL, SEED :					dry Soap, in bars or				
To Netherlands tons	1,763	—	128,818	—	Tablets :				
" Belgium "	3,380	—	355,404	—	To China cwt.s.	10,473	3,903	28,376	11,701
" Brazil "	16	—	1,521	—	" Other Foreign				
" Egypt (includ-					Countries ... "	121,926	30,703	399,932	84,978
ing Anglo-					" British South				
Egyptian					Africa "	62	31	187	71
Sudan) "	36	—	3,692	—	" British East				
" British India "	70	8	7,401	473	Indies "	12,874	20,746	34,901	56,938
" Straits					" Other British				
Settlements .. "	39	—	3,939	—	Possessions .. "	18,974	36,997	53,245	92,641
" Ceylon "	—	—	48	—	Total "	164,309	92,380	516,641	246,329
" Australia ... "	69	—	5,810	—	Polishing and Scouring				
" Canada "	137	—	11,874	—	Soap cwt.s.	223	356	572	881
" Oth'r C'tries "	4,458	302	438,013	27,414	Soap Powder ... "	4,859	593	11,361	908
TOTAL :					Toilet Soap "	10,352	6,234	102,017	61,289
Castor-seed Oil .. "	366	250	37,177	23,875	Unenumerated .. "	365	262	1,326	1,273
Cotton-seed Oil :					Total of Soap .. "	189,377	100,652	657,327	312,694
Unrefined ... "	322	—	19,585	—					
Linseed Oil :									
Pure "	7,082	52	721,959	3,476					
Not Pure "	261	—	22,116	—					
Rape Seed Oil .. "	1,565	8	132,618	536					
Soya Bean Oil .. "	50	—	4,789	—					
Other Seed Oils .. "	322	—	18,276	—					
Total "	9,968	310	956,520	27,887					
CANDLES :									
To British South									
Africa cwt.s.	9	—	64	—					
" Other C'tries "	13,096	429	74,626	2,290					
Total "	13,105	429	74,690	2,290					
CEMENT for Building &									
Engineering purposes :									
To Netherlands tons	6,779	—	21,051	—					
" U.S.A. "	—	—	—	—					
" Brazil "	2,098	—	12,690	—					
" Argentine									
Republic ... "	4,985	1,10	28,647	5,035					
" British South									
Africa "	148	—	844	—					
" British East									
Indies "	6,770	19	37,169	633					
" Australia ... "	358	2	2,025	39					
" New Zealand .. "	—	—	—	—					
" Canada "	—	—	—	—					
" Other C'tries .. "	10,672	1,733	62,334	7,875					
Total "	31,810	2,854	164,760	13,582					
GLUE, Size, and									
Gelatine cwt.s.	9,486	931	44,957	11,644					

WORRIED !

THE following extracts from a letter alleged by the *San Francisco and Pacific Druggist* to have been addressed to a revenue collector would appear to indicate that even across the Atlantic, life has its little ups and downs.

"I have been held up, held down, sand bagged, walked on, sat on, flattened out and squeezed, first by the United States Government for the federal war tax, the excess profits tax, the Liberty Loan bonds, for the state, county and city highway tax, and the auto tax and the syntax and by every society and organisation that inventive mind of man can invest to extract what you may or may not possess; from the Society of John the Baptist, the G.A.R., the Woman's Relief, the Men's Relief, the Stomach Relief, the Navy League, the League of Nations, the Red Cross, the Iron Cross, the Double Cross and every other cross of all colours until I feel that I am cross myself, and the Y.M.C.A., the Y.W.C.A., the Old Folk's Home, the Children's Home, the Orphan Society and every hospital in town.

"The Government has so governed my business that I don't know who runs it. I am inspected, suspected, examined and re-examined, informed, required and commanded so I don't know who I am, where I am or why I am here.

"All I know is that I am supposed to be an inexhaustible supply of money for every human need, desire, or hope of the human race; and because I will not sell all I have and go out and beg, borrow, or steal money to give away I have been cursed, discussed, talked to, talked about, lied to, lied about, held up, hung up, robbed, and nearly ruined; and the only reason I am clinging to life is to see what in h— is coming next!"

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THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

The specifications of the following applications are not printed by the Patent Office until the complete specifications have been accepted.

August 11th to 16th (inclusive).

Removing Amatol from Shells, etc., for Recovering the Ammonium Nitrate. Arnot, J. W.; and Beakbane, C. F. 19,969.
Recovery of Valuable Products from Gases Evolved in Destructive Distillation of Coal, Shale, etc. Bury, E.; and Skinningrove Iron Company. 20,157.
Alkaloids. Chemische Fabrik vorm. Sandoz. 20,223.
Artificial Silk. Clayton, J. 19,802.
Electrolyte for Deposition of Iron. Coles, S. O. Cowper-. 20,096.
Treatment of Pitch Materials, etc. Craig, T. J. I.; Hood, J. J.; and Spence and Sons, P. 20,153.
Lubricating-oil Purifying and Reclaiming Systems. De Laval Separator Company. 19,904.
Treatment of Emulsions, etc. Edser, E.; and Minerals Separation, Ltd. 19,797.
Purification of Benzole, etc. Evans, E. V.; Hollings, H.; and South Metropolitan Gas Company. 20,217.
Kilns for Pyrites. Fairrie, J. L. 19,978.
Production of Urea or Ammonia from Cyanamide. Giertsen, S. 20,021.
Fermentative Preparations. Groll, M. 19,830.
Mixture of Nitrogen and Hydrogen. Hanna, G. F.; and Major, J. L. 20,124.
Electrolytic Tinning, and Electrolytic Fluid for Same. Harbeck, E. 20,216.
Composition for Coating Iron, Steel, and Wood. Holzappel, A. C.; and Walther, P. 20,174.
Lubricants, Anti-scouring Agents, etc. Hood, J. J.; Spence, H.; and Spence and Sons, P. 20,152.
Nitration of Oils. Howsa, G. H. 20,192.
Aluminium Tinning and Soldering. Laird, W. B. Johnson-. 19,984.
Conversion of Heavy Hydrocarbons into Lighter Hydrocarbons. Lamplough, F.; and Synthol, Ltd. 20,132.
Nitrogen Products. Lundén, H. L. R.; and Thorsell, C. T. 20,042.
Utilisation of a Waste Sulphite of Soda and of its Derivatives in Manufacture of Soaps. Morel, J. 19,901.
Converting Paraffin into Acids. Pardubitzer Fabrik der Akt.-Ges. für Mineralöl-Industrie vorm. D. Fanto and Co. 19,822, 19,823, 19,921, and 20,023.
Oxidising Paraffin to Acids. Pardubitzer Fabrik der Akt.-Ges. für Mineralöl-Industrie vorm. D. Fanto and Co. 19,824.
Treatment of Ores by Flotation. Partington, J. W.; Taylor, M. T.; and Vivian, G. T. 19,715.
Removal of Sulphur from Gases. Rambush, N. E. 19,702.
Classifying and Concentrating Apparatus for Minerals, etc. Richardson, W. W. 19,734.
Aluminium Solders. Soc. Anon. des Laminiers et Cablerie. 19,750.
Distillation of Heavy Hydrocarbons. Steinschneider, L. 20,022.
Extraction of Fatty and Oily Matters from Wet Sludges. Stephens, A. J. (Shorples Speciality Co.). 19,739.
Producing Cakes of Solid Crude Paraffin Residue. Szekeley, A. 19,727.
Removal of Free Fatty Acids, Deodorising and Refining Oils, and Fats. Vakil, K. H. 19,701.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 6d. in stamps to the Comptroller, Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane, W.C.

1918.

Metal Chlorides. Heap, W.; and Newbery, E. 1,677 130,626
Acetic Aldehyde from Acetylene. Compagnie des Produits Chimiques d'Alais et de la Camargue. 3,589. 130,650
Preparation of Acetic Acid by Means of the Oxidation of Acetaldehyde. Compagnie des Produits Chimiques d'Alais et de la Camargue. 3,590. 130,651
Acetic Anhydride. Dreyfus, H. 3,797. 130,660
Nitrated Cellulose Products. Thomson, W. B.; Severn, W. D.; and Twycross, G. 4,029. 130,665
Manufacture of Acetone and Butyl Alcohol by Fermentation. Ricard, E. 4,047. 130,666
Treating Material with Gas or Vapour. Slocum, F. L. 4,453. 130,680
Vaporisation of Liquid Gases for Maintaining a Supply of Gas. Dibdin, R. A. 4,526. 130,686
Fixation of Nitrogen. Fearson, R.; and Parkes, H. C. 4,623. 130,693
Fuel Oils. Tinker, F. 4,757. 130,699
Hydrogen-gas Plants. Dempster, R. and J.; and Ballingall, J. M. 4,802. 130,701
Preparations Containing Colloidal Copper Compound for Fungicidal and Like Purposes. Mond, R.; and Heberlein, C. 7,576. 130,709
Sulphuric Acid. Quinan, K. B. 8,322. 130,712
Impregnation or Charging of Porous or Permeable Substances or Materials with Liquid or Plastic Materials. Carter, J. E.; Wright, S. A.; and Ratcliffe, W. 12,457. 130,731
Gas-analysing Apparatus. Egnell, Aktiebolaget Ingeniorsfirma F. 12,483. 118,112
Gas-analysing Apparatus. Egnell, Aktiebolaget Ingeniorsfirma F. 12,583. 118,114
Treatment of Textile Fibres and Fabrics and Other Porous or Absorbent Substances to Render Same Less Inflammable. Spence and Sons, P. and Craig, T. J. I. 12,683. 130,743

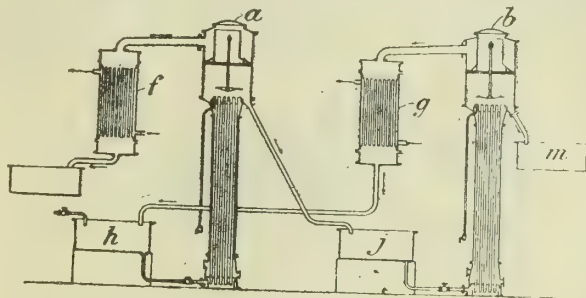
Drying Powdered Material. Ionides, A. C. 12,760. 130,755
Electrolytically Separating Nickel from Copper. Guess, G. A. 13,231. 118,629
Concentrating Ores. Ferguson, A. 15,598. 130,838
Strontium Peroxide. Pierce, J. B. 15,691. 130,840
Sodium Permanganate. Tyrer, D. 16,446. 130,844
Freeing Liquids from Particles Suspended Therein. Titan Company. 17,811. 121,457
Caoutchouc Substances. North British Rubber Company (Goodyear Tire and Rubber Co.). 17,968. 130,857
Composition for Cleaning Condenser Tubes. Urruty, J. 18,343. 121,590
Artificial Fuel Composition. Dalton, R. F. 19,645. 122,402

1919.

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Fractional Distillation. A. G. Green and Levinstein, Ltd., Manchester. British Patent, 128,362, of 1918.

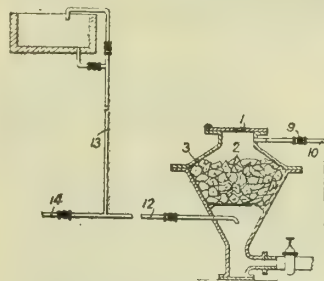
Evaporators of the "climbing-film" type are used for the separation of liquids by fractional distillation. In the arrangement shown, the mixture to be treated passes from a tank *h* to the evaporator *a*. The vapour passes to a condenser *f*, and the unevaporated liquid to a tank *j*. From



the tank *j* the liquid passes to a second evaporator *b*, the vapour from which passes to a condenser *g*, the condensate passing to the feed-tank *h* connected to the evaporator *a*. The unevaporated liquid from the evaporator *b* passes to a tank *m*. A system for separating three liquids also is described.

Preparing Solutions. F. W. Thorold and J. M. Sinclair, Toronto, Canada. British Patent, 128,531, of 1918.

In an apparatus for dissolving chemicals under pressure, the chemical 2 may be supported within a container 3, which is closed by a liquid-tight door 1. Solvent under pressure



is introduced through a pipe 10 having a needle or other regulating-valve 9. The solution is forced by the pressure of the incoming solvent through valve-controlled pipes 12, 13, 14, etc., to desired destinations. In one application of the invention, the chemical is aluminium sulphate, and the pipe 10 is connected to a commercial water supply. A filter or strainer may be placed in the path of the solvent to remove sediment, etc. The apparatus may be used to prepare a solution of bleaching-powder, lime solutions for tanneries, brine solutions for canning factories, inks or dyes, etc. The container may be of glass for use by druggists or manufacturing chemists.

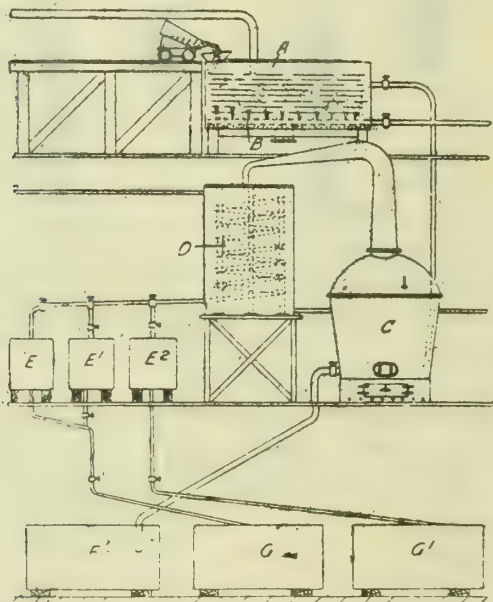
Treating Metal Surfaces. Imperial Trust for the Encouragement of Scientific and Industrial Research, Institute of Metals, G. D. Bengough, and O. F. Hudson, London. British Patent, 128,297, of 1917.

The surfaces of copper or copper alloys are provided with a protective coating by heating the article to a temperature not exceeding 450° C. in contact with an oxidising medium such as air, or an oxidising atmosphere, or a liquid such as a permanganate solution or a solution of a carbonate containing also dissolved air. For example, a brass condenser tube may be heated to 200-400° C., and the resulting oxide surface

may be improved by a light drawing operation. The oxide may be converted into an oxy-salt by exposure to the atmosphere, or by subjecting the article to the action of water or a saline solution, or a solution of a carbonate into which steam is passed. The oxidation and conversion into oxy-salt may be effected in one operation. In the case of a copper-zinc alloy, the surface may be first enriched in copper by removing some of the zinc by means of acid or a copper solution.

Refining Oils. J. B. Carper, London. British Patent, 128,326, of 1918.

In refining mineral and tar oils, the oil is distilled, and the distillate is agitated in the cold with (1) a small proportion, say 1 per cent. of a solution of sulphuric acid, preferably of 60° Bé.; (2) a larger proportion, say 4 per cent., of a solution of sulphuric acid; (3) a solution of caustic alkali; and (4) pure soft water or petrol, water-white benzole, or other light spirit; the oil is then subjected to fractional distillation. The agitation during the chemical and washing treatment is effected by means of cold compressed air, and the oil is allowed to settle after each agitation. The process is applied to spent oils from the washing of coal-gas for the recovery of benzole and toluol, or to sharp, middle, creosote, naphtha, paraffin, cracked, and other oils. In one form of the process the oil is first distilled up to 300 or 325° C., and after the chemical treatment, distillates collecting up to 180° C., at 180-225° C., and at 225-360° C., are obtained. The light distillate is

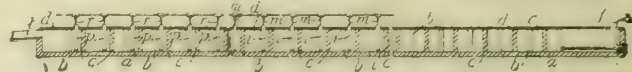


mixed with, say, 25 per cent. of benzole, petrol, or other light oil, and the mixture is distilled up to 175-180° C. to produce a motor fuel; the product may be redistilled up to 135-145° C. The middle distillate may be redistilled or not, and used as a Diesel-engine fuel. The heavy distillate may be used as a paint. In a modification, the original oil is fractionally distilled, and the distillates collecting up to 195° C., at 195-210° C. and at 210-240° C., are mixed, and the mixture is subjected to the chemical treatment. In the subsequent fractional distillation, a motor spirit is collected up to 130° C., then light and heavy rubber solvents, and finally a heavy oil for use as a lubricant or fuel. The apparatus consists of a tank A in which the distilled oil is agitated with reagents by means of cold compressed air admitted by a pipe B, together with a distilling-apparatus, comprising a still C, condenser D, collectors E, E', E'', and storage or settling-tanks F, G, G'.

Picric Acid. Brookes Chemicals, Ltd., and N. Brooke, Lightcliffe, Yorkshire. British Patent, 128,303, of 1917.

Picric acid and other nitro-compounds are prepared by continuously feeding the reagents in proper proportions into a long trough of brick or other acid-resisting material covered in by detachable slabs; the reaction takes place in the first part of the length of the trough, and is completed in the middle portion by means of steam chambers or other heating means in that portion, while in the end portion of the trough the product is cooled by means of cooling-chambers, and is

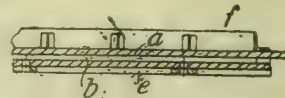
continuously discharged to filters. Using the apparatus shown in Fig. 2, nitric acid is fed to the trough *a* by a pipe *f*, phenol sulphonic acid and, if desired, waste acid being fed in by other pipes (not shown). The trough is provided with baffles *b*, *c*. In the middle portion of the trough, chambers *i* heated by steam-pipes *m* serve to heat the materials, while, in the end portion, cooling-chambers *q* supplied with cold water by pipes



r are provided; the cooled product flows off by a channel *t* to the filters. The trough is covered in by detachable slabs *d* of stone, concrete, etc. Nitrous gases evolved are led off by suitable pipes to a fume chamber. The materials in their passage through the trough are agitated by compressed air or by mechanical agitators. Direct steam boiling may be employed instead of the steam chambers.

Drying Trinitrotoluene. Clayton Aniline Company and A. Schedler, Clayton, Manchester. British Patent, 128,263, of 1917.

Trinitrotoluene is dried by causing it to flow in a molten condition through a heated tray long enough to effect the drying in one continuous operation, the trinitrotoluene being exposed in small quantities and for a short time only to the heat of the tray. The apparatus consists of a tray *a*, preferably inclined, with a steam-jacket *b* at its base. A packing *e* of asbestos or other insulating-medium is provided to minimise condensation. The tray is divided into compartments by walls *f*, which are perforated at the bottom so that the liquid can flow through, as well as over, the walls. The heating-surface of the tray may be corrugated or divided by ribs or cross-bars. Wooden baffles or a grillage may be laid in the tray to break up the flow of the liquid. In using a tray 10ft. long, the trinitrotoluene enters at 90-95° C. and leaves in a dry condition at 110° C.

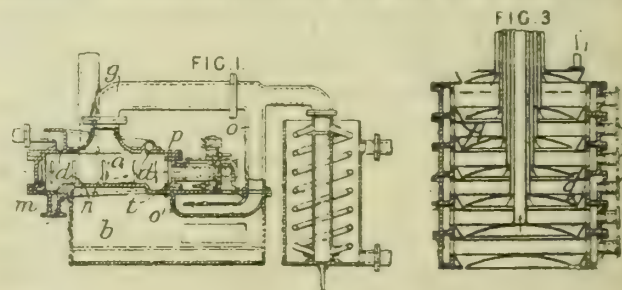


Catalysts. H. E. F. Gould-Adams, J. R. Partington, Lostock Gralam, Cheshire; and E. K. Rideal, Westminster. British Patent, 126,716, of 1917.

The catalytic oxidation of ammonia is effected by means of a catalyst prepared by gently heating a chromium salt of a volatile base such as ammonium bichromate or chromate. The resulting chromium oxide may be employed alone or with other oxides. The catalyst may be used in the form of blocks or pellets.

Distillation Apparatus. J. H. Corthesy and S. T. S. Castelli, London. British Patent, 127,690, of 1918.

The liquid to be treated is introduced in the form of drops or spray, which is given a whirling motion by means of tangential jets of vapour similar to that produced by the distillation. The upper end of a still *a* heated by a furnace *b* has holes *d* through which the liquid is fed. A fan *p* in a circuit *a, a'* withdraws vapour from the still outlet pipe *q*.



and forces it into the space *m* between an inner wall *t* and the outer wall of the still *a*. The vapour passes into the still through tangential slots *n* and imparts a rotary motion to the contents. The unvolatilised liquid passes out by a nozzle *f*. Fig. 3 shows a fractionating-still in which the vapour outlets are concentric, and each chamber has a separate nozzle *s* for the entry of vapour under pressure. The liquid passes from one chamber to another by way of slots or holes *q*.

Treatment of Catalytic Materials. E. B. Maxted and G. R. Ridsdale, Walsall, Staffordshire. British Patent, 127,025, of 1917.

In order to maintain the activity of catalysts and substances reacting with gases at high temperatures, vapour of an alkali-metal compound such as caustic soda or potash is added to the gases, for instance, by passing these over the compound heated to a temperature higher, say by 100° C., than the maximum employed for the reaction. An alkaline activator may also be added directly to the catalyst in known manner. Examples of processes to which the invention may be applied are: (1) The production of hydrogen by the interaction of carbon monoxide and steam in presence of iron, nickel, cobalt, or their oxides; (2) the synthesis of ammonia in presence of iron; (3) the production of hydrogen by alternately passing a reducing-gas and steam over iron oxide, the alkaline compound being added to either gas or both.

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Ammonium Sulphate. Soc. Industrielle des Produits Chimiques, Paris. British Patent, 127,549. Convention date, May 27, 1918.

Ammonia is removed from coke-oven and like gases by treatment with solution of sodium bisulphate at 70° C., with the production of sodium ammonium sulphate. The double salt is agitated at the boiling-point (111° C.), when anhydrous sodium sulphate precipitates, and is filtered off at 110° C., and the solution is cooled to 70° C. to obtain ammonium sulphate; or a solution of the double salt containing 15 parts of sodium sulphate to 100 parts of water is cooled to about 0° C., when hydrated sodium sulphate separates out, and the ammonium sulphate is obtained by concentration or by cooling; or the double salt is heated to 350–600° C. to obtain ammonia and sodium bisulphate, which is used again.

Cellulose Ester Solutions. H. Dreyfus, London. British Patent, 128,215. Convention date, March 4, 1914.

The following bodies are employed as solvents or camphor substitutes for cellulose acetates and other esters: (1) Benzyl alcohol or its substitution products—*e.g.*, chlorobenzyl alcohol—purified from benzaldehyde by means of sodium bisulphite, and also free from side-chain chlorination products (benzyl chloride, etc.); (2) other aromatic alcohols—*e.g.*, diphenylcarbinol; (3) acetophenone or *o*- or *p*-methylacetophenone, purified by means of sodium bisulphite; (4) alkyloxy derivatives of acetophenone, benzophenone, or their homologues—*e.g.*, methoxy- or ethoxy-acetophenone; (5) derivatives of acetophenone or benzophenone halogenated (chlorinated) in the benzene nucleus; (6) cyclohexanone or its homologues or derivatives—*e.g.*, methyl- or dimethyl-cyclo-

hexanone, or "cyclonaphthanone"; (7) alcohols corresponding with the cyclic ketones mentioned under (6). These solvents or camphor substitutes may be employed alone or together with methyl alcohol, ethyl alcohol, acetone, methyl acetate, mixtures of methyl alcohol and acetate, etc., in the manufacture of varnishes, films, celluloid-like masses, etc.

Magnesium Chloride. P. L. Hulin, Grenoble, France. British Patent, 128,327. Convention date, January 13, 1917.

In the process for dehydrating magnesium chloride in an atmosphere of hydrochloric acid gas, chlorine and hydrogen are caused to combine in proximity to the hydrated chloride, whereby the heat of the reaction dehydrates the chloride, the atmosphere of hydrochloric acid gas preventing formation of oxychloride. The temperature of the reaction may be reduced by using an excess of chlorine, or gaseous hydrochloric acid, preferably from the discharge outlet of the apparatus, may be mixed with the hydrogen and chlorine. The gaseous hydrochloric acid formed may be absorbed in water.

Hardening Lacs, Gums, Etc. W. W. Simonson and L. Van D. Blair, Chicago, U.S.A. British Patent, 127,825. Convention date, June 1, 1918.

In a process for indurating and toughening lacs and like resinous exudates, the natural lac is freed from impurities and then rendered wax-free by treatment in a usual manner with hot caustic soda, kaolin being kept as a clarifying agent. Induration is effected by mixing the clarified solution, having no free caustic soda, with lead acetate and sufficient water to precipitate in flakes a shellac-lead compound which, when washed and dried, is an indurated gummy product. To obtain a tough and further indurated product, this shellac-lead compound is heated and fused, and, if applied to an article in a fused state and heated, will adhere strongly thereto. Heating after fusion eliminates water, produces polymerisation or condensation, and increases the viscosity of the fused and adherence of the solidified compound. The shellac-lead compound may be mixed with wax-free shellac obtained by treating the clarified caustic soda solution with hydrochloric acid, and the mixture subjected to heat as described, the temperature of fusion of the mixture being varied by varying the proportions of the components and by the substitution of different metals for lead in the metallic derivative. Barium, calcium, magnesium, zinc, and other metals may be substituted for lead. The fluency of the compound may be varied by introducing inert substances such as talc and calcium sulphate. Charcoal may also be added to shorten the time necessary to secure the desired induration. The shellac-metal compound may be prepared by dissolving the shellac in alcohol or acetone, adding the desired metal hydrate, and evaporating the solvent. The indurated product, either before or after having been fused, may be mixed with a solvent and applied as a varnish.

MARKET REPORTS.

TAR AND AMMONIA PRODUCTS.

WEDNESDAY.

Benzole: London, 90%, 2s.; North, 1s. 10d. to 1s. 11d.; 50%, 1s. 10d.; North, 1s. 9½d., naked. Carbolic acid, crude, 60%, East and West Coast, nominally 1s. 5d. to 1s. 6d.; crystals, 39-40%, 8d. to 8½d. f.o.b. Crude tar, London, 45s. to 50s.; Midlands, 44s. to 46s.; North, 45s. per ton, ex works. Pitch 72s. 6d. to 75s.; East Coast, 65s. to 70s. f.o.b.; West Coast, 53s. to 55s., f.a.s. Solvent naphtha, naked, London, 90-100%, 2s. 5d.; North, 2s. 3d. to 2s. 4d.; 90-160%, naked, London, 2s. 1d.; North, 1s. 10d. to 1s. 11d. Crude naphtha naked, 30%, 9d.; North, 8d. to 8½d. Refined naphthaline, £16. to £18.; salts, £6. to £7. Toluol, naked London, 2s. 6d.; North, 2s. 5d. Creosote, naked, London 6½d.; North, 5½d. to 6d.; heavy oil, 6½d. to 7d. Anthracene, 40-45%, 7d. per unit. Cresylic acid, 95%, 2s. 7d. to 2s. 8d.; 97-99%, 2s. 9d. to 2s. 10d., ex works, London, and f.o.b. other ports. Sulphate of ammonia: home trade, £19. 10s. per ton; basis 24½%. Nitrate of soda, £21. to £22.

LONDON METAL MARKET.

THURSDAY.

Copper: Standard brands, £100. 15s. to £101. cash; £101. 15s. to £102. three months; electrolytic, £109. to £120. Tin: Standard, £274. 10s. to £275.; cash, £269. 10s. to £270. three months; Straits, £276.; English, £270. Lead:

Soft foreign, £24. 17s. 6d.; English, £26. Spelter, £40. 12s. 6d.; hard, £31. Antimony, English, regulus, 90% £42. Aluminium, £150. Nickel, £205. delivered, packages extra. Quicksilver £23. 10s. Bismuth, 12s. 6d. Platinum, 442s. per oz. Wolfram, 30s. per unit.

FERTILISER MATERIALS.

LIVERPOOL, THURSDAY.

Nitrate of soda is unchanged, the quotation on spot for 95/96% quality being £20. 2s. 6d. per ton cash, f.o.r., prompt delivery. East Indian Bone Meal for shipment is slightly easier, the nearest value of 4½% ammonia and 52% phosphate, September-October shipment, being £14. 10s. per ton, net cash, ex ship Liverpool. On spot Liverpool, holders require £15. per ton, net cash, for 4½% and 45% quality. Mineral phosphates: There is no alteration to report in this market and values are at present only nominal. Dried blood scarce, the value being about 30s. per unit of ammonia per ton, net cash.

MANCHESTER CHEMICAL MARKET.

THURSDAY.

The demand, generally, for heavy chemicals continues fairly satisfactory and values all round, with few exceptions, are steady in tone. Makers' quotations for caustic soda are unchanged, but a few resale parcels of 70% are on offer at £17.

per ton. 58% alkali is firm at £6. 15s. and refined bicarbonate of soda, bags, at £7. 10s. per ton. Bleaching powder still quiet at £15. for spot lots, softwood casks on rails. Chlorates are easier at 6½d. and 1s. per lb for soda and potash respectively. Bichromates unaltered at recent rates. Recovered rock sulphur £17. per ton on rails. Roasted saltcake firm at 60/- per ton carriage paid. There is still no sign of improvement in the export demand for copper sulphate and quotations are lower at £43. per ton f.o.b. Liverpool. Nitrite of soda firm at £59. per ton basis 100%. Phosphate of soda higher at £26. per ton. Commercial hypo-sulphite of soda unaltered at £16. 10s. per ton. Arsenic continues very scarce and £55. is quoted for odd small parcels. Yellow prussiate unchanged. Potash at 1s. 9d. and soda 7d. per lb. Carbonate of potash higher at £9. per ton for 85%. Lead salts are in active request: white acetate £85., brown £75. Lead nitrate £56. per ton. Acetic acid and acetate of soda are steady in price but there is not much inquiry. English brown acetate of lime in short supply and price firm at £11. per ton. Grey £17. 10s. to £18. per ton. Green copperas is moving off slowly and price easy at £4. 10s. in truck loads. Oxalic acid unchanged at 1s. 2½d. per lb.

TURPENTINE MARKET REPORT.

Messrs. James Watt and Son, Ltd., of 101, Leadenhall Street, London, E.C.3, report that the stocks of turpentine on August 16 were: American, 28,993 barrels, compared with 6,955 barrels at the corresponding date of 1918; French 45 barrels (14 barrels); and Spanish, 658 barrels (1,383 barrels). Deliveries during the week ended August 16 were 1,812 barrels, against 496 barrels last year, and since January 1 45,115 barrels, compared with 16,216 barrels in 1918. The price on Saturday last was 123s. per cwt., compared with 120s. at the corresponding date of last year. September-December delivery was quoted at 124s. 3d. and January-April (1920) 126s.

SWANSEA MARKET REPORT.

THURSDAY.

Prices of tinplates were practically unaltered at 35s. per standard box f.o.b. A stronger tone prevailed among copper buyers, and prices were harder but somewhat irregular, varying between £101. to £102. per ton cash and £98. 5s. three months. Tin in better call and slightly easier at £271. cash and £265. 10s. three months. Lead ruled steady with fair sales over next month at £26. per ton with immediate delivery at £25. for Spanish; English was unchanged at £26. Spelter very firm at £40. 10s. prompt and £41. three months. Zinc sheets dearer at £66. per ton f.o.b., at New York. Silver 59½ per ounce. Nickel £205. per ton including free delivery to London or equal. Quicksilver £23. 5s. 0d. per bottle. Antimony nominal, with English regulus 90% at £42. Aluminium £150. Sulphate of copper rather dull at £43. per ton and upwards for home purposes and £47. per ton in casks f.o.b. 5% for export business. Sulphate of ammonia steady at £19. 10s. 0d. per ton for delivery over current quarter; export business quiet. Nitrate of soda quiet, but steady at 21s. 9d. per cwt., in bags. Seed oils steady and in poor supplies. Palm oil rather dull, with Lagos and softs at £90. 10s., Benin £85., and hards £80. Petroleum in strong demand; American refined at 1s. 5½d. to 1s. 6½d. per gallon in casks. Turpentine quiet at £6. 4s. 0d. per cwt. net. Arsenic in better request at £48. 10s. 0d. per ton, for white powdered in bags f.o.b. Oxalic acid 1½d. per lb. Bone meal slightly cheaper at 15/9 per cwt. Pitch dealer at 53/6 per ton at works.

LIVERPOOL CHEMICAL MARKET.

THURSDAY.

A very fair inquiry for chemicals has been experienced, the strong undercurrent of business maintaining its flow, despite the many temporary interruptions and menaces that have affected one branch of industry and another, within the past three weeks. Irresponsible strikers and disturbers of the peace are learning a salutary lesson, by finding that a strike or a riot hits the wage earners as hard as anyone, and that strike doles of eight or nine shillings a week are no sort of equivalent for three, four, five, six or more, pounds a week; with prices as they now are. The strike unrest, has, accordingly, subsided largely, if not entirely; and things are going on orderly and steadily again. The demand for chemicals has consequently been almost, if not entirely normal. Bleaching powder has been in slightly more request, and is £14. 10s. to £15. per ton, free on rail or conveyance, in buyer's packages, and £17. per ton, for export. Chloride of calcium has

been in very fair inquiry and is £8. to £11. per ton, in casks, f.o.r. Caustic soda has sold with some freedom and is £24. per ton for 76%; £22. per ton for 70 to 72%, and £19. per ton for 60 to 62%. Nitrate of soda has had a quietly steady sale and is £20. 10s. to £21. 10s. per ton. Saltcake has been more inquired for and is £6. 10s. per ton, in casks, f.o.b. Soda crystals have been in good request and are £5. per ton, in 2cwt. bags, f.o.r. at works. Bicarbonate of soda has again been in active demand and is £7. 5s. to £10. per ton, according to terms of delivery. Borax has been well inquired for and is £42. per ton for ordinary and £44. per ton for powdered, in bags. Ammonia alkali has been freely called for and is £6. to £6. 5s. per ton, f.o.r. at works. Hyposulphite of soda has been in moderate demand, and is £17. per ton for ordinary, and £22. per ton for pea crystals. Sulphite of sodium has been but little called for, and is £10. per ton for ordinary and £16. to £18. per ton for pea crystals in lewt. kegs. Bichromate of soda has been in moderate request and is 9d. per lb. Phosphate of soda has been quiet and is £25. per ton. Sulphide of sodium has been rather more in demand and is £20. per ton, in casks, and £22. per ton, in drums. Chlorate of potash has been in moderate request and is 1s. 1d. to 1s. 3d. per lb. Permanganate of potash has been in fair inquiry and is 3s. 6d. per lb. Sulphate of potash continues to be but little called for and is £85. to £90. per ton for 80 to 85%. Caustic potash has been more in request and is £90. to £100. per ton, for 35°Bé. Nitrate of potash has had a quietly steady sale, and is £54. to £60. per ton for refined and £40. per ton for ordinary. Canadian potashes have had a very limited sale. Montreal first quality are £200. to £220. per ton and second quality, £190. to £210. per ton. Bichromate of potash has been in quietly steady demand, and is 1s. 6d. to 1s. 7d. per lb. Yellow prussiate of potash has been quieter and is 1s. 9d. to 1s. 10d. per lb. Salammoniac has been in fair request and is £80. per ton for lump, £75. per ton for seconds, and £5. extra per ton for ground. Sulphate of ammonia has been quiet and is £19. 10s. per ton, less traders' discount of 10s. per ton, free to nearest wharf or station; to September 30. Carbonate of ammonia has been rather more in request and is 6½d. per lb. Muriate has been inactive and is £50. to £60. per ton, according to quality. Magnesia has sold more readily. Carbonate is £3. 10s. 0d. per cwt., and sulphate, £10. to £16. per ton, according to grade. Alum has been in good demand, and is £18. 10s. per ton for the home trade, and £18. 10s. to £19. 10s. per ton for export. Aluminoferic has been but little in request and is £8. 10s. to £12. per ton, according to quality. Sulphate of alumina has been very quiet and is £12. to £17. per ton, according to grade. Sulphur has been more inquired for. English kinds are:—flowers, £32. per ton; roll, £28. per ton, and rock, £22. per ton, in bags, f.o.b. Sicilian grades are: flowers, £28. per ton; roll, £22. 10s. per ton, and rock, £17. 15s. per ton. Cream of tartar has been in good request and is somewhat dearer. Prices are from £11. 10s. to £12. per cwt. Tartaric acid has had a rather free sale, and is 3s. 1d. per lb. Boracic acid has been in very fair request, and is £72. per ton for crystals and £74. per ton for powdered. Oxalic acid has had a moderate sale and is 1s. 3d. per lb. Citric acid has been more inquired for and is 4s. 4d. per lb. White acetate of lead has had a limited sale, and is £85. to £90. per ton. Arsenic has been in fair request, and is £50 per ton, for white powdered. Sulphate of copper has been but little in demand, and is £15. per ton for farm purposes in the United Kingdom, and £47. to £48. per ton, less 5%, in casks, f.o.b. at Liverpool.

TYNE CHEMICAL REPORT.

THURSDAY

Trade continues brisk and there is a good demand for home consumption—for export the inquiry is also improving. Locally soda crystals are in good request at £5. per ton, 2cwt. bags. Rock sulphur scarce and in demand at £24. per ton.

The following prices are per ton net: Bleaching powder, softs and hards, £15.; caustic soda, 74/77%, £23. 5s.; do., 70%, £22.; do., 60%, £20.; recovered sulphur, 2cwt. bags, £24.; hyposulphite of soda, 5/7cwt. casks, £19.; lewt. kegs, £25.; sulphite of soda, 5/7cwt casks, £12.; do., lewt. kegs, £20.; silicate of soda, 75Tw., £9. 12s. 6d.; do., 100Tw., £10. do., 140Tw., £10. 10s.; soda crystals, 2cwt. bags, £5.; sulphate of soda (salt cake) in bulk, £3. 10s.; pure white sulphate of alumina, 14/15%, £19. 10s.; blanc fixe, £22.; chloride of barium, £27.; sulphide of sodium, crystals, £18., do., refined concentrated solid, 60/62%, £25.; hydrate of barium, crystals, £56.

COALS.—Market very strong and for delivery during September and forward the position is still firmer. The home demand continues very full and the surplus for shipment abroad is extremely limited. Export prices nominally—best Northumbrian steam coal, 95s. to 100s. per ton, second qualities, 90s.; Northumbrian small coals, 65s. to 75s., seconds, 60s.; best Durham gas coals, 75s. to 80s., seconds, 67s. 6d. to 72s. 6d.; gas coke, 80s. to 85s.

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Wednesday.

A fairly good volume of business has been transacted during the week at steady prices and the general range of quotations remains pretty well unaltered. There have not been a great many big deals carried out, but between moderate and small transactions the sum totalled has been well up to standard. Certain of the heavy chemicals have been in more request than others, but generally speaking all have been getting a run. Quotations:—Arsenic, £48. per ton net, Glasgow; bicarbonate of soda, £8. 15s. and £10. per ton for 6-8 casks and 1ewt. kegs, Liverpool; boracic acid crystals, English

refined, £72. for 2cwt. bags, and borax crystals, £39. for 2cwt. bags, carriage paid; caustic soda, white, 70-72%, £24. per ton, net Glasgow; chlorate of potash, 1s. 1d. per lb. net, Glasgow; chlorate of soda, £3. 4s. per cwt. net, Glasgow; citric acid, 4s. 4d. per lb. 5% Glasgow; cream of tartar 88%, per cwt. net, Glasgow; salammoniack, £80. and £75. per ton, net, any port for first and second lump respectively; salammoniack crystals £85. per ton, net, Glasgow; saltpetre, £3. 4s. net, Glasgow; tartaric acid, 3s. 1d. per lb., 5% Glasgow.

Among the sea oils there is still a pronounced scarcity, and again only one price is quotable—this being the black variety of whale oils which is still selling at 78s. None of the other whale oils are available—pale, yellow, nor brown—and black is only forward in limited quantity. There is no market for Newfoundland cod, pale seal, nor Menhaden.

In the local coal trade the demand is fairly steady without being particularly active industrially or otherwise. Most works are now able to keep themselves in sufficient supply without much difficulty and the domestic demand is meantime on a low ebb. From the export point of view there is next to nothing doing and almost the entire output of the pits is being focussed upon home requirements.

IMPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

BRISTOL.

Publication of Official Returns
Suspended.

GLASGOW.

Week ending August 16.

CALCIUM SULPHIDE—
Rouen, 250 drms.

MAGNESITE—
Montreal, 896 bgs.

OCHRE—
Baltimore, 320 brls.

ROSIN—
Bordeaux, 686 cks.

SOAP—
Boston, 14 brls.

TARTAR—
Bordeaux, 164 cks.

GOOLE.

Week ending August 16.

GLUE—
Rotterdam, 1 cs.

GRANGEMOUTH.

Week ending August 16.

FERRO SILICON—
Christiania, 50 cs.

GRIMSBY.

Week ending August 16.
NIL.

HULL.

Week ending August 16.

BARYTES—
New York, 537 brls.

COPPER PRECIPITATE—
Seville, 100 t.

DEXTRINE—
Amsterdam, 50 brls.

LITHOPONE—
New York, 460 brls.; Rotterdam, 84 cks.

PITCH—
New York, 179 brls.

POTASSIUM CARBONATE—
New York, 513 cks.

SODIUM NITRATE—
Dunkirk, 51 cks.

SULPHUR—
Seville, 1,990 t.

WHITE LEAD—
New York, 55 cks., 63 brls.

LEITH.

Week ending August 16.

NIL.

LIVERPOOL.

Week ending August 16.

ACETIC ACID—
New York, 153 brls.

ACID—
Rouen, 5 cks.

BEE'S WAX—
Alexandria, 16 bgs.; Callao, 91 sks.; Karachi, 1 pkg.

BISMUTH ORE—
Hong Kong, 167 bgs.

BORATE OF LIME—
Callao, 6,700 bgs.

CARBON BLACK—
New York, 72 cs.

COPPER IODIDE—
Soerabaya, 29 brls.

COPPER ORE—
Callao, 1 cs.

CREAM OF TARTAR—
Genoa, 72 brls.

DEXTRINE—
Yokohama, 200 bgs.

DYESTUFFS
Aniline Colour
Boston, 9 pkgs.
Bark Extract
Baltimore, 90 brls.
Chestnut Extract
Genoa, 1,200 pkgs.; Naples, 243 brls.
Extract
Kingston, 599 cks.
Logwood Extract
New York, 10 brls.
Sumac
Palermo, 1,100 bgs.
Tanning Extract
Newport News, 760 pkgs.

FORMALDEHYDE—
Baltimore, 56 brls.

GLUE—
Antwerp, 40 dbl. sks.

GRAPHITE—
New York, 60 pkgs.

LITHOPONE—
Baltimore, 250 brls.

MANGANESE ORE—
Bombay, 500 t.

MINERAL WHITE—
Genoa, 506 pkgs.

OCHRE—
Alicante, 236 brls.

PARAFFIN WAX—
Rangoon, 4,880 bgs.

PITCH—
New Orleans, 120 brls.

PLUMBAGO—
Genoa, 232 bgs.

PYRALIN—
New York, 79 pkgs.

QUININE SULPHATE—
Batavia, 2,500 cs.

ROSIN—
Bilbao, 356 brls.; Kingston, 2,964 brls.

SILVER SULPHIDE—
Callao, 211 serons, 24 sks.; Pisco, 150 cs.

SOAP—
Alicante, 1 tree.; Baltimore, 1,500 brls.; Newport News, 1,500 bxs.; New Orleans, 120 brls.

SODIUM NITRATE—
Callao, 6,970 bgs.

TALLOW—
Australia, 1,872 cks.; Buenos Ayres, 1,597 cs.

TARTARIC ACID—
Genoa, 20 brls.

TIN ORE—
Rangoon, 36 cs.

WOOD OIL—
Hong Kong, 1,000 cs.

LONDON.

Week ending August 16.

ACETONE—
U.S., 6 c.

ARGON GAS—
U.S., £268.

BARYTES—
Belgium, 101 bgs.; Spain, 247 brls.

BEE'S WAX—
B.W.I., 1,054 pkgs.; Egypt, 21 bgs.; Morocco, 52 bgs.; Portugal, 8 bgs., 205 pkgs.; Natal, 4 cs.

BISMUTH ORE—
Hong Kong, 5 t.

BORATE OF LIME—
Peru, £3,850.

BORIC ACID—
U.S., 30 t.

CARNAUBA WAX—
U.S., 553 bgs.

COBALT OXIDE—
Canada, 12 brls.

CREAM OF TARTAR—
France, 50 pkgs.

DYESTUFFS—
Aniline Dye
Switzerland, 223 pkgs.; U.S., 152 pkgs.

Argols—
France, 524 pkgs.

Benzonaphthol—
U.S., 5 pkgs.

Chestnut Tanning Extract—
France, 155 pkgs.

Gambier—
Straits Settlement, 103 pkgs.

Myrabolans—
India, 11,331 pkgs.

Saffron—
Spain, 1 pkg.

Sumac—
Sicily, 250 pkgs.; Switzerland, 3 pkgs.

Tanners Bark—
Natal, 562 t.

Turmeric—
India, 1,279 pkgs.; India, 1,379 pkgs.

FISH OIL—
U.S., 1,256 brls.

FORMIC ACID—
France, £280.

GALLIC ACID—
Canada, 8 pkgs.

GELATINE—
Belgium, £210.; Holland, £2,072.

GLUE—
France, £1,396.; Spain, £230.; U.S., £355.

GLUE STOCK—
Malta, 10 t. 10 c.

HYDROQUINONE—
U.S., £472.

LEAD ACETATE—
New York, 16 brls., 110 kgs.

LITHOPONE—
U.S., 275 cks., 2,000 brls.

MANGANESE DIOXIDE—
Sweden, £50.

MANGANESE ORE—
Brit. India, 1,500 t.

METOL—
France, £65.

OCHRE—
France, 38 cks.; Spain, 59 brls.

OXALATE SALACETIC CRYSTALS—
Norway, £1,435.

PARAFFIN SCALE—
U.S., 116 t. 4 c.

PARAFFIN WAX—
Brit. India, 200 t.; U.S., 71 t. 17 c.

PARISIAN BLUE—
Holland, 10 cks.

PHENOLPHTHALEIN
U.S., £240.

PITCH—
U.S., 37 brls.

PLUMBAGO—
Denmark, 1 bg., 20 brls.

POTASSIUM METABISULPHATE
Holland, 100 brls.

POTASSIUM OXALATE
Norway, 40 pkgs.

PYROGALLIC ACID—
Canada, 10 pkgs.

ROSIN
France, 662 cks.; Portugal, 52 brls.; Spain, 280 cks.

SALTPETRE—
India, 4 t.

SOAP—
Spain, £390.; U.S., £3,321.

SOAP MATERIALS—
France, £175.

STEARINE—
Holland, 136 bgs. Natal, 140 cks.

TALLOW
N.S.W., 268 t. 15 c., and £5,230.; N.Z., 550 t. 2 c., and £2,041.; Queensland, 127 t. 5 c., and £927.; S. Australia, 112 t. 18 c.; Victoria, 11 t. 9 c.

TANNIC ACID—
U.S., £139.

TAR—
Sweden, 313 brls.

TARTARIC ACID—
Italy, 20 pkgs.

TARTRATE OF LIME—
Greece, 508 bgs

TITANIUM POTASSIUM OXALATE
U.S., £90.

ULTRAMARINE—
France, 4 brls.

VERDIGRIS—
France, 6 pkgs.

WAX—
Brit. India, 63 cs.

WHITE LEAD—
Belgium, 1 brl.; U.S., 800 cks.

ZINC OXIDE—
Belgium, 300 brls., 309 cks.; Holland, 500 cks.; U.S., 1,000 brls.

MANCHESTER.

Week ending August 16.

ACETIC ACID—
New York, 26 brls.

CITRIC ACID—
Colombo, 271 kgs.

FORMALDEHYDE—
New York, 56 brls.

LITHOPONE—
New York, 11 bxs.

PHOSPHORUS—
Quebec, 250 cs.

SOAP—
Philadelphia, 1,000 bxs.

SODIUM BICHRIMATE—
New York, 70 cks.

MIDDLESBROUGH.

Week ending August 16.

NIL.

NEWCASTLE-ON-TYNE

Week ending August 16.

NIL.

N. & S. SHIELDS.

Week ending August 16.

SODIUM PEROXIDE—
Christiania, 20 cs.

STOCKTON-ON-TEES.

Week ending August 16.

NIL.

SWANSEA.

Week ending August 16.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

BRISTOL.

Publication of Official Returns
Suspended.

GLASGOW.

Week ending August 16.

AMMONIUM PHOSPHATE—
Bordeaux, 2 t.; Valparaiso, 1 t.

CHEMICALS (otherwise undescribed)
Adelaide, 36 t. 3 c.; Bombay, 14 t. 7 c.; Coquimbo, 1 t.; Gothenburg, 1 t.; Melbourne, 7 t. 18 c.; Mollendo, 3 t. 11 c.; Montreuil, 20 t.; Rouen, 20 t.;

COAL PRODUCTS (otherwise undes.)
Penang, £26.; Bombay, £388.; Genoa, £100.; Gothenburg, £30.; Melbourne, 7 t. 1 c.

COPPERAS—
Bombay, 15 t.

DISINFECTANTS (otherwise undes.)
Guayaquil, £29.; Karachi, 631 galls.

DYESTUFFS (otherwise undescribed)
Gothenburg, 102 t. 7 c.; Melbourne, 7 t. 5 c.

GELATINE—
Montreal, 10 c.; New York, 2 t.

HYDROCHLORIC ACID—
Bombay, 15 c.

IODINE (CRUDE)—
Montreal, 10 c.

MANGANESE CHLORATE—
New York, 14 t. 18 c.

PARAFFIN—
Bordeaux, 29 t. 19 c.

PARAFFIN WAX—
Bordeaux, 10 t.; Genoa, 1,119 t.; Rouen, 66 t. 5 c.

RED LEAD—
Callao, 4 t. 19 c.; Bombay, 8 t.; Gibraltar, 9 c.; Valparaiso, 2 t.

SHEEP DIP
Callao, 2 t. 2 c.

SOAP—
Montreal, 5 bxs.

SODIUM BICHRIMATE
Bordeaux, 5 t. 4 c.; Genoa, 25 t.; Melbourne, 14 t. 16 c.; Montreal, 19 c.; Rouen, 52 t. 14 c.

SULPHURIC ACID
Karachi, 8 t. 18 c.

TURPENTINE
Bombay, 2 t. 12 c.

WHITE LEAD
Pt. Said, 20 t. 11 c.

GOOLE.

Week ending August 9.

NIL.

GRANGEMOUTH.

Week ending August 16.

ALUM—
Christiania, 16 t. 8 c.

AMMONIUM CARBONATE
Stockholm, 5 t.

BASIC SLAG
Skien, 780 t.

CAUSTIC SODA
Rotterdam, 100 t.

COAL PRODUCTS—
Creosote Oil
Christiania, 10,000 galls.
Cresylic Acid
Christiania, 800 galls.

MAGNESIUM CARBONATE—
Nantes, 60 cs.

PARAFFIN WAX—
Christiania, 10 t.

POTASSIUM BICHRIMATE—
Christiania, 8 c.; Rotterdam, 2 t. 7 c.

ROSIN OIL
Rotterdam, 2 t.

SOAP—
Christiania, 8 t.

SODIUM BICHRIMATE—
Nantes, 70 cks.

GRIMSBY.

Week ending August 9.

NIL.

HULL.

Week ending August 12.

ALUMINA SULPHATE—
Rotterdam, 100 bgs.

BORAX
Amsterdam, 10 cks.; Rotterdam, 100 cks.

CHEMICALS (otherwise undescribed)
Alexandria, 1 cs., 30 cks., 800 bgs.; Antwerp, 115 cs., 2 drms., 4 cks., 15 kgs., 82 bgs., 48 brls.; Barcelona, 21 cks., 161 bgs.; Bombay, 845 brls.; Christiania, 2 cs., 2 cks., 41 kgs., 57 bgs.; Copenhagen, 1 cs., 1 drim., 3 brls.; Gibraltar, 1 ck.; Gothenburg, 1 stek., 3 cs., 83 drms., 93 cks., 100 pkgs., 24 erts.; Karachi, 955 brls.; Malta, 55 drms.;

CHEMICALS (otherwise undescribed)
Mantyluoto, 1 ck., 2 cs., 1 drim.; Valencia, 200 bgs.; Wasa, 5 cks.

COAL PRODUCTS—
Tar
Wasa, 158 brls.

CREAM OF TARTAR—
Gothenburg, 2 cks.

DISINFECTANTS (otherwise undes.)
Bombay, 1,400 drms., 12 cs.; Rotterdam, 100 cks.

DYESTUFFS (otherwise undescribed)
Rotterdam, 616 bgs.

GLUE—
Barcelona, 40 bgs. Christiania, 20 bgs.; Copenhagen, 1 bg.

PITCH—
Alexandria, 10 cs.

SALT—
Barcelona, 120 cs.

SOAP—
Antwerp, 404 cs.; Christiania, 3,525 cs., 105 kgs.; Gibraltar, 7 cs.

TAR—
Alexandria, 1 bx.; Christiania, 100 brls.; Gothenburg, 25 brls.

WAX—
Rotterdam, 19 cks.

LEITH.

Week ending August 16.

COAL PRODUCTS (otherwise undes.)
Gothenburg, £36.; New York, £540.

COAL PRODUCTS—
Creosote Oil
New York, 17 t. 2 c., £170.

Pitch
Iceland, £3.

COPPER SULPHATE—
Iceland, 12 t. £37.

MAGNESIUM CARBONATE—
Dunkirk, 100 t., £240.

POTASSIUM BICHRIMATE—
Gothenburg, 3 t. 10 c., £559.

SODA
Iceland, 10 t. 4 c., £59.

SODIUM BICHRIMATE—
Gothenburg, 19 c., £95.; Rotterdam, 15 t.; Rouen, 600 t. 18 c., £16,827.

LIVERPOOL.

Week ending August 14.

ACETIC ACID—
Venice, 1 t. 1 c., £95.; Volo, 12 c., £56.; Valparaiso, 12 c., £57.

ACETO SALICYLIC ACID—
Constantinople, 7 c., £228.

ALUM—
Abo, 1 t. 10 c., £70.; Callao, 2 c., £3.; Lagos, 5 c., £15.; Palermo, 19 c., £17.

ALUMINA SULPHATE—
Barcelona, 18 t., £400.; Passages, 5 t., £95.

AMMONIA—
Madeira, 4 c., £15.; Monte Video, 8 c., £30.

AMMONIUM CARBONATE—
Corunna, 1 t. 10 c., £95.; Colombo, 2 c., £8.; Fremantle, 10 c., £31.; Gothenburg, 1 c., £61.; Pernambuco, 1 t., £82.; Rangoon, 2 t., £190.; Talcahuano, 1 t., £58.; Valencia, 5 c., £20.

AMMONIUM MURIATE—
Barcelona, 1 t., £48.; Bombay, 34 t. 19 c., £2,002.; Colombo, 1 t. 5 c., £68.; Karachi, 5 c., £13.; Lisbon, 1 t. 4 c., £75.; Madras, 25 t. 5 c., £238.; Naples, 19 c., £58.; Patras, 1 t. 9 c., £83.; Volo, 3 c., £11.

AMMONIUM SULPHATE—
Constantinople, 2 c., £28.; Mauritius, 50 t., £1,075.

ANILINE DYE—
Madras, 3 c., £116.; Patras, 9 c., £59.

ANILINE SALTS—
Antwerp, 2 t., £224.; Constantinople, 2 t. 2 c., £280.; Piraeus, 2 t. 17 c., £404.

ANTIMONY—
Bilbao, 15 t.

ANTIMONY SALTS—
Barcelona, 4 c., £60.

ANTIMONY SULPHATE—
Barcelona, 5 c., £60.

ARSENIC—
Alicante, 7 c., £15.; Barcelona, 2 t., £92.; Monte Video, 5 t. 1 c., £191.; Tammersfors, 2 t., £80.; Valencia, 2 t. 3 c., £80.

ARSENIC ACID—
Constantinople, 1 c., £3.

BARIUM CHLORIDE—
Barcelona, 21 t. 4 c., £631.

BISMUTH SUBNITRATE—
Constantinople, 4 c., £77.

BLEACHING POWDER—
Bombay, 10 t., £480.; Barcelona, 4 t., £53.; Callao, 1 t., £16.; Corunna, 1 t. 10 c., £67.; Free-town, 1 c., £2.; Gothenburg, 126 t. 4 c., £1,464.; Madril, 1 t., £16.; Oporto, 5 t. 14 c., £78.; Patras, 1 t., £16.; Valencia, 32 t., £506.; Wellington, 5 c., £8.

- BORAX**—
Abo, 10 c., £23.; Calabar, 1 c., £1.; Constantinople, 4 c., £10.; Genoa, 10 t., £440.; Naples, 3 t., £130.; Napier, 10 c., £22.; Wellington, 7 c., £15.
- BORAX CRYSTALS**—
Trieste, 2 t., £80.
- BORIC ACID**—
Constantinople, 1 t., £82.; Santander, 10 c., £33.; Wellington, 3 c., £12.
- CALCIUM CARBIDE**—
Chittagong, 11 t. 2 c., £1,008.
- CALCIUM CHLORIDE**—
Barcelona, 5 t., £40.; Bombay, 35 t. 3 c., £264.; Sydney, 10 t. 1 c., £69.; Wellington, 5 t., £38.
- CALCIUM GLYCEROPHOSPHATE**—
Constantinople, 1 c., £76.
- CAUSTIC SODA**—
Acapitla, 165 pkgs.; Adelaide, 17 drms.; Algoa Bay, 45 pkgs.; Bahia, 720 drms.; Bari, 108 drms.; Batavia, 150 pkgs.; Buenos Ayres, 180 drms.; Copenhagen, 524 drms.; Durban, 25 pkgs.; New York, 100 drms.; Patras, 20 pkgs.; Rabat, 4 pkgs.; Shanghai, 2 drms.; Santos, 1,648 drms.; Samarang, 200 drms.; Smyrna, 122 drms.; Stamboni, 1,000 drms.; Stockholm, 125 drms.; Suez, 75 pkgs.; Sydney, 39 drms.; Yokohama, 638 drms.
- CHEMICALS (otherwise undescribed)**—
Alicante, 19 c., £39.; Constantinople, 2 t. 8 c., £165.; Guayaquil, 10 c., £3.
- CHINA CLAY**—
Bombay, 235 t.; Los Angeles, 50 t.
- CHLORIDE OF LIME**—
Bahia, 2 t. 5 c., £450.
- CHRYSDINE**—
Havre, 1 c., £68.
- COAL PRODUCTS**—
Benzole
Antwerp, 10 t., £280.
Carbolacene
Duala, 3 c., £5.; Opobo, 2 c., £4.; Warri, 1 c., £2.
Carbolic Acid
Constantinople, 4 c., £40.; Kobe, 4 t. 5 c., £2,560.; Montreal, 2 t. 5 c., £106.; Tammerfors, 2 t., £85.
Creosote
Lisbon, 38 t. 12 c., £340.; Monte Video, 22 t. 13 c., £375.
Creosote Oil
Tientsin, 18 t. 14 c., £110.
Cresylic Acid
Abo, 5 t. 4 c., £160.
Naphthalene
Lagos, 15 t. 5 c., £351.
Pitch
Hsin Ho. Wharf, 4 c., £4.; Vigo, 6 t. 18 c., £35.
Tar
Abijan, 10 c., £6.; Accra, 10 c., £17.; Calabar, 1 c., £1.; Grand Bassam, 10 c., £3.; Lagos, 1 t. 11 c., £20.; Mossainedes, 4 t. 8 c., £33.; Porto Alexandre, 3 t., £23.; Warri, 1 t. 16 c., £13.
- COPPER SULPHATE**—
Callao, 2 c., £5.; Mazagan, 1 t., £43.; Patras, 10 c., £23.
- CREAM OF TARTAR**—
Talcahuano, 1 c., £7.
- DISINFECTANTS (otherwise undes.)**
Arequipa, 1 c., £7.; Amsterdam, 5 c., £10.; Beira, 1 c., £10.; Calcutta, 1 t. 10 c., £98.; Calabar, 10 c., £39.; Demerara, 8 c., £7.; Lisbon, 8 c., £33.; Lagos, 13 c., £16.; Montreal, 5 c., £10.; Pt. Louis, 19 c., £19.; Wellington, 2 c., £23.
- FERRO MANGANESE**—
Barcelona, 20 t.; Gothenburg, 5 t.
- FERRO TUNGSTEN**—
Antwerp, 24 pkgs.; Gothenburg, 5 pkgs.
- FORMIC ACID**—
Barcelona, 5 c., £32.
- GLUE**—
Callao, 30 pkgs.; La Libertad, 10 pkgs.; Osaka, 100 pkgs.; San Francisco, 105 pkgs.
- GLUE, SIZE, AND GELATINE**—
Auckland, 10 pkgs.; Bilbao, 53 pkgs.; Boston, 37 pkgs.; Copenhagen, 1 pkg.; Manila, 119 pkgs.; Melbourne, 2 pkgs.; Montreal, 20 pkgs.; Oporto, 20 bgs.; Seville, 80 pkgs.; Shanghai, 50 pkgs.; Sydney, 20 pkgs.
- GLYCERINE**—
Osaka, 50 drms.
- HYDROFLUORIC ACID**—
Bahia, 2 c., £11.
- IODIFORM**—
Constantinople, 2 c., £230.
- LEAD ACETATE**—
Genoa, 5 t., £530.
- LEAD ORE**—
Lagos, 400 kgs.
- LYSOL**—
Constantinople, 1 t., £88.
Novorossisk, 2 c., £8.
- MAGNESIA (CALCINED)**—
New York, 1 c., £30.
- MAGNESIUM CARBONATE**—
Constantinople, 4 c., £42.; Corfu, 1 c., £4.
- MAGNESIUM SULPHATE**—
Talcahuano, 7 t., £84.
- MANGANESE**—
Santander, 3 c., £27.
- MERCURY BICHLORIDE**—
Novorossisk, 1 c., £37.
- MANGANESE DIOXIDE**—
Copenhagen, 10 t., £470.
- METHYL SALICYLATE**—
Constantinople, 1 c., £20.
Gothenburg, 1 c., £11.
- METHYL VIOLET**—
Havre, 1 c., £30.
- MURIATIC ACID**—
Valparaiso, 2 c., £3.
- NITRIC ACID**—
Beira, 9 c., £40.; Constantinople, 1 c., £9.
- OXALIC ACID**—
Bilbao, 6 c., £40.; Genoa, 4 t. 11 c., £612.; Sarawak, 1 t., £150.
- PARAFFIN**—
Constantinople, 1 c., £11.
- PARAFFIN WAX**—
Amsterdam, 10 pkgs.; Braila, 86 bgs.; Kingston, Jam., 10 brls.
- PHENACETIN**—
Constantinople, 1 c., £69.
- PHOSPHORIC ACID**—
Tammerfors, 1 c., £9.
- PHOSPHORUS AMORPHOUS**—
Valparaiso, 4 c., £64.
- PITCH**—
Sierra Leone, 6 c., £5.
- POTASSIUM BICHRIMATE**—
Melbourne, 6 c., £43.; Piraeus, 2 c., £16.
- POTASSIUM BROMIDE**—
Constantinople, 2 c., £36.
- POTASSIUM CHLORATE**—
Madeira, 2 c., £13.; Patras, 6 c., £38.
- POTASSIUM IODIDE**—
Accra, 1 c., £73.
Constantinople, 1 c., £47.
- POTASSIUM SULPHATE**—
Teneriffe, 7 t. 10 c., £307.
- PRUSSIAN BLUE**—
Antwerp, 6 c., £113.
- ROSIN**—
Galatz, 4 pkgs.
- SALAMMONIAC**—
Barcelona, 1 t. 19 c., £145.; Basra, 2 t., £143.; Constantinople, 1 t. 10 c., £117.; Fama-gusta, 2 c., £10.; Patras, 5 c., £18.; Palermo, 2 t. 5 c., £163.; Piraeus, 2 t., £135.; Volo, 4 c., £11.; Wellington, 1 c., £4.
- SALOL**—
Novorossisk, 4 c., £25.
- SALT**—
Aalborg, 725 t.; Abonema, 80 t.; Bombay, 1 t.; Conakry, 100 t.; Christiania, 735 t.; Cotonou, 18 t.; Grand Bassam, 25 t.; Halifax, N.S., 398 t.; Ibadan, 75 t.; Lagos, 1,010 t.; Manaos, 214 t.; Onitsha, 31 t.; Quittah, 114 t.; Secondee, 34 t.; Trinidad, 26 t. 10 c.
- SALTCAKE**—
Lisbon, 100 pkgs.; Talcahuano, 8 cks.
- SALTPETRE**—
Cartagena, 19 c., £194.
- SHEEP DIP**—
Auckland, 10 t. 19 c., £394.; Buenos Ayres, 14 t. 19 c., £1110.; Dunedin, 7 t. 1 c., £263.; Inver-cargill, 25 t. 17 c., £963.; Pt. Lyttleton, 34 t. 18 c., £1,269.; Wellington, 21 t. 14 c., £788.
- SILVER NITRATE**—
Tammerfors, 1 c., £125.
- SOAP**—
Accra, 400 bxs.; Adjua, 70 bxs.; Barbados, 654 pkgs.; Bombay, 1 bx.; Buenos Ayres, 3,589 bxs.; Calabar, 800 bxs.; Cape Town, 4 pkgs.; Ceuta, 205 bxs.; Cristobal, 2 pkgs.; Dar-es-Salaam, 14 cs.; Djibouti, 4 cs.; Durban, 4 cs.; Grand Lahou, 10 bxs.; Macassar, 675 pkgs.; Malta, 600 cs.; Mombasa, 50 cs.; Panama, 551 bxs.; Patras, 7 bxs.; Penang, 550 bxs.; Piraeus, 15 bxs.; Pontianak, 100 pkgs.; Pt. Harcourt, 1,531 bxs.; Porto Novo, 50 pkgs.; Puerto Barrios, 250 pkgs.; Rabat, 210 pkgs.; Rangoon, 2,651 bxs.; Rufisque, 216 pkgs.; St. Kitts, 25 cs.; St. Lucia, 55 pkgs.; San Julian, 2 pkgs.; Salonika, 413 cs.; Smyrna, 65 cs., 52 cks.; Secondee, 40 bxs.; Sydney, 2 cs.; Stamboni, 164 cs.; Taltal, 100 pkgs.; Tanga, 76 cs.; Toronto, 5 bxs.; Tripoli, 216 pkgs.; Valencia, 100 pkgs.; Valparaiso, 8 bxs.; Zanto, 1 pkg.
- SODA ASH**—
Adelaide, 189 pkgs.; Bahia, 50 pkgs.; Bari, 100 pkgs.; Calcutta, 4,712 pkgs.; Gothenburg, 150 pkgs.; Kobe, 5,030 pkgs.; Lisbon, 500 pkgs.; Patras, 20 pkgs.; Piraeus, 100 pkgs.; Stockholm, 200 pkgs.; Samarang, 620 pkgs.; Shanghai, 3,942 bgs.; Smyrna, 450 pkgs.; Syra, 30 pkgs.; Taltal, 95 pkgs.; Vera Cruz, 20 pkgs.
- SODA CRYSTALS**—
Calcutta, 300 pkgs.; Samarang, 70 pkgs.; Smyrna, 4 pkgs.; Sourabaya, 100 pkgs.
- SODIUM BICARBONATE**—
Adelaide, 120 pkgs.; Bahia, 25 pkgs.; Bari, 30 pkgs.; Monte Video, 50 pkgs.; Oporto, 50 pkgs.; Patras, 40 pkgs.; Rio de Janeiro, 130 pkgs.; Sourabaya, 50 pkgs.; Samarang, 20 pkgs.; Shanghai, 2,520 pkgs.; Smyrna, 235 pkgs.; Syra, 65 pkgs.; Warri, 1 pkg.
- SODIUM BROMIDE**—
Constantinople, 2 c., £21.
- SODIUM NITRATE**—
Constantinople, 3 c., £4.
- SODIUM SALICYLATE**—
Constantinople, 2 c., £53.
- SODIUM SILICATE**—
Buenos Ayres, 182 pkgs.; Calcutta, 48 pkgs.; Lisbon, 140 pkgs.; Melbourne, 343 pkgs.; Monte Video, 50 pkgs.; Oporto, 36 pkgs.; Shanghai, 320 pkgs.; Sydney, 4 pkgs.; Vera Cruz, 46 pkgs.
- STEARINE**—
Oporto, 4 pkgs.
- SULPHUR**—
Barcelona, 18 c., £68.; Lagos, 10 c., £21.
- SULPHUR (BLACK)**—
Gothenburg, 2 c., £17.
- SULPHURIC ACID**—
Valparaiso, 2 t. 7 c., £91.
- TALLOW**—
Alexandria, 25 brls.; Marseilles, 22 t.
- TANNIC ACID**—
Constantinople, 2 c., £138.
- TERPINOL**—
Tammerfors, 1 c., £25.
- WOOD PRESERVATIVE**—
Bathurst, 3 cks.
- ZINC CHLORIDE**—
Sydney, 8 c., £22.
- ZINC SULPHIDE**—
Havre, 9 t. 6 c., £305.

LONDON.

Week ending August 13.

- ACETANILID**—
Pt. Elizabeth (F.), 1 cs. (pt.), £6.
- ACETATE OF LIME**—
Rotterdam, 50 t., £950.
- ACETIC ACID**—
Antwerp, 3 pkgs., £8.; Callao, 3 cs., £25.; Christiania, 1 brl., £17.; Cape Town, 3 cs., £14.; Valparaiso, 2 cks., £30.
- ACETIC (ANHYDRIDE)**—
Amsterdam, 1 crby., £18.
- ACETO SALICYLIC ACID**—
Cape Town, 2 cs., £55.; Iquique, 1 cs. (pt.), £7.; Naples, 1 cs. (pt.), £7.; Paris, 20 cs., £461.; Pt. Elizabeth, 1 cs., £23.
- ACETONE**—
Antwerp, 26 drms., £735.; Cape Town, 1 dr., £6.; Rotterdam, (F.), 8 drms., £240.
- ALUM**—
Cartagena, 13 c., £19.; Colombo, 6 c., £9.; Pt. Elizabeth, 11 c., £18.; Rio de Janeiro, 5 c., £10.; Rostoff on Don, 1 t., £25.; Soerabaya, 5 kgs., £40.
- ALUM (CHROME)**—
Danzig, 8 cks., £200.
- ALUMINA SULPHOCYANIDE**—
Bombay, 1 ck., £9.
- AMMONIA**—
Accra, 3 cs., £3.; Athens, 11 cs. (pt.), £13.; Cape Town, 10 cs., £20.; Colombo, 8 cs., £16.; Delagoa Bay, 6 cs., £12.; Durban, 4 cs., £3.; Montreal, 8 cs., £13.; Rangoon, 12 cs., £24.; Rio de Janeiro, 29 cs., £77.; Santos, 2 cs., £5.; Shanghai, 110 drms., £333.; Singapore, 5 cs., £13.; Trinidad, 1 pkg., £7.
- AMMONIA (ANHYDROUS)**—
Hong Kong, 10 cylds., £122.; Odda, 8 cylds., £141.; Shanghai, 5 cylds., £57.
- AMMONIUM ACETATE**—
Calcutta, 1 cs. (pt.), £6.
- AMMONIUM BENZOATE**—
Buenos Ayres, 1 ck. (pt.), £50.
- AMMONIUM BROMIDE**—
Shanghai (F.), 2 cs. (pt.), £7.
- AMMONIUM CARBONATE**—
Antwerp, 1 t. 4 c., £73.; Buenos Ayres, 2 t. 11 c., £275.; Calcutta, 11 c., £59.; Callao, 1 c., £5.; Colombo, 4 c., £12.; East London, 5 c., £18.; Guayaquil, 1 t. 3 c., £126.; Hong Kong, 1 c., £7.; Madras, 4 c., £29.; Rio Grande do Sol, 10 c., £54.; Rio de Janeiro, 1 t. 19 c., £213.; Rotterdam, 2 t. 10 c., £155.; Samarang, 1 c., £5.; Santiago (Chili), 6 c., £30.; Santos, 18 c., £112.
- AMMONIUM CHLORIDE**—
Belawan, 1 kg., £6.; Pelotas, 4 cks., £27.; Shanghai, 1 cs. (pt.), £6.; Soerabaya, 22 kgs., £166.
- AMMONIUM CITRATE**—
Calcutta, 1 cs. (pt.), £5.
- AMMONIUM HYDRATE**—
Calcutta, 1 cs. (pt.), £10.
- AMMONIUM MURIATE**—
Bombay, 7 t. 7 c., £532.; Paris, 2 t., £150.; Zanzibar, 2 c., £9.

AMMONIUM NITRATE—
Antwerp, 20 t. 5 c., £546.

AMMONIUM SULPHATE—
Dunkirk, 149 t. 4 c., £3,790.;
Demerara, 50 t., £1,095.; Kobe,
435 t. 15 c., £10,380.; Yoko-
hama, 199 t. 10 c., £4,570.

ANTIMONY CHLORIDE—
Wellington, 4 cs., £15.

ANTIMONY REGULUS—
Antwerp, 10 t.

ANTIMONY SULPHIDE—
Antwerp, 14 cks., £544.; Dun-
kirk, 8 cks., £156.

ANTIMONY TARTRATE—
Odense, 1 ck., £68.

ARSENIC—
Rio de Janeiro, 1 t., £55.

BARIUM CHLORIDE—
Lisbon, 1 cs., £7.

BARIUM NITRATE—
Bombay, 60 cks., £150.

BASIC SLAG—
Channel Islands, 120 t., £390.

**BISMUTH AND AMMONIUM
CITRATE**—
Calcutta, 1 cs., £14.

BISMUTH CARBONATE—
Beira, 1 cs. (pt.), £5.; Durban,
3 cs. (pt.), £17.

BISMUTH SALICYLATE—
Cape Town, 1 cs., £19.; Cape
Town, 1 cs. (pt.), £19.

BISMUTH SUBGALLATE—
Calcutta, 1 cs. (pt.), £6.; Rio de
Janeiro, 1 cs. (pt.), £18.

BISMUTH SUBNITRATE—
Calcutta, 1 cs. (pt.), £11.; Dur-
ban, 2 cs. (pt.), £5.; Pt. Madryn,
3 cs. (pt.), £11.; Rio de Janeiro,
1 ck. (pt.), £10.

BITUMEN WAX—
Copenhagen, 1 t.

BORAX—
Antwerp, 32 t. 7 c., £1,279.;
Antwerp (Switzerland via), 24 t.
13 c., £977.; Bangkok, 3 c., £7.;
Brussels, 10 c., £21.; Cologne,
200 t. 18 c., £7,966.; Colon,
14 c., £33.; Durban, 3 c., £7.;
East London, 7 c., £18.; Guaya-
quil, 3 c., £8.; Panama, 3 c.,
£8.; Paris, 4 t., £485.; Pt.
Elizabeth, 4 c., £15.; Rio de
Janeiro, 4 c., £12.; Rotterdam,
20 t. 14 c., £837.; St. John's,
N.F., 13 c., £63.; Soerabaya,
4 c., £12.

BORIC ACID—
Alexandria, 1 c., £5.; Switzer-
land, via Antwerp, 4 c., £14.;
Buenos Ayres, 5 t., £540.;
Cologne, 2 t., £146.; Colon,
2 c., £14.; Durban, 3 c., £9.;
Macao, 2 c., £13.; Pt. Dickson,
2 c., £11.; Pt. Elizabeth, 1 c., £4.;
Rio Grande do Sol, 5 c., £18.;
Rio de Janeiro, 6 c., £19.;
Rotterdam, 5 t. 10 c., £395.;
Seremban, 1 c., £6.; Soerabaya,
1 c., £6.; Tientsin, 1 c., £5.

CALCIUM CARBIDE—
Delagoa Bay, 5 t. 18 c., £140.;
Lagos, 4 c., £9.; Piraeus, 1 c.,
£28.

CALCIUM CARBONATE—
Belawan, 1 ck., £5.; Semarang,
1 ck., £6.

CALCIUM CHLORIDE—
Malta, 1 dr., £5.

CALCIUM GLYCEROPHOSPHATE—
Buenos Ayres, 1 cs. (pt.), £15.

CALCIUM HYPOPHOSPHITE—
Christiania, 1 cs., £34.

CALCIUM SILICIDE—
Antwerp, 110 cts., £535.

CARBON (RETORT)—
Calais, 95 t., £500.

CARBON BISULPHATE—
Novorossisk, 6 t., £540.

CARBON BISULPHIDE—
Odessa, 5 t., £300.

CARBON SULPHIDE—
Antwerp, 10 drms., £17.

CARNAUBA WAX—
Amsterdam, 12 c.; Antwerp,
6 c.; Dunkirk, £113.; Lisbon,
10 c.; Paris, 1 t.

CAUSTIC POTASH—
Callao, 1 cs. (pt.), £5.; Durban,
2 cs. (pt.), £19.

CAUSTIC SODA—
Rotterdam, 14 t. 19 c., £330.

CERESINE WAX—
Antwerp, 1 t.; Amsterdam, 2 t.
2 c.; Colombo, 2 t.

CHEMICALS (otherwise undescribed)
Alexandria, 7 cs., £24.; Athens,
1 cs. (pt.), £6.; Bangkok,
11 pkgs., £50.; Beira, 1 cs.
(pt.), £41.; Buenos Ayres, 2 cs.
(pt.), £41.; Calais, 1 brl., £9.;
Calcutta, 4 cs. (pt.), £46.; Dur-
ban, 5 cs. (pt.), £94.; East
London, 3 cs., £16.; Lisbon, 8
pkgs., £38.; Novorossisk, 2 cs.,
£12.; Piraeus, 2 cs., £65.;
Paris, 5 cs. (F.), £125.; Penang,
1 cs., £5.; Pt. Elizabeth, 10 cs.
(pt.), £88.; Pt. Swettenham,
1 cs., £8.; Rio de Janeiro, 1 cs.,
£10.; Stockholm, 2 cs., £63.

CITRIC ACID—
Alexandria, 1 c., £27.; Belewani,
1 c., £33.; Boston, 2 t. 10 c.,
£1,182.; Calcutta, 1 c., £24.;
Christiania, 9 c., £220.; Deseado,
1 cs. (pt.), £11.; Durban, 1 c.,
£23.; Madras, 1 c., £18.;
Madeira, 5 c., £130.; Malacca,
2 c., £53.; Monte Video, 1 ck.
(pt.), £9.; Montreal, 5 t. 15 c.,
£2,600.; New York, 4 t., £1,836.;
Paris, 1 t., £443.; Pt. Madryn,
1 cs. (pt.), £9.; Rio de Janeiro,
3 c., £79.; St. John, N.F., 13 c.,
£200.

COAL PRODUCTS

Aniline Colour
Hong Kong, 1 cs., £128.

Aniline Dyes
Amsterdam, 5 kgs., £165.; Brus-
sels, 8 pkgs., £251.; Italy, 14
pkgs., £444.; Calcutta, 3 cks.,
£269.; Casablanca, 2 cs., £100.;
Cape Town, 11 pkgs. (pt.), £195.;
Colombo, 1 cs., £88.; Djibouti,
1 cs., £33.; Durban, 1 cs., £37.;
New York, 4 pkgs., £161.; Pt.
Elizabeth, 8 pkgs., £182.; Sao
Paulo, 1 cs., £36.

Aniline Oil
Brussels (F.), 1 dr., £61.

Alizarine
Bombay, 5 cks., £150.; Copen-
hagen, 1 brl., £26.; New York,
5 cks., £253.

Alizarine Dye
Madras, 100 cks., £3,182.

Benzonaphthol
Alexandria, 1 cs. (pt.), £8.;
Buenos Ayres, 1 cs. (pt.), £8.;
Rio de Janeiro, 1 cs. (pt.), £9.

Bitumen
Buenos Ayres, 22 cks., £68.

Bituminous Solution
Antwerp, 10 drms., £21.

Carbolic Acid
Iddo, 8 drms., £18.; Salonika,
6 drms., £34.; Swatow, 1 cs., £6.

Creosol
Barbados, 3 cks., £16.

Cresylic Acid
Cape Town, 200 drms., £350.

Mirbane Oil
Antwerp (F.), 1 dr., £5.

Naphthalene
Calcutta, 57 cks., £225.; Cape
Town, 12 cks., £15.; East
London, 4 cks., £26.; Paris,
17 cks., £115.; Rio de Janeiro,
4 cs., £33.; Shanghai (F.), 2 cs.
(pt.), £28.; Sao Paulo, 1 cs.
(pt.), £5.; Zanzibar, 2 drms., £8.

Paraffine Black
Beyroul, 3 cks., £278.

Pitch
Antwerp, 110 pkgs., 979 t.,
£3,838.; Broome, 6 pkgs., £15.;
Manila, 10 cks., £19.; Rouen,
167 brls., £719.

Tar
Accra, 10 drms., £5.; Amster-
dam, 50 brls., £72.; Cape Town,
5 brls., £10.; Chinde, 30 drms.,
£16.; Pt. Harcourt, 10 drms.,
£5.; Secondee, 10 drms., £5.

COAL PRODUCTS

Toluene and Phenylene Dyes
Rotterdam, 2 drms., £49.

COBALT CARBONATE—
Copenhagen, 1 ck., £75.

COPPER SULPHATE—
Algiers, 1 c., £3.; Amsterdam,
1 t., £100.; Rosario, 1 ck., £8.;
Rostoff on Don, 1 t., £50.;
Santos, 4 t. 17 c., £202.

CREAM OF TARTAR—
Alexandria, 2 c., £12.; Beyroul,
2 c. (F.), £22.; Brussels, 1 cs.
(pt.), £27.; Calcutta, 2 cs.
(F.), £17.; Copenhagen, 3 t.
18 c., £922.; Danzig, 1 t., £235.;
Durban, 2 c., £31.; Helsingfors,
1 t. 1 c. (F.), £325.; Madras,
1 cs., £10.; Panama, 1 cs. (pt.),
(F.), £6.; Rio de Janeiro, 1 ck.,
£8.; Rotterdam, 1 t. 5 c. (F.),
£300.; San Julian, 1 c. (F.), £13.

DISINFECTANTS (otherwise undes.)
Adelaide, 10 c., £14.; Alexan-
dria, 4 c., £8.; Accra, 13 c., £36.;
Antwerp, 9 t. 5 c., £195.;
Bangkok, 3 c., £20.; Beira, 3 t.,
£125.; Benguella, 7 c., £24.;
Barbados, 4 c., £6.; Brussels,
4 t. 11 c., £160.; Calcutta, 7 t.,
£366.; Cape Town, 4 t. 4 c.,
£165.; Christiania, 1 t. 1 c. (F.),
£115.; Christiania, 1 t. 1 c., £87.;
Dunkirk, 1 t. 18 c., £36.; Dur-
ban, 19 c., £46.; Ghent, 4 c.,
£10.; Iddo, 5 c., £12.; Lagos,
15 c., £30.; Malta, 3 c., £6.;
Medan, 1 t. 14 c., £75.; Paris,
4 t. 8 c., £120.; Pt. Harcourt,
2 c., £6.; Pt. Elizabeth, 2 t.
18 c., £108.; Pelotas, 1 c., £11.;
Penang, 19 c., £134.; Pt.
Dickson, 4 t., £180.; Pt.
Swettenham, 3 t. 5 c., £141.;
Rotterdam, 2 t. 8 c., £132.;
Salonika, 3 c., £7.; St. Helena,
2 c., £5.; Secondee, 2 c., £6.;
Siboga, 7 c., £15.; Singapore,
2 t. 14 c., £97.; Tangier, 1 c., £5.

DYESTUFFS

Carbolic Crystals
Piraeus, 3 cs., £13.

ETHER

(Anton, 2 cs. (pt.), £5.; Gibraltar,
10 cs. (pt.), £18.

ETHER (NITRIC)—
East London, 1 cs., £8.

ETHER (SULPHURIC)
Macao, 5 cs., £25.

ETHYL BROMIDE
Buenos Ayres, 1 cs. (pt.), £7.

FATTY ACIDS

Nantes, 20 t.

FLUORIC ACID

Adelaide, 8 cs., £28.

FULLERS EARTH

Malaga, 20 t.

GELATINE

Pt. Elizabeth, 2 c.; Rotterdam,
2 t. 10 c.

GLUE

Montreal, 5 t.; New York, 2 t.;
Tientsin, 10 c.

GLUE, SIZE, AND GELATINE

Amsterdam, 11 t. 10 c.; Ant-
werp, 2 t. 1 c.; Batavia, 3 t. 4 c.;
Barbados, 2 c.; Bombay, 1 c.;
Boulogne, 13 c.; Brisbane, 1 c.;
Buenos Ayres, 1 c.; Calcutta,
5 t. 4 c.; Colombo, 3 t. 19 c.;
Christiania, 3 t. 6 c.; Christ-
church, 1 c.; Durban, 3 c.;
Italy, 1 t. 4 c.; Karachi, 10 c.;
Madras, 1 c.; Singapore, 3 t.
17 c.; Tokio, 5 t.

GLYCERINE

Alexandria, 2 c., £17.; Brussels,
5 c., £27.; Calais, 2 t., £265.;
Calcutta, 8 c., £104.; Colombo,
2 c., £17.; Durban (crude), 10 c.,
£41.; Havre, 10 c., £65.;
Karachi, 1 c., £7.; Madras, 2 c.,
£14.; Malacca, 1 c., £9.; New
York (crude), 10 t. 5 c., £680.;
Soerabaya, 1 c., £7.

GOLD CHLORIDE

Colombo, 1 cs. (pt.), £7.

HEXAMETHYLENETETRAAMINE

Iquique, 1 cs. (pt.), £10.

HYDROCHLORIC ACID

Beira, 2 t. 10 c., £39.; Colombo,
2 c., £8.; East London, 2 c.,
£23.; Gibraltar, 1 c., £5.;
Karachi, 2 t. 6 c.; Rio de Janeiro,
9 c., £36.

HYDROFLUORIC ACID

Beira, 3 cs., £32.

HYDROGEN PEROXIDE

Cape Town, 4 cs., £25.; East
London, 1 cs., £6.

IODINE

Buenos Ayres, 1 cs. (pt.), £12.;
Karachi, 1 cs. (pt.), £6.; Rio de
Janeiro, 1 cs. (pt.), £11.

IODINE (RESUBLIMED)

Christiania, 1 cs. (pt.), £21.;
Durban, 1 cs. (pt.), £6.; Madras,
1 cs., £90.

IRON AND AMMONIUM CITRATE

Buenos Ayres, 2 cs. (pt.), £25.;
Calcutta, 1 cs., £12.

IRON CARBONATE

Calcutta, 1 ck. (pt.), £5.

IRON GLYCEROPHOSPHATE

Buenos Ayres, 1 cs. (pt.), £8.

IRON PERCHLORIDE

Monte Video, 4 cs., £8.

LACTIC ACID

Paris (F.), 5 cks., £15.

LEAD ACETATE

Bombay, 100 kgs., £338.; Madras
1 cs. (pt.), £15.; Padang, 2 cs.,
£17.; Piraeus, 1 ck., £11.

LITHIUM BENZOATE

Rio de Janeiro, 1 cs. (pt.), £10.

MAGNESIA (CALCINED)

Guayaquil, 4 cs., £19.; Rio de
Janeiro, 2 cs., £20.

MAGNESIUM CARBONATE

Alexandria, 2 cs. (pt.), £7.;
Guayaquil, 4 cs., £7.; Melbourne,
4 cs., £10.; Rio de Janeiro, 3 cs.,
£14.

MAGNESIUM CITRATE

Buenos Ayres, 2 cs., £14.;
Penang, 1 cs., £6.; Pt. Madryn,
17 pkgs. (pt.), £23.

MAGNESIUM SULPHATE

Beira, 4 c., £6.; Bocas del Toro,
6 c., £14.; Brisbane, 1 c., £6.;
C. Town, 6 c., £8.; Cartagena,
6 c., £14.; Colon, 1 t., £43.;
Corinto, 14 c., £34.; Guayaquil,
1 t. 8 c., £72.; Karachi, 5 c.,
£11.; Lagos, 10 c., £19.; Monte
Video, 3 t. 19 c., £79.; Panama,
1 t. 4 c., £61.; Rio de Janeiro,
1 t. 17 c., £56.; Sierra Leone,
8 c., £15.; Singapore, 4 c., £9.;
Sydney, 11 c., £21.

MANGANESE BINOXIDE

Antwerp, 3 cks., £35.

MERCURY BICHLORIDE

Constantinople, 1 cs. (pt.), £35.

MERCURY CYANIDE

Iquique, 1 cs. (pt.), £40.

MERCURY OXIDATE

Constantinople, 1 cs. (pt.), £35.

MERCURY PERCHLORIDE

Rangoon, 1 cs., £18.

METHYL ETHYL KETONE

Paris, 1 dr., £14.

METHYL SALICYLATE

Durban, 2 cs., £11.

METHYLENE BLUE

New York, 2 pkgs., £68.

MINERAL BLACK

Antwerp, 4 cks., £15.

NAPHTHOL SALICYLATE

Buenos Ayres, 1 cs. (pt.), £8.

NICKEL AND AMMONIUM SULPHATE

Rotterdam, 1 ck., £15.

NICKEL SALTS

Paris, 46 cks., £480.

NIGROSINE BASE

Havre, 1 ck., £56.

NITRIC ACID

Colombo, 3 c., £13.; Channel
Islands, 2 c., £6.; Karachi, 2 c.,
£5.; Pt. Dickson, 2 cs., £5.

PARAFFIN WAX—

Amsterdam, 2 c.; Bangkok, 11 c.; Lisbon, 20 c.

PEARL ASH—

Cape Town, 1 ck., £18.

PHOSPHATE—

Calcutta, 11 t. 16 c., £200.

PHOSPHORIC ACID—

Beira, 16 cs., £141.; Montreal, 20 crbys., £182.; Naples, 20 crbys., £390.; Paris, 40 crbys., £356.; Pt. Elizabeth, 1 cs., £8.; Rio de Janeiro, 1 ck., £18.

PHOSPHORUS—

Dunedin, 25 cs., £332.

PLUMBAGO—

Christiania, 1 t. 1 c.

POTASSIUM ACETATE—

Calcutta, 1 cs., £10.; Haarlem, 1 cs. (pt.), £5.; Karachi, 1 cs. (pt.), £9.

POTASSIUM BICARBONATE—

Brussels, 1 cs. (pt.), £5.; Calcutta, 1 cs., £7.; Canton, 10 cs. (pt.), £6.; Colombo, 1 cs., £14.; Karachi, 1 ck., £8.; Rangoon, 1 cs., £10.

POTASSIUM BICHROMATE—

Athens, 40 pkgs., £120.; Cologne, 50 cks., £345.; Monte Video, 5 cks., £98.; Piraeus, 1 ck., £11.; Switzerland, 1 ck., £55.

POTASSIUM BISULPHITE—

Boulogne, 20 cks., £110.

POTASSIUM BITARTRATE—

Canton, 7 cs. (pt.), £6.

POTASSIUM BROMIDE—

Calcutta, 1 cs. (pt.), 1 cs., £32.; Callao, 2 cs., £55.; Canton, 15 cs., (pt.), £6.; Genoa, 3 cs., £41.; Kobe (F.), 33 cs., £162.; Karachi 1 cs. (pt.), £8.; Rio de Janeiro, 5 cks. (pt.), £23.

POTASSIUM CHLORATE—

Bangkok, 1 c., £15.; Iquique, 1 cs. (pt.), £7.; Rio de Janeiro, 1 c., £15.

POTASSIUM CITRATE—

Calcutta, 1 cs. (pt.), £8.; Malacca, 1 cs. (pt.), £8.

POTASSIUM CYANIDE—

Antwerp, 10 c., £112.; Bahia, 1 c., £28.; Canton, 8 c., £174.; Malacca, 1 c., £17.; Paris, 5 c., £70.; Pt. Dickson, 1 c., £12.; Rio de Janeiro, 1 c., £15.; Singapore, 2 c., £50.

POTASSIUM HYDROXIDE—

Pt. Elizabeth, 1 cs. (pt.), £8.

POTASSIUM IODIDE—

Bahia, 1 cs., £55.; Calcutta, 1 ck. (pt.), £78.; Copenhagen, 1 cs., £153.; Durban, 3 cs. (pt.), £5.; East London, 1 cs., £78.; Monte Video (F.), 4 cs., £195.; Pt. Madryn, 17 pkgs. (pt.), £11.; Rio de Janeiro (F.), 2 cs., £182.; Rio de Janeiro, 1 cs. (pt.), £18.; Rotterdam, 1 cs., £15.

POTASSIUM METABISULPHITE

Calais, 10 c., £97.; Cape Town, 20 cks., £190.; Leghorn, 10 kgs., £112.

POTASSIUM MURIATE—

Calcutta, 1 cs. (pt.), £10.

POTASSIUM PERMANANATE—

Beira, 1 cs. (pt.), £89.; Novorossisk (F.), 8 drms., £672.; Rio de Janeiro, 9 cks. (pt.), £56.; Rangoon, 1 cs., £14.

POTASSIUM PRUSSATE—

Buenos Ayres, 1 pkg., £28.; Rosario, 1 ck., £28.

POTASSIUM SULPHIDE—

Callao, 2 cs., £105.; Sao Paulo, 1 cs. (pt.), £9.

POTASSIUM SULPHOGUAI-

ACOLATE—
Buenos Ayres, 1 cs. (pt.), 1 cs., £70.; Rio de Janeiro, 1 cs. (pt.), £22.

PRUSSIAN BLUE—

Copenhagen, 2 cks., £150.

PYROGALLIC ACID—

Colombo, 1 cs. (pt.), £6.; Pt. Elizabeth, 1 cs. (pt.), £5.; Tientsin, 2 drms., £60.

QUININE—

Aden, 137 ozs.; Calcutta, 17,985 ozs.; Cape Town, 259 ozs.

SALICYLIC ACID—

Brussels, 3 cs., £25.; Calcutta, 1 cs. (pt.), 3 cs., £21.; Copenhagen, 6 cks., £63.; Italy, 23 pkgs., £299.; Singapore, 1 kg., £7.

SALT—

Toronto, 2 t.

SALTCAKE—

Ghent, 170 t., £613.

SALTPETRE—

Colombo, 5 c., £18.; Maceio, 6 c., £18.; Pt. Elizabeth, 11 c., £40.; Rio de Janeiro, 6 t. 8 c., £382.; Rotterdam, 1 t., £55.; Santos, 10 t., £600.; Zanzibar, 2 c., £8.

SHEEP DIP—

Beira, 2 c., £5.; Cape Town, 11 c., £39.; Pt. Elizabeth, 5 t. 5 c., £375.; Punta Arenas, 10 t. 5 c., £540.

SILVER NITRATE—

Auckland, 1 cs. (pt.), £16.; Pt. Elizabeth, 1 cs. (pt.), £5.

SOAP—

Abo, 5 t.; Adelaide, 1 c.; Alexandria, 5 t. 10 c.; Amsterdam, 15 c.; Antwerp, 474 t. 3 c.; Auckland, 1 c.; Batavia, 4 c.; Bangkok, 6 c.; Bordeaux, 2 t. 13 c.; Bergen, 6 c.; Bombay, 9 c.; Boulogne, 46 t. 6 c.; Calcutta, 2 t. 6 c.; Cape Town, 1 c.; Constantinople, 3 c.; Cologne, 169 t. 18 c.; Colombo, 1 t. 8 c.; Copenhagen, 99 t. 17 c.; Demerara, 1 c.; Dunkirk, 8 t. 16 c.; Durban, 1 c.; East London, 6 c.; Gibraltar, 14 c.; Ghent, 2 t. 1 c.; Italy, 1 t. 9 c.; Karlstad, 11 c.; Kilindini, 2 c.; Lisbon, 2 c.; Mauritius, 6 c.; Monte Video, 10 c.; Mazagan, 4 c.; Montreal, 8 c.; New York, 19 c.; Ostend, 11 c.; Paris, 110 t. 9 c.; Pt. Elizabeth, 3 c.; Pt. Said, 2 c.; Rio de Janeiro, 2 c.; Rostoff, 9 t. 2 c.; Rotterdam, 35 t. 3 c.; Santos, 2 c.; Santa Cruz, 4 c.; Shanghai, 12 c.; St. Helena, 1 c.; Singapore, 4 t. 1 c.; Sydney, 2 c.; Soerabaya, 1 t. 5 c.; Stavanger, 6 c.; Tientsin, 10 c.; Trinidad, 5 c.; Valparaiso, 10 c.; Wellington, 4 c.

SODA—

Colon, 9 c., £7.

SODA COMPOUNDS—

Pt. Elizabeth, 3 pkgs., £23.

SODA CRYSTALS—

Buenos Ayres, 10 c., £6.; San Julian, 14 c., £10.; Smyrna, 11 c., £6.

SODIUM ARSENIATE—

Cape Town, 2 c., £6.

SODIUM BENZOATE—

Cape Town, 3 cs., £125.; Italy, 2 c., £60.; Lisbon (F.), 1 cs., £7.; Mauritius, 1 cs., £13.; Rio de Janeiro (F.), 1 c. (pt.), £17.

SODIUM BICARBONATE—

Brussels, 4 c., £7.; Corinto, 15 c., £30.; Durban, 3 c., £5.; East London, 4 c., £6.; Malta, 1 c., £6.; Panama, 1 t. 2 c., £43.; Rio de Janeiro, 1 t., £25.; Singapore, 3 c., £8.

SODIUM BISULPHITE—

Nantes, 4 c., £11.; Rouen, 35 t., £1,010.

SODIUM BROMIDE—

Callao, 1 cs. (pt.), £11.

SODIUM CARBONATE—

Jaffa, 4 c., £6.; Paris, 1 ck., £16.

SODIUM CITRATE—

Calcutta, 1 cs. (pt.), £6.; Cape Town, 1 cs., £25.

SODIUM CYANIDE—

Antwerp, 4 c., £35.

SODIUM GLYCEROPHOSPHATE—

Genoa, 5 crbys., £110.

SODIUM HYPO—

Bombay, 5 c., £13.

SODIUM HYPOSULPHITE—

Bombay, 1 t. 10 c., £34.

SODIUM IODIDE—

Calcutta, 1 cs. (pt.), £11.; Christiania, 1 cs. (pt.), £21.

SODIUM NITRATE—

Bombay, 12 cks., £251.

SODIUM PYROPHOSPHATE—

Amsterdam, 1 ck., £13.

SODIUM SALICYLATE—

Karachi, 1 cs., £6.; Pt. Elizabeth, 1 cs., £15.

SODIUM SULPHATE—

Amsterdam, 5 c., £6.

SODIUM SULPHATE (GLAUBER

SALTS)—

Alexandria, 1 t. 2 c., £14.; Calcutta, 13 c., £5.

SODIUM SULPHITE—

Antwerp, 2 t. 7 c., £58.; Calais, 3 kgs., £30.; Christiania, 1 t. 4 c., £29.; Jaffa, 4 c., £7.

SODIUM TARTRATE—

Bombay, 2 c., £15.; Madras, 1 cs., £8. Pt. Elizabeth, 1 ck., £7.

SPERMACEETI WAX—

Antwerp, 5 c.

STEARINE WAX—

Antwerp, 2 c.

SULPHUR—

Antwerp, 4 t., £134.; Havre, 5 t., £98.

SULPHUR (BLACK)—

Paris, 2 cks., £16.

SULPHUR (FLOWERS)—

Cape Town, 6 t. 14 c., £178.; Colon (F.), 2 c., £8.; Christiania, 1 t., £32.; Piraeus, 2 c., £8.; Pt. Elizabeth (F.), 9 c., £16.; Rotterdam (F.), 2 t., £69.

SULPHUR PRECIPITATE—

Wellington, 1 c., £5.

SULPHURIC ACID—

Beira, 1 t. 5 c., £33.; Karachi, 3 c., £12.; Pt. Elizabeth, 12 c., £21.; Singapore, 1 c., £8.; Spitzbergen, 1 c., £12.; Tarquah, 15 c., £19.

SUPERPHOSPHATE—

Channel Islands, 150 t., £994.

SUPERPHOSPHATE OF LIME—

Sao Paulo, 10 t., £133.

TALLOW—

Bombay, 3 t. 8 c.; Dusseldorf, 5 t. 9 c.; Nantes, 24 t. 2 c.

TANNIC ACID—

Calcutta, 3 cs. (pt.), £13.; Rio Gallegos, 1 cs. (pt.), £7.; Rio de Janeiro, 1 cs., £32.

TARTARIC ACID—

Alexandria, 1 cs., £10.; Christiania, 6 c., £119.; Colombo, 1 c. (F.), £11.; Corinto, 1 cs. (F.), £10.; Dunedin, 2 c., £35.; Kolding, 2 c., £43.; Madras, 1 c., £12.; Pt. Elizabeth, 4 c., £80.; Pt. Sudan, 1 c., £19.; Rangoon, 1 c., £11.; Rio de Janeiro, 4 c., £90.; Toronto, 1 t., £310.; Italy, via Treport, 1 c., £21.

TITANIUM SALTS—

Pt. Elizabeth, 1 kg., £11.

WAX—

Amsterdam, 1 t. 10 c.; Christiania, 10 c.; Colombo, 5 t.; Galatz, 2 t. 10 c.

WHITE LEAD—

Beira, £56.; Boulogne, £614.; Calcutta, £721.; Christiania, £100.; Durban, £10.; Ghent, £325.; Havre, £21.; Ostend, £302.; Paris, £920.; Rotterdam, £9.; Rouen, £247.; Shanghai, £235.

WOOD OIL—

Rotterdam, 2 t.

ZINC OXIDE—

Lisbon, 1 ck., £9.

ZINC SALTS—

Melbourne, 1 cs., £14.

ZINC SULPHIDE—

Bangkok, 3 cks., £8.

MANCHESTER.

Week ending August 13.

ALUM—

Treport, 10 bxs.

ALUM (CHROME)—

Bordeaux, 13 cks.

AMMONIA (LIQUID)—

Bordeaux, 6 drms.

AMMONIUM CARBONATE—

Gothenburg, 20 kgs.

AMMONIUM MURIATE—

Montreal, 17 cks.

BLEACHING POWDER—

Bordeaux, 29 cks.

CAUSTIC SODA—

Gothenburg, 50 drms.

CITRIC ACID—

Montreal, 6 cks.

COAL PRODUCTS (otherwise undes.)

Antwerp, £338.; Gothenburg, £242.; Malmö, £100.; Montreal, £74.; Rouen, £437.

GLUE—

Bombay, 2 bgs.

METAL ORE—

Bordeaux, 5 kgs.

POTASSIUM BICHROMATE—

Gothenburg, 3 pkgs.

PYRIDINE—

Bordeaux, 6 drms.

SALT—

Ghent, 1,400 kgs.; Gothenburg, 525 t.; Montreal, 1,600 t.; Quebec, 2,450 t.; St. John, N.B., 12,460 pkgs.

SIZE—

Gothenburg, 3 cks.

SOAP—

Antwerp, 356 cs.; Gothenburg, 30 cs.

SODA ASH—

Gothenburg, 1,040 bgs.

SODIUM BICARBONATE—

Antwerp, 198 kgs.; St. John, N.B., 300 kgs.

TARTARIC ACID CRYSTALS—

Montreal, 2 cks.

TITANIUM SODIUM OXALATE—

Treport, 9 pkgs.

MIDDLESBROUGH.

Week ending August 16.

AMMONIUM SULPHATE—

Kobe, 1,941 t. 8 c., £34,729.; Yokohama, 1,393 t. 15 c., £25,130.

CHEMICALS (otherwise undescribed)

Singapore, 17 t. 19 c., £281.

COAL PRODUCTS—

Benzole

Rotterdam, 26,063 galls., £2,520.

Naphthalene

Rotterdam, 2,224 galls., £210.

Pitch

Antwerp, 729 t. 2 c., £2,392.

MAGNESIUM CARBONATE—

Genoa, 20 t., £950.

SALT—

Landskrona, 243 t. 15 c., £648.;

Trelleborg, 220 t., £692.

TAR—

Shanghai, 1 t. 11 c., £66.

NEWCASTLE-ON-TYNE

Week ending August 16.

NIL.

N. & S. SHIELDS.

Week ending August 16.

NIL.

STOCKTON-ON-TEES.

Week ending August 16.

NIL.

SWANSEA.

Week ending August 16.

OXALIC ACID—

Bordeaux, 1 t. 12 c., £228.

PRICES CURRENT.

THURSDAY, August 21, 1919

PREPARED BY MESSRS. HIGGINBOTTOM AND CO., 21, SPRING GARDENS, MANCHESTER.

The values stated are F.O.R. at makers' works, or at usual ports of shipment in U.K., unless otherwise specified
The prices in different localities may vary.

Acids:—				£	s.	d.	£				s.	d.
*Acetic	40% and 60%	...	per cwt.	31/-	&	47/-	Lead, Carbonate (White lead), pure	...	per ton	51	0	0
"	Glacial	...	per ton	85	0	0	" Nitrate	...	"	56	10	0
Arsenic,	S.G. 2,000°	...	per ton	70	0	0	Lime, Acetate (brown)	...	"	11	0	0
Boric,	Crystals	...	"	72	0	0	" (grey), 80% (ex ship)	...	"	19	0	0
*Fluoric	...	per lb.	0	0	7	Magnesium Chloride	...	"	15	10	0	
*Muriatic (Tower Salts), 28° Tw.	...	per carboy	0	6	6	" Carbonate (light)	...	per cwt.	3	0	0	
*Nitric, 80° Tw.	...	per ton	31	0	0	" Calcined Magnesite	...	per ton	22	10	0	
Oxalic	...	per lb.	0	1	2½	" Sulphate (Epsom Salts) (coml.)	...	"	11	0	0	
Phosphoric, 1,750°	...	"	0	1	9	" (druggists)	...	"	16	0	0	
*Sulphuric (fuming, 70%)	...	per ton	—	—	—	Manganese, Sulphate	...	"	80	0	0	
" (Pyrites, 168°)	...	"	7	18	9	" Borate	...	"	109	0	0	
" (" 140°)	...	"	4	10	0	*Methylated Spirit, 64° (industrial)	...	per gal.	0	5	7	
" (free from arsenic, 144°)	...	"	5	7	4	*Naphtha (Wood), Solvent	...	"	0	10	0	
Tannic (commercial)	...	per lb.	0	2	6	" Miscible, 60° p.	...	"	0	10	0	
Tartaric (crystals)	...	"	0	3	1	Oils:—						
*Acetone	...	per ton	8	0	0	*Cottonseed	...	per ton	135	0	0	
*Alum, loose lump (delivered)	...	"	17	0	0	*Linseed	...	"	135	0	0	
Alumina Sulphate (pure)	...	"	17	0	0	Stearine, 115-120° M.P.	...	"	95	0	0	
Aluminoferic (in slabs)	...	"	8	10	0	Potassium, Bichromate	...	per lb.	0	1	6	
Aluminium (Ingot Metal, 98/99%)	...	per ton	150	0	0	" Carbonate, 80/82%	...	per to	95	0	0	
*Ammonia, Anhydrous	...	per lb.	0	1	10	" Chlorate	...	per lb.	0	1	0	
" 880	...	per ton	33	0	0	" Cyanide, 98%	...	"	—	—	—	
" 920	...	"	20	0	0	" Hydrate (Caustic Potash) 90%	per ton	16	0	0		
" Carbonate	...	per lb.	0	0	6½	" 75/80%	"	140	0	0		
" Muriate (grey)	...	per ton	50	0	0	" Potash Hydrate Liquid, 38° B.	"	70	0	0		
" (sal ammoniac) 1st & 2nd,	per cwt.	80/- & 75/-	—	—	—	" Nitrate (refined)	...	"	60	0	0	
" Nitrate	...	per ton	60	0	0	" Permanganate (B.P. crystals)	per lb.	0	3	6		
" Phosphate	...	"	110	0	0	" Prussiate (yellow)	...	"	0	1	9	
" Sulphate (grey), London, net	...	"	—	—	—	" (red)	...	"	0	5	6	
" " Hull	...	"	—	—	—	" Sulphate, 90% (ex ship)	per ton	40	0	0		
" " Manchester	...	"	—	—	—	" Muriate, 80%	...	"	30	0	0	
*Aniline Oil (pure)	...	per lb.	0	1	2	Silver (metal)	...	per oz.	0	4	11½	
Aniline Salt	...	"	0	1	2	Sodium (metal)	...	per lb.	0	1	3	
Antimony	...	per ton	45	0	0	" Acetate	...	per ton	52	0	0	
" (tartar emetic), 43/44%	...	per lb.	0	3	4	" Arseniate, 45%	...	"	60	0	0	
" (golden sulphide)	...	"	0	1	3	" Borate (Borax), Crystals	...	"	39	0	0	
Arsenic, white powdered	...	per ton	55	0	0	" Bicarbonate (1 cwt. kegs)	...	"	9	10	0	
Barium Chloride (in casks)	...	"	24	0	0	" Bichromate	...	per lb.	0	0	11	
" Carbonate (native), 92/94%	...	"	11	10	0	" Carb. (Caustic Soda-ash), 48%	per ton	12	10	0		
" Sulphate (native levigated)	...	"	£7 to £14	—	—	" (Alkali), 58% (bags)	f.o.r. {	6	0	0		
Baryta Chlorate	...	per lb.	0	1	3	" (Soda Crystals), (bags)	wks {	4	2	6		
*Bisulphide of Carbon	...	per ton	55	0	0	" Chlorate	...	per lb.	0	0	6¼	
Bleaching Powder, 35%	...	"	15	0	0	" Cyanide (100% basis)	...	"	0	0	10	
" Liquor, 7%	...	"	6	0	0	" Hydrate (76% C. Soda) (f.o.r.)	per ton	24	0	0		
Casein (commercial)	...	"	85	0	0	" (74% C. Soda)	"	23	5	0		
Chromium Acetate (crystals)	...	per lb.	0	1	6	" (70% C. Soda)	"	22	0	0		
Calcium Chloride	...	per ton	8	0	0	" (60% C. Soda)	"	21	0	0		
China Clay (at Runcorn), in bulk	...	"	70/-	to	90/-	" (pure liquid, 90° Tw.)	"	10	2	6		
Coal-tar Products and Dyes:—							" 77/78% Powdered (99%) Hydrate	"	24	10	0	
Alizarine (artificial), 20%	...	per lb.	0	2	0	" Hyposulphite (commercial)	...	"	16	10	0	
Magenta	...	"	18/-	to	35/-	" Manganate, 25%	...	"	65	0	0	
Anthracene, 40/50% A, f.o.b., L'don, per unit,	...	"	0	0	7	" Nitrate, 96%, reifd., f.o.r., L'pool	"	"	21	0	0	
Benzol, 90's (naked)	...	per gal.	0	2	0	" Nitrite, 100%	...	"	60	0	0	
" 50/50's	...	"	0	1	10	" Phosphate	...	"	26	0	0	
Carbolic Acid (crude, 60°)	...	"	0	1	5½	" Prussiate	per lb.	0	0	7¼		
" (crystallised, 40°)	...	per lb.	0	0	8½	" Silicate (glass) Alkaline	per ton	12	5	0		
" Acid (pale liquid, 97/98%)	...	per gal.	0	2	9	" (liquid, 100° Tw.)	...	"	9	10	0	
*Creosote (ordinary), naked	...	"	0	0	6½	" Sulphate (Saltcake), delivered	...	"	3	0	0	
*Crude Naphtha, 30% at 120°C.	...	"	0	0	9	" (Glauber's Salt)	...	"	3	10	0	
*Grease Oils, 18° Tw. (naked)	...	per ton	6	10	0	" Sulphide (conc.), 60/65% casks	...	"	19	0	0	
Pitch, f.o.b., Liverpool or Garston	...	"	2	14	0	" Sulphite	...	"	9	0	0	
*Solvent Naphtha, 90% at 160°	...	per gal.	0	2	1	Sulphocyanide, Ammonium, 95%	per lb.	0	2	1		
Copper	...	per ton	101	0	0	" Barium, 95%	...	"	0	1	4	
" Sulphate	...	"	43	0	0	" Potassium	...	"	0	2	4	
" Oxide (copper scales)	...	"	90	0	0	" Calcium, 70%	per lb.	0		4		
Dross Salts	...	"	39	0	0	Sulphur, (Flowers)	Sicilian per ton	23	0	0		
*Glycerine (crude), 80%	...	"	72	0	0	" (Roll Brimstone)	"	21	0	0		
" (industrial, S.G. 1,260)	...	"	110	0	0	" Brimstone (best thirds)	"	"	"	"		
*Iodine	...	per oz.	0	1	0	(ex ship)	...	"	14	10	0	
*Iron Nitrate, 80° Tw.	...	per ton	12	0	0	Tallow	...	"	100	0	0	
" Sulphate (copperas), delivered	...	"	4	10	0	Tin Crystals	per lb.	0	1	10		
" Sulphide	...	"	7	15	0	" English Ingots	per ton	270	0	0		
Lead (Foreign Pig)	...	"	25	0	0	Titanium, Potass. Oxalate	per lb.	0	1	6		
" Litharge Flake	...	"	45	0	0	Titanous Chloride	per cwt.	4	10	0		
" Acetate (white), (ex ship)	...	"	84	0	0	Zinc (Spelter)	per ton	40	10	0		
" (brown)	...	"	75	0	0	" Powder, 88/92%	"	70				
						" Chloride (solution, 102° Tw.)	"	23	10	0		
						" Sulphate, Crystal	"	22	0	0		

THE CHEMICAL TRADE JOURNAL AND CHEMICAL ENGINEER.

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EDITORIAL NOTICES.

Communications for the Editor, if intended for insertion in the current week's issue, should reach the office not later than Wednesday morning.

CURRENT TOPICS.

FUEL RESEARCH.

IT is now some two years since the Government appointed the Fuel Research Board, and we now learn that the experimental research station at Greenwich is nearing the stage of completion. The problems involved in this work will be mainly chemical, and we ought, eventually, to arrive at some clear conclusions on the question of low temperature carbonisation. The origin of the appointment of the Fuel Research Board was due to the fine preparatory and pioneer work of the Fuel Economy Committee of the British Association, whose annual meeting is to be held in Bournemouth early in September after a break of a year or two—the first in its history—due to the war. The driving force on that Committee was Professor W. A. Bone, and with the appointment of the Fuel Research Board the work of that Committee practically came to an end, inasmuch as it was understood that the Fuel Research Board would take it over. We all fully recognise, of course, that the difficulties of the past few years have made it practically impossible for any research, outside purely war work, to be carried on. Nevertheless, there is a feeling of dissatisfaction that so little has been done, having regard to the fact that the Government took the fuel question out of private hands so far as research was concerned. That was a step which was urged by the British Association Committee, but so far it would seem that slower progress has been made than if those enthusiasts who were working at the problem—but who were handicapped for want of funds—had been allowed to go along in their own way and had been provided with funds. That may or may not have been the case, but we notice that although from the preliminary programme of the British Association no mention is made of any report being forthcoming from the British Association Fuel Committee, in the programme of the Iron and Steel Institute meeting, which will be held later in September, there is to be a symposium on fuel economy more or less under the aegis of the British Association Committee. One of the first things which Professor Bone always laid down as essential to any complete scheme of fuel research and fuel economy was a chemical and mineralogical survey of the coalfields of the United Kingdom, and yet only a few weeks ago we find him complaining in public that so far as he was aware no steps in that direction had yet been taken. The site of the experimental research station of the Fuel Board at Greenwich has been leased at a nominal rent

by the South Metropolitan Gas Co., the chairman of which is Dr. Charles Carpenter, who also has been taking a keen interest in fuel economy. The original plans were that actual experiments would have been commenced within nine months, but we are given to understand that certain requirements of the Office of Works in the matter of the design of the building have had the effect of delaying the completion for nearly another eighteen months; and this in relation to one of the most, if not the most, urgent problems with which the country is faced to-day. Generally speaking, therefore, the position is no further advanced than it was, experimentally, when the British Association Fuel Committee last reported, although, of course, a considerable amount of necessary preliminary work has been carried out. Whatever delays have been occasioned cannot be placed to the account of the Fuel Research Board, which consists of scientific men only too keenly alive to the urgency of the position. Sir George Beilby, and those associated with him, are essentially men of action, as has been shown in their reports already issued, but if the experimental side of fuel economy is to make rapid progress under Government auspices it is essential that it be carried out on business lines, and that the business and scientific men whose services have been secured shall have a free hand without being trammelled by the inevitable circumlocution of Government management.

TRADE PROSPECTS IN INDIA.

FROM the figures given in the annual review of the trade of India, 1917-18, to which we briefly referred a few weeks ago, it will be observed that the British Empire is the greatest factor in India's foreign trade, and this position has been fully maintained during the war, despite the keen and new competition which the war introduced from the United States and Japan. A more recent report from H.M. Trade Commissioner in Calcutta, however, calls attention to the importance of British manufacturers of all classes of products fully appreciating that the India of to-day is a very different country, viewed from the point of view of British trade, from what it was a few years ago. We know in this country the strength of American chemical industry, and there is little doubt that the competition from this quarter will continue and will have to be fought. In addition, the development of the steel industry in India, with its by-product installations, will produce on the spot large quantities of coal tar, benzole, sulphate of ammonia, and other products. The great factor, therefore, to be considered, so far as Indian trade *per se* is concerned—leaving on one side for the moment manufacturing methods in this country with the view of reducing production costs,—is the business methods to be adopted for adequately dealing with trade in India. What are wanted are efficient selling organisations. This is the same advice that has been given for years by our Consular Service and Board of Trade representatives. Broadly speaking, it has never been acted upon in a comprehensive manner, and it therefore comes to-day with greater force than ever in view of the new circumstances brought about by the war. In the past too many British firms have been content to be represented in India by mercantile agents, and so far as principal lines of business are concerned, British manufacturers, who already have a large interest in the market, are advised to open offices and establish selling organisations of their own. Of course, many firms have already done this, with conspicuous success, and that makes it all the more surprising that

a greater number of others have not followed suit. H.M. Trade Commissioner urges that where the trade to be obtained does not warrant a manufacturer going to the extent of maintaining his own organisation, it would be advisable for him to co-operate with some half-a-dozen other manufacturers of non-competing articles and form a group-selling organisation on the spot with a trained staff in charge. We do not doubt that British manufacturers realise that they will have to face much more intense and sustained competition in the future than they have done in the past. Whilst the future of Germany is so uncertain that it may be some years before German competition becomes a force again in India, yet it must not be overlooked that there is not the same intensity of feeling in the East against enemy States as there is amongst the Allies in Europe. Dealers in India do not mind as a rule whether they buy British, American, or German goods provided they are able to get what they want at a low price. The British merchant overseas, also, is to a large extent cosmopolitan, and while naturally he would prefer to distribute British goods, he would, with very few exceptions, readily turn his attention to foreign articles if they showed a greater margin of profit. Bound up with the development of a successful selling organisation, obviously there is the onus upon the British manufacturer of bringing down his costs of production to a competitive level, and to maintain his unexcelled quality. As we have said, competition from America in particular, and also from Japan, will be severer than ever before. Both these countries have developed their shipping, financing, and distributing organisations, and although in the matter of sales the British manufacturer must be guided by the nature of his product as to the method he adopts, in many cases he should visit the country himself in order that he may the better realise how different the India of to-day is, and how much more difficult and complex the problems that have to be faced are, compared with the India of pre-war times.

ANALYSIS OF BASIC SLAG.

MR JOHN HUGHES, Official Agricultural Analyst for Herefordshire, writes: The analysis of basic slag requires special attention, and differences in the results obtained by analysts vary much more than in the case of ordinary raw phosphates, such as Algerian, Gaisa, or Florida.

In order to separate the silica it is absolutely necessary that the original hydrochloric acid solution should be evaporated to complete dryness in a water bath kept at boiling temperature, otherwise the amorphous silica is not rendered insoluble so that it can be removed by subsequent filtration. Unfortunately, however, such evaporation to hard dryness makes the elimination of the phosphoric acid from the residue by exhaustion, even with strong hydrochloric acid, a difficult matter, and it is always necessary again to exhaust the silicious matter after filtration and ignition with more acid, otherwise from 1 to 2 per cent. of phosphate of iron may remain unaccounted for in the residue.

Quite recently a basic slag guaranteed to contain 38 per cent. of phosphate of lime was the subject of a difference of nearly 2 per cent. by analysts operating on duplicate samples, and a third analysis was necessary, the results of which fully confirmed the quality guaranteed.

The writer has found if one gramme of chloride of sodium be added to the two grammes of basic slag taken for analysis, and the hydrochloric acid solution be evaporated to dryness in the usual way, that on treating the hard residue with strong hydrochloric acid, warmed, and then diluted with water before filtration, the elimination of the phosphoric acid from the silicious matter is much more readily and completely effected; so that practically no appreciable quantity of phosphoric acid is left behind in the insoluble residue.

THE PROGRESS OF ANALYTICAL CHEMISTRY.*

By C. AINSWORTH MITCHELL.

(Concluded from page 195.)

Inorganic Analysis.

QUALITATIVE.—Further applications of the use of textile fibres impregnated with reagents in microscopical qualitative analysis have been devised. It has been shown that the difficulties which attend the use of test papers are obviated when a single test fibre is used. For example, a fibre of turmeric viscose silk is a sensitive reagent for boric acid, being capable of detecting 0.000025 milligramme of boron, whilst wool fibres saturated with zinc sulphide are suitable for the detection of traces of copper (0.001 milligramme) and other heavy metals.

A test for iodides in the presence of cyanides has been based on the precipitation of the cyanide by means of cobalt nitrate, and detection of the iodide in the filtrate by oxidation with potassium permanganate in the presence of sulphuric acid and chloroform. Comparative experiments with different oxidising agents have shown that the liberation of iodine from potassium iodide is least affected by cyanides when permanganate is used as the oxidising agent.

A solution of mercuric nitrate in nitric acid may be used for the detection of the sulphuric ion in insoluble sulphates. This reagent forms turpeth mineral, which may readily be identified under the microscope. In the case of mixtures, the sulphate should be precipitated as barium sulphate, and the test applied to the precipitate.

A method of detecting selenium in sulphuric acid depends on the fact that such acid shows a pronounced violet coloration when tested with aspidospermine. Sulphuric acid free from selenium does not show this reaction, but after the addition of an oxidising agent produces a rose-red coloration.

The detection of phosphoric acid by means of molybdic-acid solution is rendered ten times more sensitive by the addition of pyridine to the reagent.

The compounds formed on adding a concentrated solution of potassium iodide to ammoniacal solutions of cadmium and nickel salts afford a means of separating and identifying those metals in presence of other metals. Cadmium forms an insoluble, white precipitate, $\text{Cd}(\text{NH}_3)_2\text{I}_2$, composed of white octahedra, whereas copper gives no precipitate with the reagent. The nickel compound is bluish-violet, has the formula $\text{Ni}(\text{NH}_3)_6\text{I}_2$, and is also composed of regular octahedra. Cobalt forms an analogous precipitate, and should therefore be separated before applying the test for nickel.

On heating for a few minutes a solution containing osmium in the tetroxide condition, or an osmichloride, with an excess of thiocarbamide and a few drops of hydrochloric acid, a coloration is obtained ranging from rose to deep red, according to the concentration of the osmium. The reaction, which is capable of detecting 1 part of osmium in 100,000 is due to the formation of a red compound of the composition $[\text{Os}6\text{NH}_2\cdot\text{CS}\cdot\text{NH}_2]\text{Cl}_3\cdot\text{H}_2\text{O}$.

Other colour reactions which have been described are those given by thorium and zirconium with an aqueous solution of pyrogallolaldehyde. This reagent gives a yellow coloration and precipitate with thorium salts, whilst with zirconium compounds it produces a similar coloration and precipitate after boiling or the addition of hydrogen peroxide. The test is capable of detecting 0.1 milligramme of thorium nitrate in 100cc. The reaction is not produced by pyragallol, pyrogallolcarboxylic acid, or protocatechualdehyde.

Quantitative.—The use of thymolsulphophthalein as an indicator in acidimetric titrations has many advantages, owing to the fact that it shows two distinct changes of colour at different hydron concentrations. It may therefore be used for the differential titration of mixtures of weak and strong acids, such as benzoic and hydrochloric acids, or acetic and sulphuric acids, although in the latter case the error may be as much as ± 0.5 per cent. Another application of this indicator is in the titration of aniline with hydrochloric acid.

A method of estimating the alkalinity of certain liquids, such as soap solutions, has been based on the measurement of the volume of nitrogen which the solution liberates from a nitrosamine. This gives results sufficiently trustworthy for practical purposes, although not so accurate as those

obtained by measuring the pressure of the gas. Nitrosotriacetnamine and nitrosovinylidacetnamine are suitable compounds for titrations within definite limits of hydroxyl-ion concentration.

An acidimetric method of titrating zinc will be found of use when a rapid estimation of the metal is required. The solution, which must contain the zinc in the form of chloride and be free from other heavy metals, is neutralised with sodium hydroxide, methyl-orange being used as indicator, and, after the addition of phenolphthalein, is titrated with $N/10$ -sodium hydroxide solution. The end-point of the titration is indicated by the pink colour not disappearing when the liquid is boiled. The precipitated zinc hydroxide does not interfere with the accuracy of the results.

Several new iodometric methods have been published during the year. For the estimation of copper and iron, advantage has been taken of the fact that the salts of both metals liberate iodine from a solution of potassium iodide in dilute acetic acid. When both iron and copper are present, the former may be precipitated as ferric phosphate, which does not liberate iodine from potassium iodide, and the liquid again titrated. The iodine found in the first titration is equivalent to the copper and iron together, whilst that obtained in the second titration corresponds with the amount of copper. The method is also applicable in the presence of zinc and aluminium.

In another iodometric method of estimating copper, the solution of the metal is nearly neutralised, and the copper converted into cupric acetate. After the addition of excess of sodium thiosulphate and slight excess of potassium thiocyanate, the liquid is filtered from the cuprous thiocyanate, and the excess of thiosulphate in the filtrate titrated with standard iodine solution. Of the common metals, only iron interferes with the estimation.

In estimating sulphites by oxidation to sulphates by means of potassium iodate, it is essential that there should be an excess of the iodate and sufficient hydrochloric acid to prevent the hydrolysis of the iodine chloride formed in the reaction



The excess of iodate is then estimated by means of standard iodine solution. The method may also be used for estimating lead sulphide, which is introduced in a freshly precipitated state into the iodate solution.

In estimating selenious acid by the direct process, it is necessary to add four times the theoretical amount of potassium iodide, to heat the mixture with hydrochloric acid in a distillation flask, and to titrate the iodine both in the receiver and the residue. The indirect method is also trustworthy when a similar procedure is used. Selenic acid is best estimated by reduction with hydriodic acid.

In analysing a mixture of phosphorus, hypophosphorus, and phosphoric acids, a phosphorus acid may first be estimated by determining the iodine absorption of the solution. The hypophosphorus acid is then hydrolysed in the presence of hydrochloric acid in accordance with the equation $\text{H}_4\text{P}_2\text{O}_6 + \text{H}_2\text{O} = \text{H}_3\text{PO}_3 + \text{H}_3\text{PO}_4$, and the resulting phosphorus acid estimated iodometrically as before. Finally, the solution is oxidised and the total phosphoric acid estimated.

For the estimation of hypobromite in the presence of bromate or hypoiodite in the presence of iodate, the hypobromite or hypoiodite is oxidised by means of a mixture of sodium hydroxide and hydrogen peroxide, $\text{NaBrO} + \text{H}_2\text{O}_2 = \text{NaBr} + \text{H}_2\text{O} + \text{O}_2$, the liquid boiled to expel the excess of hydrogen peroxide, potassium iodide and sulphuric acid are added, and the iodine liberated by the bromate is titrated. Another portion of the solution is treated with potassium iodide and sulphuric acid to obtain the iodine equivalent of the hypobromite and bromate together, and the hypobromite is obtained by difference. A method of estimating iodates and bromates in the same solution has been based on the fact that bromates are gradually decomposed by dilute hydrochloric acid with the formation of hydrobromic acid and hypochlorous acid, whilst iodates are not affected. The iodine equivalent of the two compounds together is obtained as described above. Another portion of the solution is then treated with dilute hydrochloric acid, and subsequently oxidised with hydrogen peroxide and sodium hydroxide, and the iodine equivalent again determined. The difference

* Abstracted from the Chemical Society's "Annual Reports on the Progress of Chemistry for 1918."

between the amounts obtained in the two titrations corresponds with the bromate.

An iodometric method of estimating nitrites has been based on the reaction $\text{NaNO}_2 + 2\text{HI} = \text{NaI} + \text{I} + \text{NO} + \text{H}_2\text{O}$, which is carried out in a series of connected flasks. The liberated iodine is titrated with arsenious acid.

In this connection, mention may also be made of a general method of estimating iodine in inorganic and organic compounds, based on its conversion into iodine trichloride. The iodine liberated in the reaction, $6\text{FeSO}_4 + 3\text{H}_2\text{SO}_4 + 2\text{ICl}_3 = 3\text{Fe}_2(\text{SO}_4)_3 + 2\text{I} + 6\text{HCl}$, is extracted with chloroform and titrated with thiosulphate solution.

An oxidimetric method of estimating thorium has been described. The thorium is precipitated as oxalate, and the precipitate heated at 85° with dilute sulphuric acid, and titrated first in the cold and finally at 85° with standard potassium permanganate solution. If a known excess of oxalic acid has been used for the precipitation, the filtrate may be heated to 85° and titrated with permanganate. An extension of the method may also be used for estimating fluorine. The fluoride is precipitated as thorium fluoride by means of an excess of thorium, the excess of which, in turn, is precipitated as thorium oxalate.

Metallic silver may be used as a reducing agent in the volumetric estimation of iron, the dissolved silver being subsequently precipitated as thiocyanate. The filtrate is treated with an excess of silver nitrate and titrated with potassium permanganate solution. The presence of titanium does not affect the results, but vanadium is quantitatively reduced by silver. Titanous chloride may also be used as a reducing agent for ferric salts, the excess being subsequently removed by means of copper sulphate.

It has been pointed out that in titrating potassium permanganate solution containing nitric acid with sodium arsenite, the latter has a reducing value considerably in excess of that shown when no acid is present. It is probable that a manganic compound is formed under these conditions.

To obtain trustworthy results in the titration of chlorides by Volhard's method, the liquid should be stirred at the first indication of change of colour, and the titration then completed. Thiocyanates, if present, should be oxidised with sodium peroxide in sulphuric acid solution before the titration. In using the method conversely for the estimation of silver, the presence of other metals, such as mercury, lead, nickel, or cobalt, or of lower oxides of nitrogen, causes the results to be inaccurate. The use of palladium iodide as indicator renders the method more trustworthy and sensitive and capable of being used in the presence of the substances mentioned. The addition of a small amount of gum arabic is advisable to prevent the precipitation of silver or palladium iodide during the titration.

A volumetric method of estimating chlorides, bromides, and cyanogen consists in titrating the solution with standard mercuric nitrate solution, using sodium nitroprusside as indicator. The results are more accurate than those obtained by Volhard's method, and the method can be used in the presence of sulphates and phosphates, although sulphites and nitrites must be removed before the titration. Conversely, the method is applicable to the estimation of mercury.

The presence of dissolved or gelatinous silica does not interfere with the titration of chlorine with silver nitrate, provided that the liquid is made neutral to phenolphthalein with nitric acid, and any resulting gelatinous mass is finely distributed throughout the liquid before introducing the reagent.

One objection to the method of titrating copper with potassium cyanide solution is that the end-point of the reaction is no longer sharp when much less than 1 gramme of copper per litre is present. For smaller quantities, a volumetric method has been based on the fact that a solution of a double carbonate of copper and an alkali metal in excess of sodium carbonate solution gives a sharp reaction with potassium cyanide. The double carbonate is prepared by adding a solution of sodium carbonate and sodium hydrogen carbonate to the copper solution.

The results obtained by the volumetric method of estimating lead by means of ammonium molybdate, as ordinarily used, are too high. To obviate this, it is essential to dissolve the lead sulphate in the smallest possible quantity of ammonium acetate solution.

Calcium may be estimated volumetrically by precipitating it under specified conditions with an excess of ammonium oxalate, the excess of which is subsequently titrated in the filtrate by means of potassium permanganate solution.

Turning to the gravimetric methods, it will be found that several new methods of separating metals in different groups have been described. For example, for the separation of copper, zinc, cadmium, nickel, and cobalt, the metals are precipitated by means of sodium carbonate, the precipitate is dissolved in the minimum quantity of ammonia solution, and the liquid diluted and boiled until reprecipitation is complete. The precipitate may be an oxide, as in the case of copper, a hydroxide or hydrocarbonate, as in the case of zinc and nickel, or a carbonate, as cadmium carbonate. The precipitate is ignited, or sometimes is preferably reduced with hydrogen, and the metal weighed. For the separation of individual metals, modifications of various well-known methods may be employed.

Another new method is concerned with the separation of metals of the copper group from those of the arsenic group. It is based on the facts that the sulphides of mercury, arsenic, antimony, and tin are soluble in a solution of sodium hydroxide saturated with hydrogen sulphide, and then mixed with a more concentrated sodium hydroxide solution, whereas the sulphides of lead, bismuth, copper, and cadmium are insoluble therein.

Dicyanodiamide sulphate is a convenient reagent to use for the quantitative precipitation of copper or nickel when it is desirable not to use an alkali hydroxide. It may also be used as a group reagent for separating copper and nickel from zinc, aluminium, arsenic, lead, and antimony.

The use of hydrofluoric acid in electrochemical analysis is mentioned elsewhere. A further application of this reagent has been based on the fact that stannic tin and tungsten are not precipitated by hydrogen sulphide from an acidified fluoride solution, and may thus be separated from copper, lead, silver, mercury, antimony, and arsenic.

The accuracy of the results obtained by estimating sulphuric acid as barium sulphate depends to a considerable extent on the rate at which the barium chloride is added, whilst other factors, such as the concentration, the amount of stirring, and the acidity of the liquid have a much smaller influence. At least one and a-half minutes should be allowed for the addition of the reagent. In the presence of potassium salts, the results are too low, but tend to compensate the high results caused by a too rapid addition of barium chloride.

Gravimetric methods of estimating chromates and dichromates as barium chromate and as silver chromate have been described. In each case, the insoluble chromates are precipitated and washed under specified conditions, dried at 132° , and weighed. The silver method is the more trustworthy, but is not applicable in the presence of chlorides, whilst the barium method cannot be used in the presence of sulphates. Nitrates, chlorates, and acetates do not affect the results, but even when the silver method is used, sulphates cause the results to be too high.

A similar method has been devised for the estimation of strontium, which is precipitated as sulphate, carbonate, or oxalate, preferably the last. In each case, the precipitate is washed with a saturated solution of the respective strontium salt, dried at 132° , and weighed. It should be noted that magnesium chloride interferes with the estimation as oxalate. For the separation and estimation of barium when associated with strontium, the saturated solution of the two chlorides is treated with a mixture of hydrochloric acid and ether, and the precipitated barium chloride washed with the same mixture, dried at 150° , and weighed.

For the estimation of magnesium, the compound $\text{MgNH}_4\text{PO}_4 \cdot 6\text{H}_2\text{O}$ is precipitated at 90° , washed with ammonia and methyl alcohol, dried over calcium chloride, and weighed. The method cannot be used, however, when any considerable quantity of potassium chloride or sodium chloride is present.

Several new methods of separation by means of volatilisation have been published. When tantalum is precipitated as tantalum acid, the silica which is usually present cannot be separated by treatment with hydrofluoric acid without some loss of tantalum. To obviate this difficulty, the tantalum acid may be volatilised in a current of hydrogen chloride at 900° , and the residual silica weighed.

Other volatilisation methods have been devised for vanadium, molybdenum, and tungstic acid. In the case of vanadium, the compound is heated in a current of carbon dioxide and carbon tetrachloride in a silica tube, and the resulting vanadium chlorides collected in dilute nitric acid and water. The vanadic acid is then reduced to vanadyl sulphate, and the solution titrated with standard permanganate solution. Molybdenum compounds are volatilised

at 400–560° in carbon tetrachloride vapour, and the volatilised molybdic acid is collected, evaporated with nitric acid, and weighed. For the volatilisation of tungstic acid, a current of carbon dioxide saturated with carbon tetrachloride vapour is used, and the separated acid treated as in the case of molybdic acid.

The new colorimetric methods include one for the estimation of manganese, which depends on the oxidation of manganese salts by means of an alkali periodate in acid solution, and comparison of the resulting permanganate with standard solutions. Tungstic acid may also be estimated colorimetrically by reducing it by means of titanous chloride, and comparing the blue oxide which remains in suspension under certain conditions with standard suspensions of known composition. The method is not applicable in the presence of vanadium, phosphorus, or molybdenum, and these if present must be removed prior to the estimation.

Electrochemical Analysis.

Further applications of the electrometric method of titration have been described during the year. For example, it is a convenient method of estimating manganese in steel. For this purpose, the manganese is oxidised to permanganate by means of sodium bismuthate or ammonium persulphate, and the resulting solution titrated with mercurous nitrate solution. The presence of chromates or vanadates does not interfere with the estimation. Another modification of the method has been devised for the titration of solutions containing proteins, a special apparatus being used to prevent local reactions when the reagent first comes in contact with the solution.

On titrating oxalic acid with sodium hydroxide solution, a sharp change occurs in the electrical conductivity of the liquid at the moment when the first hydrogen atom is displaced by sodium. Should, however, the sodium hydroxide contain carbonates, the results obtained in the estimation of oxalic acid will be too high. By means of this method, it is also possible to titrate strong acids in the presence of weaker acids.

An apparatus has also been devised for measuring the density and the amount of salts in a liquid by means of its electrical conductivity at a definite temperature. The current is derived from two electrolytic cells connected with an alternating current galvanometer and a recorder. A method of this sort should prove useful for following the progress of concentration of liquids being evaporated.

A method of estimating vanadic acid has been based on its reduction in the presence of sulphuric acid by means of anodes of silver or copper in rapid rotation in an electrolytic cell, or by means of a rotating cylinder of zinc. Over reduction is prevented by the addition of silver sulphate, and the completion of the reduction is shown by the appearance of metallic silver. The liquid is then filtered and the vanadium estimated by titration with potassium permanganate. The best results are obtained by the use of silver plated with pure copper.

It has been found that hydrofluoric acid is a useful reagent for electrolytic separations. For example, copper can be quantitatively separated from vanadium, tin, or tungsten and electrolytically deposited from an acid fluoride solution. Uranium and titanium behave in the same way as vanadium. The stannic ion does not appear to be present to any notable extent in acid fluoride solutions of stannic tin, but on adding boric acid to the solution, the tin may then be separated either electrolytically or by means of hydrogen sulphide.

By fractional electrolysis of a dilute solution of the sulphates of gallium and iridium, it is possible to separate the gallium in a pure condition, but it is necessary to repeat the electrolysis about fourteen times.

Water Analysis.

The introduction of rapid methods of examining water for the use of armies in the field has been one of the features of recent work in this branch of analysis. For the rapid determination of the hardness of water on the spot, Blacher's method of titration with potassium palmitate is in general the most suitable, and the reagent is prepared for the purpose in the form of standardised pellets.

It has been found that Wartha and Pfeiffer's method of estimating the hardness is rendered more trustworthy, especially in the case of waters rich in magnesium salts, by increasing the amount of sodium carbonate to 14.5 grammes, and that of the sodium hydroxide to 8.01 grammes, per litre.

A suggestion has been made that the hardness of water might be estimated by measuring the increase in the surface

tension after the addition of calcium or magnesium salts to an alkaline soap solution.

For the rapid estimation of magnesium in water, an alkalimetric method has been devised. The water is rendered neutral to methyl-orange and treated with potassium oxalate in slight excess of the amount equivalent to the calcium present, and then with a measured excess of a mixture of standard alkali hydroxide and carbonate solutions. The liquid is then made up to definite volume and filtered, an aliquot part of the filtrate treated with an amount of calcium chloride equivalent to the excess of potassium oxalate used, and the excess of alkali titrated.

In the colorimetric estimation of lead in water, the salts present have a considerable influence on the intensity of the colour reaction. To obviate this, it is necessary to prepare the standard lead solutions for the comparison from the same water which has previously been freed from lead. Comparisons made with standards prepared from distilled water may give results much too low.

A colorimetric method of estimating minute quantities of vanadium in water has been based on the fact that diphenylamine gives a violet coloration with aqueous solutions of vanadium compounds acidified with hydrochloric acid. The test is capable of detecting 0.002 per cent. of vanadium, and is not affected by small quantities of iron, titanates, or nitrates, but in the presence of free nitric acid the method would require modification. For a quantitative estimation, the colour may be compared with that given by solutions containing known quantities of ammonium vanadate.

In Riegler's colorimetric method of estimating phosphoric acid in water, the hydrazine sulphate may conveniently be replaced by stannous chloride.

A new colorimetric method has also been devised for the detection of nitrites in water. The sample is treated first with antipyrine solution, then with mercuric sulphate solution, and finally with a few drops of potassium ferricyanide solution, a red coloration being produced in the presence of a trace of nitrite. The test is also applicable to nitrates after reduction to nitrites.

FERTILISER SCARCITY.

DR. E. J. Russell contributes to the August *Journal* of the Board of Agriculture an interesting summary of the work carried out at Rothamsted Experimental Station, near Harpenden. He explains that in the earlier years of the war there were not many important matters which required to be investigated, but in 1916, when the food problem became acute, methods of dealing with the situation were closely studied, and much valuable information was gained. For instance, the limitation of the amount of fertilisers available to the farmer was a serious matter. The production of sulphate of ammonia fell from 350,000 tons per annum to a little over 250,000 tons, while superphosphate fell from 800,000 tons to 500,000 tons. A substitute for sulphuric acid was provided in the form of nitre-cake, but the fertiliser manufacturer did not like it. A working solution of the problem, however, was found, and Dr. Russell adds that "there is little doubt that both sulphate of ammonia and superphosphate could have been made from nitre-cake had the necessity arisen." The situation eased, however, before it became too serious. The difficulty of obtaining potash and securing an efficient substitute was one of the urgent questions. Residues from manufacturing processes were available, but they chiefly suffered from one or two, or both, of two defects, low content of potash and the presence of toxic substance. After sorting out, blast furnace flue-dusts were regarded as likely to prove most suitable, and arrangements were made for distribution. Considerable quantities have been used, and generally with distinct advantage.

Then the elimination of loss in the manure heap through avoidable causes was carefully investigated, and the conditions which make for success are stated to be protection from rain and efficient storage. A new process by which sewage sludge can be used is being studied, as it gives a sludge containing 6 per cent., or more, of nitrogen in an easily available form. Before its agricultural value can be established, however, there are many problems to be studied, and work is now going forward. Other aids to production, such as a close study of calcium cyanamide and ammonium nitrate, may yield good results, and naturally, in view of the importance of basic slag in modern farming, considerable attention is being devoted to it.

IMPORT RESTRICTIONS ON CHEMICALS.

WITH reference to the Prime Minister's statement in Parliament last week on the subject of trade policy, the Board of Trade make the following announcement as to the steps which are proposed in connection with imports of goods from abroad.

Legislation will be introduced when Parliament reassembles in the autumn:—

(a) For the protection of goods manufactured in Great Britain and Ireland against dumping by taking power to prevent the sale in this country of similar goods beneath their price in the country of origin.

(b) To enable the Board of Trade to check any flood of imports (for instance from Germany) that might arise from a collapse of exchange so disproportionate to costs of production in the country of origin as to enable sales to take place in this country at prices altogether below costs of production here.

(c) To deal with unstable "Key" industries in the following way:—

A limited number of unstable "Key" industries will be scheduled, the products of which will be prohibited from importation into this country except on licence.

Pending legislation, a general license under the Prohibition of Import Proclamations will be issued by the Board of Trade having effect as from September 1, 1919, and authorising the importation into the United Kingdom of all goods with the exception of those in the following list, which will be treated as unstable "Key" industries:—

(1) All derivatives of coal tar generally known as intermediate products capable of being used or adapted for use as dyestuffs or of being modified or further manufactured into dyestuffs. All direct cotton colours, all union colours, all acid colours, all chrome and mordant colours, all alizarine colours, all basic colours, all sulphide colours, all vat colours (including synthetic indigo), all oil, spirit and wax colours, dyes, stains, colour acids, colour lakes, leuco acids, leuco bases whether in paste, powder, solution, or any other form.

(2) (i) Synthetic drugs (including antiseptics.) (ii) Synthetic perfumes and flavourings; synthetic photographic chemicals; synthetic tannins; esters and acid derivatives of aromatic hydrocarbons; alkaloids and their salts (except quinine); and the following organic chemicals:—Acetamide; acetic acid; acetic anhydride; acetyl chloride; camphor bromide; cinnamic acid and its salts; ethylene bromide; formamide; formic acid and its salts; gallic acid; lactic acid and its salts; nuclein; paraldehyde; pyrogallol; saccharine or other substances of like nature or use; salicin; thymol. (iii) Analytical re-agents; and the following fine chemicals:—Barium compounds; cerium fluoride and fluorides of other rare earth metals; hydrosulphites and allied bleaching compounds; hypophosphorus acids; iron and ammonium citrate; iron tartrate; molybdic acid and its salts; phosphorus oxides and halogen compounds; salts of per acids and artificial peroxides; silver nucleinate and proteinate; tungstic acid and its salts.

(3) Optical glass including lenses, prisms and like optical devices.

- (4) Scientific glassware.
- (5) Illuminating glassware.
- (6) Laboratory porcelain.
- (7) Scientific and optical instruments.
- (8) Potassium compounds.
- (9) Tungsten powder and ferro-tungsten.
- (10) Zinc oxide.
- (11) Lithopone.
- (12) Thorium nitrate.
- (13) Gas mantles and mantle rings.

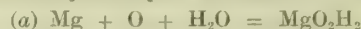
It is not proposed to make any addition to the above list unless and until Parliament so determine, with the possible exception that in the event of the contingency foreshadowed in paragraph (b) above arising it might be necessary to suspend temporarily all or any of the imports from the country affected by the collapse of exchange.

CHARCOAL BRIQUETTES.—The Forest Research Institute of India is making experiments on the manufacture of charcoal briquettes, but is handicapped by lack of a suitable binding material.

SOME CHEMICALLY REACTIVE ALLOYS.*

By E. A. ASHCROFT.

AN alloy of 15 per cent. of pure magnesium with 85 per cent. of pure lead has the remarkable property that upon exposure to moist air oxidation of both the magnesium and the lead proceeds so rapidly that a lump of alloy so exposed swells up and falls to a black powder in a single night, or in some instances even in an hour or two. The reactions to this point may be expressed thus:—



from which it will be seen that both water vapour and oxygen take part and that hydrate of magnesium and sub-hydrate of lead are the products formed.

On more prolonged exposure the finely divided sub-hydrate of lead will pass over completely into the hydrate $\text{PbO}_2 \cdot \text{H}_2$ with a corresponding change of colour. However, a much longer period at ordinary atmospheric temperature is required for this second stage of oxidation. Oxidation of the sub-hydrate of lead to the hydrate can be accelerated by the addition of water to the powder, the oxidation then going on quite rapidly, and as this oxidation is accompanied by an evolution of hydrogen it would appear that it is entirely due to water vapour. Shaking up the oxidised alloy in water in which carbon dioxide has been dissolved produces a very nice quality of white lead, and this application of the alloy may prove industrially useful.

The author proceeded to demonstrate the entirely different behaviour of the alloy at atmospheric temperature in the presence of ordinary moist air and in the presence of reasonably dry air. In the latter case the reaction does not take place. In this experiment is indicated a ready means of producing nitrogen or nitrogen and hydrogen mixtures from these alloys, or of removing remainders of oxygen from various mixtures in the cold. Such a method may find many industrial uses.

Another application of the alloys might possibly be the production of hydrogen alone, which takes place readily and quantitatively by boiling the powdered alloy in water. This method of producing gases, although it cannot hope to compete with the larger established methods economically in the best situations, has a great advantage in that the gases can be produced very readily where wanted, and for transport purposes to a great distance (as compared with cylinders) there is very great saving of weight shown.

For the production of hydrogen a 30 per cent. Mg alloy is best, whereas for the atmospheric oxidation previously described the maximum effect is obtained with about 15 per cent. alloy, and with about 30 per cent. on the one hand and 10 per cent. on the other the effect becomes much slower or ceases altogether.

Still another alloy of some interest is the eutectic Mg Zn. This alloy possesses very different properties, inasmuch as it can be pounded fine, passed through a 100-mesh sieve, and exposed to the air almost indefinitely without oxidation. It is likely to find industrial application in connection with the removal of gold from cyanide solutions, as well as for pyrotechnic purposes.

A few words were added regarding the manufacture of these alloys, and it was shown that the cost of the alloys became largely a question of the cost of anhydrous magnesium chloride.

From the figures given it was shown that under favourable conditions in regard to cost of energy there is no reason why magnesium lead alloys or magnesium zinc should not be produced at prices not greatly in excess of the cost of the basic metals, lead and zinc. Such results, however, were dependent for their realisation upon the opening of sufficiently large markets to make it worth while to carry out the operations on a fairly large scale.

In the course of the discussion Dr. J. A. Harker, F.R.S., suggested using the method for removing oxygen contaminating the hydrogen used for balloons.

Dr. E. Rideal thought the action a catalytic one based on electrolytic processes, similar to the behaviour of iron in removing small traces of chlorine from water.

Dr. H. C. Greenwood said the method might be useful in preparing argon from commercial oxygen.

* Paper read at a recent meeting of the Faraday Society.

INDUSTRIAL RESEARCH.

THE Department of Scientific and Industrial Research has favoured us with an official report of a Conference of Research Organisations held at the offices of the Board of Education in London, on July 29. Sir William McCormick (Chairman of the Advisory Council) presided in the absence of the Right Hon. H. A. L. Fisher, M.P.

Sir William McCormick in opening the proceedings, said: The reason for calling this meeting to-day is that there are one or two matters which have cropped up, some of which have arisen from the side of the Associations, some of them have been difficulties which the Government have felt, but I am sure they are all matters on which we would like mutual enlightenment. The first of these is an obvious one, the formation of a Records Bureau. The second head is with regard to the conditions of employment of research workers by research associations. The third head, co-operation amongst research associations for the study of accessory materials or equipment, is one that has cropped up here and there in the course of the work of the new Research Associations already formed.

Mr. A. P. M. Fleming (British Westinghouse Company): I think that in the memorandum which the Department have prepared relating to this question of the formation of a Records Bureau, they have adopted the very wise policy in the first place of limiting their efforts to what they can economically handle to make sure that their information is reliable and also, as we express it, deal with this particular part of the problem efficiently. I should rather have liked to see some extension of this work, which is at present to be confined, as I understand, to the handling of records principally from research associations. In addition to becoming a Records Office for the fruits of industrial research from these different associations operating as finished records, I should like also to see some attempt made to collect the side lines, shall I say, of research. There very valuable data which often arise in the pursuing of some research to a conclusion and which may be only incidental to the research itself, are often of a very fleeting kind, and unless they are recorded in some fashion may be lost altogether. It is often extremely valuable information and so I conceive an organisation such as is proposed dealing also with other things.

Mr. Conrad Beck (British Scientific Instrument Research Association): In the formation of our Association it was pointed out that the results of research would be retained for the benefit of the members of that Association, except in such cases where the Department might decide that it was of national importance that they should be disclosed. I think that our members as a whole are under the impression that the researches to be worked out in our Association will be, at any rate in the first instance, their property, and that raises the somewhat delicate question of how this Bureau would deal with work which has been originated by individual research associations. Of course one can quite well see that there will be a great many cases which will be of equal interest to entirely different trades, and some sort of communication between the research associations would undoubtedly be essential to prevent an enormous amount of overlapping of work.

Mr. H. L. Heathcote (British Non-Ferrous Metals Research Association): I am continually being faced with the need of reading the originals of works of research. At present it is only with the greatest difficulty that one can obtain sight of originals, and I believe that this Bureau, if it could secure for the advantage of research workers the sight of original works, whatever they might be, would be a very great advantage.

Sir Frank Heath, K.C.B. (Secretary of the Department of Scientific and Industrial Research): Mr. Beck mentioned the very important question of the ownership of results by research associations. We have declared officially that the ownership in scientific results is that of the members of the association; the association holds that property in trust for its members. Accordingly the Records Bureau will be organised in two sections, a confidential section and a non-confidential section. We shall ask research organisations, in forwarding us information, to indicate which part of the information they consider confidential and which they do not consider confidential, and any information in the confidential section of the Bureau will be communicated to nobody at all without agreement with the body that sends it. But Mr. Beck realises, as we all realise, that sometimes this confidential information may be of great value to another

research association, and it might be quite easy to negotiate the transference of that information to another association on reasonable terms. Then Mr. Heathcote has spoken about the need for getting at original papers. On that, of course, we must never forget that it is a primary duty of a research association to have its own library and its own records bureau. It is not intended that the central organ shall relieve the association from collecting their own information and from having their own library. At the same time anything that the Department through the Records Bureau can do to help research associations to get a sight of scarce or rare publications I can assure you they will do. It will be the duty of the Bureau rather to draw attention to original sources of information than to send *precis*. I think that we could do a good deal in that sort of way. We shall naturally get to know of new sources of information, and as we get the information we shall send those new sources to the associations. I fancy that that would be more useful than attempting to send *precis* of papers.

Sir Herbert Jackson, F.R.S. (Scientific Instruments Research Association): I think there may be a little misapprehension, perhaps, as to the value it will be to have this confidential information with the Department of Scientific and Industrial Research; but those who remember the very early days of the war when we were so anxious that some Department of the kind should be brought about will recognise that it was held by a great number of scientific people that there should be some body set up which should be a kind of trustee of progress and activity on the subject of research. It may be—it is not yet—that such a Department will be utterly unnecessary in twenty years more or less, because the objects to be gained by research will be so well recognised that every industry will, of course, consider research as almost its primary duty. At present I think that the confidential information does not need to circulate but should be collected, because one of the chief things which we hope from the Department of Scientific and Industrial Research is that it will be keeping a watchful eye on the whole amount of national research and will know, because it has this confidential information, what is going on, and will be in a position to spur on others who are not doing what ought to be done, and look after the work which is being done in industry and survey the whole field. But the principle which Sir Frank Heath has suggested of circulating information is one which is perfectly sound. When they have these pieces of information in the Department they can easily see, with the experience of a year or two, or a month or two, what it would be advisable to circulate. In the Association I have to deal with, we are faced at once with the problem of a certain thing which has been made and discovered being, we hope, of value to another industry. How far the whole details of the research are to be communicated to the other industry is a matter for the research association with which I am connected. When the Department gets that information it knows how to act, and in that way I do not think there need be any fear that the confidential information will be lost and wasted.

Mr. J. P. Hinchcliffe (Woolen and Worsted Research Association): The first proposition that I want to lay down is this—that the success of our various endeavours in the different fields of research will depend very largely on the generosity and fairmindedness with which we treat our agreements with research workers, and I am perfectly certain that unless we do make those agreements absolutely fair as between the association and our workers we are doomed to failure. The first standard I should lay down there is that we should pay such a salary as to put the investigator in such a position that he has no family anxiety; otherwise his mental effort is detracted from, and he cannot give the best service to our work.

Sir H. Jackson, F.R.S.: May I as a director say that when the idea of some kind of bonus being given to research workers came before me, I viewed it with consternation. I think it would be impossible for a director to carry out his work under those circumstances. The only way is to remember that when you get a good man you should pay him well, and when you have got your good man give him a feeling of security of tenure by increasing his salary.

Sir Frank Heath: When the model articles were drawn up for Associations, provision was made for co-operation between Research Associations, but we had rather vague notions as to the way in which this co-operation should actually take place. Since then it has been suggested that the best procedure would be the appointment of Joint Committees which might include representatives of a number of Associations, and that these Joint Committees should have specific prob-

lems referred to them and that by agreement between the various Associations contributions from those Associations should be made with which the researches could be financed. Refractories, so I understand, is a subject which is of very great interest to a large number of industries who use refractories, as well as to the industry which makes refractories. Now if a Research Association for refractories, consisting in the main of manufacturers of refractory materials, comes into existence, I take it that that Association will not really be successful in attacking the very large number of problems which we have to attack; refractories for glass, refractories for steel, refractories for non-ferrous metals, refractories for gas, refractories for pottery—there is an enormous range of industries which use refractory materials in one way or another. If that Association is going to be successful, somehow or other it has got to be in the very closest touch with the industries which use the refractories. One of the Associations which is just about to come into existence is the Glass Research Association, and refractories bulk very large in their problems. It has been suggested to me that the best way of dealing with refractories for glass is to have a Joint Committee of the Glass Research Association and the Refractories Research Association working out refractories specifically from the point of view of the different industries. Now refractories happens to be a subject which will force, I think, the new Association into very close relationship with a whole ring of other Associations, but quite apart from refractories, there must be a number where two or more research associations are directly interested in something which, though it is not the main product of the industry, is yet of very great importance in one or other of their processes and which appeals in that way to more than one industry. The suggestion I want to throw out is that you should set up these committees *ad hoc* and then learn by experience whether that is the most successful way of proceeding.

THE FARADAY SOCIETY.

THE ninety-third ordinary meeting of the Faraday Society took place recently in the rooms of the Chemical Society, Burlington House, London. Professor Alfred W. Porter, F.R.S., Vice-President, was in the chair.

Mr. F. H. Jeffery, M.A., read a paper entitled

"The Electrolysis of Solutions of Sodium Nitrate Using a Silver Anode."

The anode was of Stas silver, the cathode was of platinum, and was hung in a porous pot, the anolyte was stirred rapidly. The sodium nitrate was of 98.6 per cent. purity, the rest being nitrate. Solutions of concentrations from 70gms. to 10gms. sodium nitrate per 100 gms. water were examined.

No silver was deposited on the cathode; at the anode a yellow solution containing a silver complex was formed, no gas was evolved but a film formed on the anode consisting of silver nitrate and a small percentage of finely divided silver. The presence of sodium nitrate in the anolyte did not affect the reaction, the addition of 10gms. sodium nitrate to 100 c.c. of an anolyte of 30gms. sodium nitrate per 100gms. water did not cause a deposition of silver on the cathode and measurements of the anode potential showed that the reaction at the anode was not affected.

Measurements of the rate of work involved in the transfer of electricity from the anode to the liquid in contact with it showed that the nature of the reaction at the anode remained constant throughout the electrolysis and also that it was unchanged by raising the anode potential and increasing the current density.

From the yellow anolyte crystals of $\text{Na Ag}(\text{NO}_2)_2$ were isolated.

A paper by Mr. W. E. Forsythe, of the Nela Research Laboratory, Cleveland, U.S.A., on

"The Disappearing Filament Type of Optical Pyrometer,"

was presented by Dr. Ezer Griffiths, who exhibited some of the instruments described in the paper.

The paper discussed fully the principles that determine the accuracy and use of this type of pyrometer, which appears to be used more widely in America than here. The instrument is practically a telescope with a lamp filament at the focus of the objective, in series with a battery resistance and ammeter. The instrument is sighted on the hot body in such a manner that the image of the filament crosses that of the body. The current is then adjusted until the filament is

just as bright as the body sighted. A red glass in the eyepiece eliminates difficulties due to colour differences. The pyrometer as made was described.

The matters next considered included the monochromatic screen, the calibration of the pyrometer, the carbon filament, the temperature of, and emissive power and wave-lengths emitted by non-black bodies, absorbing screens, and other questions concerned generally with optical pyrometry.

Mr. C. C. Patterson considered the paper very helpful and the type of pyrometer described a very interesting one.

Mr. A. G. Tarrant spoke of the accuracy attainable with the pyrometer which was very reliable. He asked for further information on the effect of screens, which he had found negligible. This freedom from error made the instruments very useful in awkward situations, and an example of its adaptability was given.

Professor Alfred W. Porter, D.Sc., F.R.S., read a paper

"On the Equation for the Chemical Equilibrium of Homogeneous Mixtures. Part I. Equilibrium at Constant Temperature."

The general equation for chemical equilibrium is obtained in a way which is so much less abstract than the method of depending upon the thermodynamic potential that no dubiety need exist of the meaning of the result and the conditions under which any particular form of it applies. The result is expressed in terms of the pressures of the constituents when isolated and in osmotic equilibrium with the mixture through membranes each permeable to one alone of the constituents. The method employed is, essentially, the same as that of Van't Hoff (the "equilibrium box" method) but it is employed for the first time for other than perfect-gas mixtures. In the general case even the meaning of the term "partial pressure" has to be defined, because the additive law does not hold good. It is defined, as in other osmotic phenomena, as the pressure of the particular constituent when in osmotic equilibrium with the mixture. The general equation is put into different forms to suit simple deviations from the perfect gas law.

Mr. Irving Langmuir sent in a paper on

"The Mechanism of the Surface Phenomena of Flotation,"

which was communicated by Mr. E. Hatschek.

The paper called attention to a theory of absorption and surface tension which greatly aids in understanding the phenomena of flotation. Experiments were described which show that oil films of molecular thickness are sufficient to alter radically the surface of solids. The conditions under which froth is formed were discussed, and it was considered that the selective action by which substances like galena are separated from quartz and calcite is dependent upon the contact angle formed by the oiled surfaces rather than by any selective tendency on the part of the oil. The necessity for further researches was urged.

THE BRITISH ASSOCIATION.

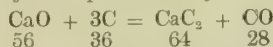
THE annual meeting of the British Association will be opened at Bournemouth on Tuesday, September 9, after an interval of three years, the last gathering taking place at Newcastle-on-Tyne in September, 1916. In his presidential address to Section B, Chemistry, Professor P. Phillips Bedson, of Armstrong College, Newcastle, will discuss the periodic law of Mendeleeff and the position of chemists in relation to industries. Succeeding him, Professor Sir William Pope, General H. Hartley, Lieutenant-Colonel C. D. Crozier, and Professor Boswell will contribute papers on Chemistry during the War, Chemical Warfare, High Explosives, and Geochemistry during the War. Communications from the Holton Heath Cordite Factory, by Dr. Thayne on Bacteriology and its Application outside Medicine, and by Mr. J. Reilly on Distillation of Organic Compounds and on Inter-molecular Rearrangements, etc., will in a way be preparatory to the visit to the Factory. Of the remaining papers the report of the Fuel Committee, and Dr. R. Lessing on the Chemistry of Coal Tar will interest the engineer. The other papers by Drs. Lowry and Perman on Equilibria; by Professor E. C. C. Baly on The Molecular Phase Hypothesis, a Theory of Chemical Activity; by Professor A. Lapworth on The Positive and Negative Rule in Organic Researches, and by Professor R. Robinson on Conjugation of Partial Valencies are of theoretical interest.

CARBIDE CONVERSION CALCULATIONS.*

BY ISMOND E. KNAPP.

IN carrying on experimental work in connection with the manufacture of calcium carbide, considerable time was consumed in making the necessary calculations. Changes were being made in the design of the furnace, and it was important to know the efficiency of conversion that was obtained in each run. Inasmuch as the quality of the coke and lime varied considerably, this calculation was rather tedious. In order to simplify it, the following method was worked out, and it has proved entirely satisfactory.

The reaction may be represented by this equation:—



Analysis shows that the crude carbide or furnace product contains only a small amount of free carbon (seldom over 1.0 per cent.) and but very little sulphur. These small amounts are neglected in these calculations, and it assumed also that all of the constituents in the coke ash and the impurities in the lime (such as SiO_2) go through the carbide furnace unchanged, and are present in the furnace product. On this basis the furnace product will have only the following constituents:—

- (1) Calcium carbide.
- (2) Coke ash.
- (3) Lime impurities.
- (4) Unchanged lime.

Let A = decimal fraction fixed carbon in the coke.

B = decimal fraction ash in the coke.

C = decimal fraction CaO in the lime.

D = decimal fraction loss on ignition of the lime.

Then, $1 - A - B$ = moisture + volatile + sulphur in the coke, and $1 - C - D$ = impurities in the lime.

It is evident from the above equation that the theoretically correct proportions for a mixture of lime and coke are:—

$$\frac{36}{A} : \frac{56}{C}$$

In case the proportions actually used are not the theoretical, care must be taken that they are calculated to the above form, and that only the factor 36 is affected. For instance, if a small excess of carbon were used, this factor might become 37 or 38. It can be determined easily by solving this proportion:—

$$\frac{\text{lb. lime used} \times C}{\text{lb. coke used} \times A} = \frac{56}{X}$$

whence, X = the factor to be used in place of 36 in all of the following formulae.

Assuming that the efficiency of conversion, E, is known, then the weight of CaC_2 in the furnace product from a coke-lime mixture of the above composition will be 64E. The weight of the coke ash will be $\frac{36}{A} B$; the weight of the

impurities from the lime will be $\frac{56}{C} (1 - C - D)$; and the

weight of the unchanged lime will be $(1 - E) 56$. The corresponding amount of unchanged carbon, $(1 - E) 36$, apparently is burned, and so does not appear in the furnace product. Now, if F represents the total weight of the furnace product, we may write:—

$$F = \text{carbide} + \text{ash} + \text{dead lime} + \text{excess lime} \\ = 64E + \frac{36B}{A} + \frac{56(1 - C - D)}{C} + (1 - E) 56 \quad (1)$$

The purity of the furnace product, P, is, of course, the ratio of the weight of CaC_2 in the furnace product to the total weight of the furnace product—i.e.,

$$P = \frac{64E}{F}$$

or, substituting the above expression for F,

$$P = \frac{64E}{64E + \frac{36B}{A} + \frac{56(1 - C - D)}{C} + (1 - E) 56}$$

By rearranging this equation we finally obtain:—

$$E = \frac{P \left(\frac{36B}{A} + \frac{56(1 - C - D)}{C} + 56 \right)}{64 - 8P} \quad (11)$$

* Chem. and Met. Eng. (New York).

A and B are known from the coke analysis; C and D are known from the lime analysis; and P is known from the analysis of the crude carbide. Hence the efficiency of conversion can be calculated quickly by simple substitution.

The following example will show the practical application of the foregoing formula:—

Data—

Coke analysis: 0.903 fixed carbon, 0.069 ash.

Lime analysis: 0.768 CaO , 0.177 loss on ignition.

Mixture ratio: 200lb. lime to 130lb. coke.

Charged into furnace: 766lb. of above mixture.

Recovery: 459lb. crude carbide.

Analysis of product: 0.076 CaC_2 .

Calculations—

$$\frac{200 \times .768}{130 \times .903} = \frac{56}{X}, \text{ whence } X = 36.3.$$

Then the proportions in the mixture are $\frac{36.3}{A} : \frac{56}{C}$.

A = 0.903; B = 0.069; C = 0.768; D = 0.177; P = 0.760.

Then by formula II, E = 0.824, or 82.4 per cent. efficiency of conversion.

As a check on the above calculation it is often of interest to go back and calculate the weight of the furnace product, using formula I for F. The result thus obtained should show a fairly close agreement with the weight of furnace product actually obtained. The writer has checked repeatedly within 3 per cent. in this manner.

For instance, in the example given above, the weight of the charge can be computed thus:—

$$\frac{36.3}{A} + \frac{56}{C} = \frac{36.3}{0.903} + \frac{56}{0.768} = 113.1.$$

By formula I, F = 69.4.

The weight of the charge actually used was 766lb.

Hence, 113.1 : 69.4 :: 766 : X.

Whence, X = 470lb., theoretical weight of the furnace product. This result shows a variation from the weight of the crude carbide actually obtained (459lb.) of 2.3 per cent.

Sometimes it is desirable to know the maximum purity of the crude carbide that can be obtained from given raw materials, with an efficiency of conversion of 100 per cent. This can be found by putting E = 1 in the above formula for P, which then reduces to

$$P_{\max} = \frac{64 \times 1}{64 + \frac{36B}{A} + \frac{56(1 - C - D)}{C}}$$

In the example given above the maximum purity obtainable is 90.4 per cent.

Although a high degree of accuracy is not claimed for these formulae, on account of the assumptions made regarding the chemical changes in the carbide reaction, nevertheless they have proved very helpful in the work for which they were developed.

METALLURGY OF LEAD.

IN conjunction with the University of Utah and with various mining companies, the United States Bureau of Mines has since 1914 been carrying on extensive experiments for the purpose of the better utilisation of the ore treasures of the State of Utah. A detailed account of the researches on the low-grade lead ore is given in Bulletin 157 of the Bureau, by Dorsey A. Lyon and Oliver C. Ralston.

Most of the processes tried are modifications of well-known processes; but there is much scope for variety in their application, and some of the innovations, also in roasting furnaces, are of considerable interest. Some novelties in flotation are also noteworthy. Thus the lead can most profitably be recovered from leached ores by electrolysis, and chloridising roasting at higher temperatures than usually recommended, followed by electric precipitation of the metallic fumes, looks promising. The ores dealt with may be classified as carbonates and more or less oxidised ores, sulphides and slimes; gold and silver may be present, and their recovery will complicate matters. Oxidised ores are generally leached with brine to which hydrochloric or sulphuric acid is added; the chloride solution is precipitated with lime or electrolysed, and it was found that the electrolysis with iron anodes answered very well, especially in impure solutions; by currents

of less than 1 volt and of high density, 40 amperes per square foot, the current efficiency then rising above 90 per cent. The spongy lead produced oxidises rapidly, but when compressed it can easily be smelted and freed of iron dross. Silver in the electrolytic bath is subsequently precipitated by lime or better by scrap iron. If not present as chloride, the silver would not pass into solution; such ores are submitted to chloridising roasting by the old Augustin process. For that roasting both pyrite and salt should be added to the ore and coal.

In Utah the roasting was effected in new furnaces of Holt-Dern or Christensen. When the temperature is kept at about 700° C., little lead is volatilised, and this lead can be recovered by the electric dust-precipitation process of Cottrell. For mixed sulphides the temperature may purposely be raised, and the metal fumes be precipitated. In the presence of zinc sulphide, however, copper, silver, and gold are retained with the zinc, and are not volatilised; the iron is converted into oxide, and the lead volatilises. The calcium chloride from the furnace slag can be used for further chloridising roasting in the place of sodium chloride. Some carbonate ores slime badly; these slimes can be concentrated by flotation after superficial sulphidising, which is best effected by means of sodium sulphide, as the experiments show; sulphuretted hydrogen is too much of a nuisance. The silver and gold rise with the lead. Whether flotation is on the whole practicable depends upon transport and water facilities and other general features, of course. The treatment of mixed sulphides containing zinc remains a rather difficult problem.—*Engineering*.

SUPPLIES OF GERMAN POTASH.

THE Government have recently acquired from Germany a quantity of potash salts in exchange for food, and arrangements have now been made by the Board of Trade, in conjunction with the Board of Agriculture, for the distribution of about 40,000 tons for agricultural purposes. The sale of the material will be undertaken by the British Potash Company Limited, 49, Queen Victoria Street, London, E.C.4, under the direction of an official committee, on which the Board of Trade and the Departments of Agriculture for England, Scotland, and Ireland will be represented, together with representatives of trade interests.

The following maximum selling prices have been agreed:—For sales to farmers delivered to nearest railway station in Great Britain or Ireland, in lots of not less than four tons—potash salts, 30 per cent. K_2O , £12 10s.; muriate of potash, 80 per cent. KCl , £20 12s. 6d.; sulphate of potash, 90 per cent. K_2SO_4 , £23 2s. 6d., all per ton net cash in bags. Manure mixers, merchants, dealers, and co-operative societies will be allowed a discount on these prices of 7s. 6d. per ton on potash salts and 10s. per ton on the muriate and sulphate of potash. The potash will be sold at the above basis prices, and a proportionate increase or decrease will be made for higher or lower quality as shown by analysis of a representative sample of each consignment.

Farmers should place their orders without delay with their usual dealer or co-operative society. Manure mixers, merchants, dealers, and co-operative societies should send their orders to the British Potash Company, 49, Queen Victoria Street, London, E.C.4. Special terms may be arranged for purchases ex ship.

For sales of small quantities made ex merchants' store the Board would regard as reasonable the following maximum additions to the price charged for four-ton lots:—

Quantity delivered.	Additional price.
1 ton and over	10s. per ton
2 cwt. and over, but less than 1 ton ...	1s. per cwt.
1 cwt. and over, but less than 2 cwt. ...	2s. per cwt.
28lb. and over, but less than 1 cwt. ...	3s. per cwt.
14lb. and over, but less than 28lb.	4s. per cwt.

No potash of a lower grade than 30 per cent. salts is available under the above arrangement, but licences are being granted to the Alsace Lorraine Trading and Development Company, 54, Gresham Street, London, E.C.2, for the importation of 20,000 tons in all of kainit (14 per cent. K_2O) and sylvinit (20 per cent. K_2O). Farmers who wish to purchase potash of these grades should apply to their usual dealers.

LONG-TERM CREDITS FOR EXPORTS.

THE Board of Trade announce that an office will shortly be opened under management appointed by the Board for furnishing sterling credits in accordance with the scheme for assisting the exportation of goods to certain disorganised parts of Europe, which was referred to by the Prime Minister in the House of Commons last week. The credits will be based on bills drawn in this country by the seller of the goods and accepted by the buyer, and will be subject either (a) to the deposit with an approved bank in the country of purchase of currency to an amount required by the office, or (b) to a guarantee of currency of a required amount by an approved bank, or (c) to arrangements for the handing over of produce of the buying country, or (d) to the deposit of securities with the approved bank or the office under the scheme. The office will fix periodically the amount of currency required to be deposited per £100 sterling, and will have power to vary its charges according to the nature of each transaction. The credits will continue for such periods as the office may determine in each case, having regard to the economic prospects of the country concerned and the character of the business, but the maximum period will be three years. The charges for each period of six months will be on a rising scale in order to induce early liquidation.

The office will be entitled (a) to take over and liquidate collateral pledges, (b) to have recourse against the acceptor of the bill for any deficiency, and (c) to have recourse against the guarantor. The credits furnished will not as a rule exceed 80 per cent. of the prime cost of the goods sold, plus freight and insurance (including the charge made by the office). In special cases, however, at the discretion of the Executive, the amount may be increased, but in no case will it exceed the prime cost plus freight and insurance (including the charge made by the office). If the proceeds of the bill are less than the prime cost plus freight plus insurance (including the charge made by the office), the loss represented by the difference will be divided between the office and the drawer of the bill in the proportion of four-fifths to one-fifth.

Business will be taken only through banks and on the reports of banks, and the aggregate amount of credit to be granted will not exceed £26,000,000.

The area and classes of goods to which the scheme relates will be settled from time to time by the Government, but credits will not be furnished either for the export of raw material or for the sale of stocks held by Government Departments.

A SUGGESTED EMPIRE PATENT LAW.

A COMMITTEE of the Institute of Electrical Engineers, which has been considering the subject of a British Empire patent law, has drawn up a scheme, by which any person would be able to obtain an Empire patent covering as many of the British Dominions, Colonies, Dependencies, and Protectorates (collectively referred to, for convenience, as territories) as he may select, by making application to the British Patent Office. The fees payable would be the sum of the existing local Government fees in the selected territories, plus such small fee as might be charged by the British Patent Office to cover the expense of carrying out its part of the scheme. The application would be examined and the patent granted in the same way as in an application for a British patent, and the specification, when printed, would bear the names of the selected territories in which it would be effective. Thereafter the patent would be assimilated with the domestic patents in each of the selected territories, and would be subject to the local laws in such territories for the determination of validity, infringement, and all other questions affecting Letters Patent after grant. Careful consideration has been given to the suggestion that a patent should be obtainable covering the whole of the British Empire in the same way that a patent in the United States covers all the States in the Union, but there are so many difficulties connected with such a scheme that it is not felt any practical result could be expected of any attempt to elaborate a proposal along such lines. It is believed that the suggested scheme is practical, and has the merit that it could easily and immediately be put into operation without disturbing the existing laws in the various territories in the Empire.

ITEMS OF INTEREST.

SALES OF SURPLUS GOVERNMENT PROPERTY.—The sum realised by sales of surplus Government property, as shown by the latest official figures, is now £162,509,246. This includes £100,633,988. for sale on trading account; £46,563,905. for other surplus stores at home; and £15,311,353. abroad.

NEW COLOUR WORKS AT SELBY.—Some ten acres of land have been purchased in The Holmes, at Selby (Yorks.), by Messrs. Thevenaz and Company, of Hull, for the purpose of erecting dye and colour works thereon. The new industry will give employment to a large number of workpeople.

SCIENCE AND KEY INDUSTRIES EXHIBITION AT GLASGOW.—Good progress is being made with the arrangements for the British Science and Key Industries Exhibition, which the Glasgow Corporation are to hold within the Kelvin Hall of Industries, Kelvingrove, Glasgow, from November 17 to 29 next.

WINDING-UP THE GREYNA FACTORY.—Official intimation has been received at Greytna Munition Factory near Carlisle, that the manufacture of explosives is to cease. The 3,000 workers now at Greytna are to be reduced still further, and only sufficient retained to keep the machinery in order. The services of officials will also be dispensed with.

FIRE.—While a number of workmen were engaged at the Columbia Works of Messrs. Joseph Thompson and Co., of Sheffield, emery and bone cutters, on Friday (August 22), a spark set fire to xylonite dust, and the front of the large three-storey building was quickly a mass of flames. All employees escaped with the exception of Benjamin Wildsmith.

GERMAN GLYCERINE STOCKS.—The Koln-Rottweiler Company in Berlin are to take over conjointly with the United Chemical Works, Charlottenburg, from the Imperial Realisation Office the disposal of the stocks of glycerine, and it is reported that these two companies, along with the Dynamite Trust, are to form a limited liability company to undertake this task.

SCOTTISH SHALE OIL WORKERS.—A ballot by the members of the Federation of Scottish Shale Oil Workers on the question of a shorter working day has resulted in an overwhelming majority in favour of stoppage of work, but the joint board of the Federation on Tuesday decided to withhold notices in view of the invitation to meet the representatives of the companies in conference in London early next month.

BRITISH SCIENCE GUILD.—The ninth number of the *Journal* of the British Science Guild may be obtained—price 6d. per copy, postage, 1½d.—on application to the Secretary, British Science Guild, 199, Piccadilly, W.1. The *Journal* contains the report of the work of the Guild for 1918-19, various memoranda, and a report of the annual meeting, with addresses by Major-General Seely, Sir Joseph Thomson, and Lord Sydenham, on "Science and Labour Unrest."

NORFOLK OILFIELDS.—It is stated that the first commercial retort for the distillation of the Norfolk oil shales owned by English Oilfields, Limited, has been tested, and that the results have been satisfactory beyond expectation. A new type of retort is being used for the treatment of the shale, and the crude oil obtained is described as of good quality. Arrangements are now in train for the erection of the entire retorting plant. A model village for the employees is being planned.

NON-FERROUS METALS RESEARCH.—The British Non-Ferrous Metals Research Association is in process of formation under the Government scheme for industrial research, and it is expected that the Board of Trade will issue a licence to the Association in the near future. The Association will encourage and develop technical efficiency in the production, treatment, and utilisation of non-ferrous metals and alloys, by the promotion and application of scientific and industrial research, and also institute an information bureau of all important technical and scientific information directly or indirectly relative to the non-ferrous metals industries of the British Empire. It is hoped that the information collected during the war and in the possession of the Ministry of Munitions will be made available for the use of the Association. Any further information and particulars will be gladly supplied on application to the secretary, Provisional Committee, British Non-Ferrous Metals Research Association, 30, Paradise Street, Birmingham.

ZINC AND ZINC DUST PRICES.—There is no change to report in the price of Australian high grade zinc dust (88% 92% metallic zinc), which remains at £70. per ton f.o.r. The Zinc Producers' Association continue to allow their customers the benefit of any reduction made in their selling price of zinc dust within 30 days of acceptance of order. The price of Australian electrolytic zinc, containing 99.95% metallic zinc, is unchanged at £42. per ton f.o.b. Australia for direct shipment to New Zealand, India, South Africa and the Far East.

GLASGOW TECHNICAL COLLEGE APPOINTMENTS.—Important appointments to the Chemistry Department of Glasgow Technical College were made at a special meeting of the governors on Tuesday. It was resolved to recommend that Dr. Thomas Gray, the Professor of Technical Chemistry, be appointed Director of the School of Chemistry, and that the vacancy due to Dr. G. G. Henderson's resignation be filled by the appointment of assistants in the department of chemistry—Mr. Forsyth J. Wilson, D.Sc., Ph.D., F.I.C. (late Captain and chemical advisor to the 11th Army Corps), and Mr. Isidor M. Heilbron, D.S.O., D.Sc. Ph.D., F.I.C. (late Lieutenant-Colonel and a senior staff officer in the Salonica Forces)—the former with the title of Professor of Inorganic and Analytical Chemistry, and the latter with the title of Professor of Organic Chemistry.

FRENCH FIRMS RESUMING BUSINESS.—The following declarations of partial or complete resumption of business by French individuals and commercial concerns, in accordance with article 55 of the law of April 17, 1919, on the reparation of damages caused by the war, have been published in the *Journal Officiel*:—Léon et Charles Goubé, oil dealers, Lille, resuming work gradually; Société Anonyme des Produits Refractaires, refractories, Feignes, partial resumption; Asin-Loche, dealers in fertilisers and wool wastes, Villers-Pol, par Le Quesnoy, partial resumption; Société Anonyme des Ciments Portland Français, Portland cement manufacturers, Bettrechies-les-Bavay, partial resumption; Louis Rey, dealers in drugs, chemical products, Cambrai, partial resumption; J. H. Leclercq Fils, oil manufacturers, Marcq-en-Baroeul, partial resumption.

IMPORTATION OF FUEL OILS.—The Board of Trade understand that the notice issued by them on August 22 with reference to the interim administration of the Government's key industry policy has led to some misapprehension. Pending legislation a general licence under the prohibition of imports proclamations is to be issued to cover all goods, with the exception of those set out in the list of key industries. In the case of kerosene and benzine (including white spirit), gas oil, and fuel oil, this general licence refers to total quantity of import, and does not affect the agreement entered into by the Government to limit the number of importing firms for the period of the existence of the Pool Board and nine months thereafter to those firms which co-operated with the Government to form the Pool Board, as a result of which the community received material benefits. The termination of the war organisation of the Pool Board as from January 31, 1919, was announced in the Press on January 2. The nine months' period which has to elapse before other firms are allowed to import does not therefore expire until October 31.

UNITED STATES EXPORTS OF DYESTUFFS.—The total dyes and dyestuffs exported from the United States during May showed a decrease as compared with the exports during May of last year, the value being 954,943dols. as compared with 1,278,578dols., according to figures issued by the Bureau of Foreign and Domestic Commerce. During the eleven-month period ending with May exports had a value of 16,473,019dols. as compared with 15,244,771dols. exported during May last year, and 10,249,241dols. exported during the same period the year before. Aniline dyes exported during May were valued at 585,970dols. as compared with exports of 626,204dols. during May last year. During the eleven-month period ending with May exports were valued at 9,325,287dols. as compared with 6,469,497dols. during the same period last year. Total chemicals, drugs, dyes, and medicines exported during May were valued at 9,732,617dols. as compared with 13,086,270dols. During the eleven-month period ending with May, exports were valued at 135,785,933dols. as compared with 165,365,629dols. exported during the same period last year, and 168,786,802dols. during the same period the year before.

ASBESTOS WORKERS' PAY.—The management of the Cape Asbestos Company, at Barking, on August 22, received the officials of the National Union of General Workers concerning the dispute which has occurred there with reference to a recent arbitration award to the female workers, some 400 of whom were on strike last week. The management have agreed to concede the award of an increase of 5s. to female workers over 18, and 2s. 6d. to those under 18 as from June 1 last. They also agreed to the demand for a forty-eight hours' week without reduction of pay. The claim for a week's holiday was left over to see if it is adopted in the asbestos industry generally, in which case the Barking company have practically promised to fall into line. The employees resumed work on Monday.

IMPORTATION OF BONES AND BONE MEAL INTO SOUTHERN RHODESIA.—A Notification No. 225, dated June 27, issued under the "Animals Diseases Consolidation Ordinance, 1904," of Southern Rhodesia, provides that the following regulations shall be in force from June 27—viz., No person shall import any bones (for use), or any material wholly or partially manufactured or derived from bone, such as bone meal, bone flour, bone dust, dissolved bones, bone compound, or the like, unless such bones shall have been sterilised by subjection to either: (a) A dry heat of 140° C. for not less than three hours; or (b) a moist heat (under pressure) of 105° C. for not less than fifteen minutes. A declaration to this effect shall be furnished by the importer with the application for registration under Section 1 of Government Notice No. 421 of 1914, and, further, in any sale effected the seller shall furnish to the buyer the said declaration, in addition to the invoice required by Sections 6 and 7 of the said notice. Any person contravening these regulations shall be liable to the penalty provided under the Ordinance. If at any time it shall subsequently appear that any person has made such declaration falsely, he shall be liable to the penalty provided under the Ordinance.

JOINTS OF GLASS TO METAL.—Some tests recently completed at the U.S. Bureau of Standards on the strength of metal joints used in the gas manipulation and purification work have shown that platinised glass tubes fused into metal tubes will hold pressure up to about 3,000lbs per square inch. Capillary tubes, fastened to metal in the same way, will hold in excess of 6,000 pounds per square inch. Some of the applications of this in connection with laboratory work will be discussed in a paper which is now in preparation. Some of these are: 1. In connection with glass bulbs and small valves used in handling and accurately weighing liquefied gases under pressure, such as ammonia, carbon dioxide and ethyl chloride; 2. In the accurate determination of gas densities under normal conditions by condensing the gas by means of liquid air into glass bulbs provided with metal inlet and outlet, which can be subsequently weighed more accurately than the large bulb in which the volume and pressure of the gas are measured; 3. In the determination of the density of volatile liquids and liquefied gases to a high degree of accuracy; 4. As a vacuum tight and clean joint between metal containers used in the purification of gases at high pressures, and glass apparatus used in their purification in vacuo.

NITROGEN PRODUCTS COMMITTEE'S REPORT.—The Report of the Nitrogen Products Committee, appointed in June, 1916 which was ready last May, is still unpublished. The terms of reference were wide, and doubtless the Report is a voluminous document; but, even so, the suggestion that the delay in its publication is due to the time required for the preparation of an index seems unconvincing. We suspect, says *The Times*, that the Government had their usual hesitancy in deciding on a policy. The Committee carried out much experimental work on the production of ammonia by the direct union of hydrogen and nitrogen on the Haber method. The general principles of this method are well known, but the all-important technical details were a German secret. The Committee are believed to have attained results which are in some respects better than the German practice. We understand that the Report recommends the establishment of a plant on a commercial scale, as the experimental apparatus at University College, where the investigations were conducted, was only on a laboratory scale. So far, concludes our contemporary, Great Britain has done little except to produce reports. Early last year the Government began the erection of an ammonia factory at Billingham-on-Tees, but this was not given precedence over schemes like the motor works at Slough, and is still a long way from completion.

PATENTS IN 1918.

THE thirty-sixth report of the Comptroller General of Patents, Designs, and Trade Marks, issued as a White Paper, shows that last year 168 applications were made under the Patents, Designs, and Trade Marks Temporary Acts and Rules, for the avoidance or suspension of patent rights. In 146 of these licences have been, or will be, granted, and in six other cases the patents have been suspended in favour of the applicants. Of the remaining applications one has been refused, five have been withdrawn or abandoned, four have been returned as not being required by reason of the patents having expired, or for some other cause, and the rest have not yet been decided. Four applications for the avoidance or suspension of the registration of trade marks were received. One application was refused, one application was withdrawn, and the remaining two cases were allowed to stand over.

During 1918, 31 applications for the grant of licences under patents vested in the Custodian under Section 6 of the Trading with the Enemy (Amendment) Act 1916, were received. Two of these applications were withdrawn, and in the remaining 29 cases licences have been or will be granted. During the year it was decided that the benefit of all enemy owned patents should be vested in the Custodian, and under the Trading with the Enemy (Amendment) Act 1918, an order was made on October 31, 1918. From the date of the vesting order to the end of the year five applications for the grant of licences under such patents were received. One of these was returned as the patent had expired, and in the remaining four cases licences will be granted.

The applications for patents and trade-marks during 1918 show an advance on those for 1917, but the applications for designs are lower in number. In the years from 1908 to 1914 the greatest number of applications for patents was 30,603 in 1909; 42,077 designs were registered in 1912; and 6,112 trade-marks were registered in 1909. Last year's figures were as under:—

Patents. Applications, 21,839; specifications: provisional, 15,662; complete, 13,263; sealed, 10,809.

Designs.—Applications, 10,019; registered, 9,597.

Trade-Marks.—Applications, 6,968; registered, 3,055.

The receipts from patents fees were £314,431., and from designs fees £5,767., being increases of £22,216. and £355. over the respective amounts for 1917. The total receipts were £345,405., as compared with £318,149. in 1917, an increase of £27,256. The surplus of receipts over expenditure was £135,890., as compared with £124,427. in 1917.

In the Patents Department there was again a large increase in renewal fees, which amounted to £232,629. against £219,693. in 1917.

The number of applications made for the restoration of patents which had lapsed was 23, of which nine are still pending. The number of applications to register designs was 10,019, as compared with 13,208 in 1917. During the year 3,451 trade-marks were advertised and 3,055 were registered.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

(SPECIALLY CONTRIBUTED.)

The dullness in the Cumberland and North Lancashire hematite pig-iron market precludes any immediate hope that additional furnaces may be put into blast on ordinary iron, and so bring about such a demand for local coke as would compel the working of the 380 by-product ovens at their full capacity. The very quietude of the iron market, however, may result in smelters at their meeting next week lowering prices, and in that case, of course, the outlook might conceivably be very much improved. The general feeling is that only a substantial revival of the rail trade can justify an increase of the production of ordinary iron, and therefore, an expansion of the output of local coke. Some of the ovens have had difficulty this week in getting all their coal requirements satisfied, production at the collieries, one of which is still idle on account of labour difficulties, having been below the average. East Coast coke supplies to West Cumberland this week are under 9,000 tons and to the Furness district, 15,100 tons. The make of by-products is somewhat diminished. Benzole is being marketed with ease both here and in Ireland, and the full output of sulphate of ammonia is being absorbed. Spain is taking a good proportion of pitch. Creosote is in fair demand.

OBITUARY.

PROFESSOR VERNON HARCOURT.

The death of Professor Augustus John Vernon Harcourt, M.A., F.R.S., which took place in the Isle of Wight on Saturday last at the age of 84 years, is announced by *The Times*.

Educated at Cheam, Harrow, and Balliol, it was at Balliol under Henry Smith that Professor Harcourt laid the foundation of his chemical career. When Brodie, also a Harrow and Balliol man, later a pupil of Bunsen, returned to Oxford as Professor of Chemistry, Harcourt became first his pupil and then his assistant. At Balliol Brodie began working on the peroxides of the acid radicals, and afterwards on the oxidation of graphite, and then turned to the systematic study of alkaline peroxides, whose reducing action he was the first to explain—incidentally supplying a strong chemical argument in favour of the diatomic nature of oxygen. In 1858 Brodie migrated to the chemical department of the new museum, and took Harcourt still an undergraduate—with him as lecture assistant. A year later Harcourt was appointed Demonstrator in the students' laboratory. In the summer of 1858 Harcourt gained a first class in the School of Natural Science, and in 1859 was elected a student of Christ Church and Lee's Reader in Chemistry. For six years he continued to work under Brodie at the University Museum, and then moved into the Lee's Laboratory at Christ Church, vacated by Dr. George Rolleston on his election to the Linacre Professorship of Comparative Anatomy. At Christ Church Harcourt continued the investigations which he had begun in the museum on the Rate of Chemical Change.

The influence of his master, Brodie, can be plainly traced in Harcourt's chemical career. Brodie's work on the alkaline peroxides led Harcourt in the first place to investigate the conditions under which oxygen was absorbed by the metals potassium and sodium, and secondly to investigate the course of a chemical change in cases where the reactions occur slowly enough to be followed throughout their progressive stages. In his first paper Harcourt established the formulæ of potassium and sodium peroxides by experiments as simple and well-designed as they are conclusive; and then began to study the course of such oxidations as those effected by permanganic acid and hydrogen peroxide with the object of determining the law connecting the rate of a given chemical action with the quantities of the reacting substances.

The bold generalisation of Berthollet—that chemical change was not an action independent of mechanical laws, but that the amount of change was governed by the "mass" of the reacting substances as well as by chemical affinity—remained for his own and for two succeeding generations of chemists a brilliant but unworkable idea. It was not at once, but only after long search, that Harcourt found a reaction simple enough to be followed throughout without complications caused by secondary actions due to the products of the primary change. But at length he hit on the action between hydrogen peroxide and hydrogen iodide, which proceeded with the necessary simplicity and at a convenient rate for study. Harcourt and his collaborator, Esson, showed that when the conditions of the experiment were kept constant the rate of the chemical change was strictly proportional to the mass of the reacting substances; and with the same apparatus they were able to show the effect of temperature on the rate of the chemical change, and so accurately could the changes be followed that they were able to calculate the absolute zero of chemical action—a datum in surprising agreement with the absolute zero of temperature obtained by physical methods.

Though one of the pioneers of physical chemistry, Harcourt remained a sceptic towards the new theories of solution and ionization, and the word "dissociation" was anathema to him. In his last address as president of the Chemical Society, in 1897, he maintained that the distinction between dissociation and decomposition was absurd. In applied chemistry Harcourt was chiefly drawn to questions dealing with the purification and testing of coal gas, he having been appointed (in 1872) one of three Metropolitan Gas Referees whose duty it is to prescribe the mode of testing the London gas and—subject to the various Acts of Parliament—to fix the limits of impurity allowed. One of his early researches on coal gas was his attempt to purify the gas from sulphur compounds by means which he devised for converting the carbon disulphide into hydrogen sulphide. Harcourt's "sulphur test" came into wide use, but its application on a large scale for the purification of coal gas has only recently been carried out successfully by Dr. Charles Carpenter at the South Metropolitan Gas Works.

FERTILISER NEWS.

(SPECIALLY CONTRIBUTED.)

Sulphate of Ammonia.—The demand for this material is quite good at the present time, and, according to late reports, the price is now said to be in the region of £20. Certainly, higher prices are looked for. The amount of sulphate being produced is not great, and already the export trade appears to have been cut down so as not to limit unduly the supplies available for home requirements. From the United States advices are to the effect that sulphate of ammonia trading in that market has developed to no unusual proportions; and nothing beyond a moderate demand is noted for both domestic consumption and for export purposes. Since last writing, prices have fractionally declined in New York; but even this condition has had no effect in the way of stimulating business, with buyers seemingly not interested in forward stocks for the time being.

Basic Slag.—This is perhaps the busiest spot in the fertiliser market at the moment. Demand is exceedingly good, and buyers appear to be often requiring very large quantities in proportion to the acreage of their farms. Doubts are expressed, however, as to whether the supply will last over the winter. It is increasingly clear that more than ever orders should be placed early, as only the extreme optimists believe that accidental factors will leave stock available for later buying.

Superphosphates.—Superphosphates appear to be in improved demand, and prices are understood to be going higher. The phosphate rock position in America is still somewhat complicated, and the market is said as a result to be a very nominal affair. Florida producers are making no headway. The Tennessee output is sold up for several months ahead. American advices agree that foreign markets will undoubtedly be open for large quantities of American phosphate rock, but labour difficulties there are still a serious handicap to the producers, with no encouragement offered for any immediate adjustment of affairs.

Potash.—The reported acquisition of 40,000 tons of German potash salts for sale in this country, to be paid for by food exports, is very interesting to the British farmer, much of whose land has been half starved for potash for an unduly prolonged period. Prices are said to have been fixed as follows for sales to farmers at nearest railway-stations in lots of 4 tons and upwards: £12. 10s. per ton for potash salts 30 per cent. K_2O ; £20. 12s. 6d. for 80 per cent. muriate; and £23. 2s. 6d. for 90 per cent. sulphate. The demand at these rates is expected to be brisk. Smaller quantities than 4-ton lots will be traded in at slightly advanced figures. The present arrangement does not deal with any potash of a lower grade than 30 per cent. salts. It is reported later, however, that some 20,000 tons are coming, composed of 14 per cent. kainit and 20 per cent. sylvinit.

Bone Meals.—The situation in East Indian bone meal in particular is a very tight one at the present time. Supplies show no appreciable increase, and prospects for imports are not good in the present shipping position. News continues to come to hand about the large supplies of bone meal that are available in India and awaiting export to this country, but there is no indication of shiproom being allocated for their transport. The price is still a good one here, and East Indian producers would no doubt like to be able to take advantage of it. It seems a pity that the producing and consuming ends, therefore, cannot get together.

Norway Chemical Works' Troubles.—Latest advices from Norway indicate that the chemical position there has not been good for some time. There are various reasons for the stoppage of factories, such as absence of orders and strikes amongst the workmen. The Norwegian Nitrate Company have just restarted some furnaces after three months of strike, which has been settled by granting the eight-hour day. The company, it appears, like other electro-chemical concerns, have to contemplate fresh difficulties in respect to wages, which, if not agreed upon, may imperil further production by this class of factory in Norway.

Italian Fertiliser Prices.—The agricultural position in Italy does not appear to move very satisfactorily, but certain fertilisers are on offer at appreciable prices. We find, for example, that superphosphate, 14-16 per cent., can be had at 1.37 lire, and bone superphosphate at 3 to 3.40 lire, per unit. Basic slag, 12-14 per cent. phosphoric anhydride total, is offered at 30 lire, and nitrate of soda at 94 lire. Sulphate of ammonia, 20-21 per cent., is valued at 135 lire per cwt. Chili nitrate of soda is quoted in the South at 100-110 lire per cwt.

PARLIAMENTARY NEWS.

Fuel Research.

In the House of Commons Lieut.-Colonel Burgoyne asked the Chancellor of the Exchequer whether, in view of the shortage of domestic and industrial fuel, the great demand for oil, and the publicity which is being given to the possibility of producing these substances from low-grade coal, colliery waste, and/or other bituminous material, he will consider the advisability of taking steps to protect the public from investing in schemes which are technically unsound?

Mr. H. Fisher: My right hon. Friend has asked me to answer this question. The Government are doing everything they can by setting up a Fuel Research Station for the purpose of providing the public with schemes which are technically sound to guard them against investing their money in schemes which are not technically sound.

Lieut.-Colonel Burgoyne asked the Prime Minister what progress has been made to date in connection with the Government experimental Fuel Research Station at Greenwich; what amount of money has been expended in connection therewith; and whether any results have been obtained towards the utilisation of inferior coal and colliery waste which will tend to increase the amount of domestic and industrial fuel, solid and liquid, for public distribution and consumption during the coming winter months?

Mr. H. Fisher: The Prime Minister has asked me to answer this question. The laboratories at the Fuel Research Station are completed and have begun work. The main building will, it is hoped, be completed next month. The recorded expenditure up to the present on buildings and equipment is £130,924, and it is estimated that the cost under these heads will be £193,588 when the station as at present planned is finished. It has not yet been possible to conduct experiments bearing on the last part of the question, but they will be undertaken in due course after the station is complete.

Shipment of Oilseed Cargoes.

Lieut.-Commander Kenworthy asked the President of the Board of Trade if he is aware that, according to the estimate of the secretary of the Oilseed Supply Committee, 42,657 tons of copra, oilseed, and kernels have been conveyed to Hull by railway wagons since the Armistice; why arrangements cannot be made to ship the Australasian portion of these cargoes direct to Hull in the monthly Commonwealth steamer to that port; and, if not, whether, in view of wagon shortage, other means of direct shipment can be arranged?

Mr. Bridgeman: I am making inquiries into this matter, and will consider what action can be taken to improve the present arrangements for dealing with these cargoes.

LEGAL INTELLIGENCE.

Extracting Oil from Shale.

At the London Bankruptcy Court on Tuesday last before Mr. Registrar Francke, the public examination was held of Robert Ferguson Strong, 69, Ranelagh Road, Pimlico, lately carrying on business and residing at 109, Victoria Street, S.W.1., civil and mining engineer. The statement of affairs filed by the debtor disclosed gross liabilities amounting to £554. 5s. 1d. (of which £521. 9s. 4d. was expected to rank against the estate for dividend), assets nil, thus showing a deficiency of £521. 9s. 4d.

The Receiving Order was made on a creditor's petition on June 19, 1919, the act of bankruptcy being failure of the debtor to comply with the requirements of a bankruptcy notice.

Replying to questions put by the Official Receiver, debtor stated that for the past fifty years he had followed the occupation of a civil and mining engineer, and that for the past twenty or thirty years his earnings had not exceeded £130. per annum; about ten years ago he commenced to experiment for the production of oil from coal, peat, shale and other substances, in which he was successful, but subsequent efforts to form a company to acquire his inventions proved to be abortive, and the letters patent which he held lapsed, and at the date of the receiving order he was negotiating with a firm of financiers for the erection of a small plant at Portland for the purpose of demonstrating that oil can be produced from the shale there. He attributed his failure and insolvency mainly to lack of capital and delay, owing to the war, in obtaining the necessary funds for the erection of

plant to work the fuel oil industry. He has kept no books of account.

The examination was concluded.

A Marking-ink Manufacturer's Failure.

At the London Bankruptcy Court on Tuesday last before Mr. Registrar Francke, the public examination was held of Robert Sturley, described as lately carrying on business as R. Sturley and Sons, at 18 and 19, Bridge Road, Stratford, manufacturers and agents. The Receiving Order was made on a creditor's petition. The statement of affairs filed by the debtor disclosed gross liabilities amounting to £508. 7s., and assets, £190. 6s., thus showing a deficiency of £318. 1s.

Replying to questions put by the Official Receiver, debtor stated that for 14 years prior to 1915 he carried on business as a marking ink manufacturer at 95, Morville Street, and 18 and 19, Bridge Road, but that owing to difficulties since the war in obtaining materials, he discontinued the business. He then began business at 18 and 19, Bridge Road as a manufacturers' agent. Down to about six months ago he was just able to make a living but he had always been handicapped by continued ill-health and lack of capital. In February last owing to pressure of creditors and having no stock he was compelled to cease trading and he is now employed as a traveller at a salary of £3. a week and expenses. He attributed his failure and insolvency to the stoppage of his marking ink business owing to the war and to the expenses of the continued illness of himself and family. Debtor had not kept any books of account and had never been bankrupt before.

The examination was concluded.

GAZETTE NEWS.

LIMITED COMPANIES.—Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions, Orders, and Official and Other Notices.

British Coalite Company, Ltd.—Resolved July 22, confirmed August 6: That the scheme submitted to this meeting for the amalgamation of the company with Coalite, Ltd., and Low Temperature Carbonisation, Ltd., be approved, and that for the purpose of carrying the same into effect the company be wound up. H. Bacon and another, liquidators.

Broughton Rubber Company, Ltd., Manchester.—H. W. Garnett, 61, Brown Street, Manchester, chartered accountant, appointed receiver August 6.

Coalite, Ltd.—Resolved July 22, confirmed August 6: That the scheme submitted to this meeting for the amalgamation of the company with British Coalite Company, Ltd., and Low Temperature Carbonisation, Ltd., be approved, and that for the purpose of carrying the same into effect the company be wound up. H. Bacon and another, liquidators.

Grays Chemical Works, Ltd.—Petition presented, August 8, by Dr. G. T. Morgan, 13, Elms Avenue, Muswellhill, N. Hearing, Royal Courts of Justice, Strand, October 14. Tippetts, 11, Maiden Lane, Queen Street, E.C., and 189, Earl's Court Road, S.W., solicitors.

Hay's Waterproof Glue and New Patent Enamel Composition and Varnish Company, Ltd., Portsmouth. Resolved July 14, confirmed August 1: That the company be wound up. F. O. Goodman, 24a, Commercial Road, Portsmouth, liquidator, who is authorised to sell and dispose of the company's undertaking on terms not less beneficial to the company than those contained in an agreement submitted to the meeting and expressed to be made on behalf of the company of the one part and Jno. H. Franckeiss of the other part.

London and Maikop Oil Corporation, Ltd., London, E.C.—Resolved July 30, confirmed August 14: That the company be wound up. A. E. Cave, Sun Court, Cornhill, E.C., F.C.A., liquidator. Meeting of creditors offices of company, 20, Copthall Avenue, E.C., September 2, at 12 noon.

Minbu Oil Company of Burma, Ltd., London, E.C.—Resolved July 30: That it is advisable to wind up. R. M. Edington, 175, West George Street, Glasgow, accountant, liquidator.

New Selphosa Salt Company, Ltd.—Resolved July 16, confirmed August 6: That the company be wound up. T. F. Wild, liquidator.

Vulcan Globe Match Company, Ltd.—Resolved July 3, confirmed August 1: That the company be wound up. C. F. Cape, 12, Coleman Street, E.C., liquidator.

Vulcan Match Agency, Ltd.—Resolved July 3, confirmed August 1: That the company be wound up. C. F. Cape, 12, Coleman Street, E.C., liquidator.

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

The specifications of the following applications are not printed by the Patent Office until the complete specifications have been accepted.

August 18th to 23rd (inclusive).

- Utilising Explosives. Adams, S. H. 20,431.
Oxidising Anthracene. Barrett Company, 20,707.
Separation of Solids of Different Specific Gravity or Inertia. Bennett, W. 20,347.
Acetic Acid. British Cellulose and Chemical Manufacturing Company; Hotz, J.; and Soller, M. 20,574.
Refractory Material. British Thomson-Houston Company (General Electric Company). 20,386.
Separating Hydrocarbons and Water. Brown, W. A.; and White, F. G. 20,689.
Recovering Tin. Collins, J. J. 20,481.
Flotation and Collection of Minerals, etc. Conder, C. M.; and Vivian, G. T. 20,231.
Packing, Storage, and Use of Dyes. Crompton, W. E.; and Ecroyd, E. B. 20,517.
Distillation of Coal, etc. Davidson, T. M.; and Low Temperature Carbonisation, Ltd. 20,598.
Revivifying Spent Oxide. Dibdin, L. A. 20,322.
Separation and Utilisation of Sulphur from Coal Gas, etc. Finlayson, T. C.; and Morgan, J. S. 20,533.
Drying China-clay, etc. Grace, C. J. 20,763.
Tarless Fuel, etc. Harger, J. 20,259.
Recovery of Nitrating Acid in Manufacture of Nitro-cellulose, etc. Marks, E. C. R. (Hamburger). 20,670.
Production of Caustic Soda from Brine by Electrolysis. Nair, J. K. 20,784.
Protecting Ferrous Metals from Rust. Newman, T. F. 20,656.
Soap. Rogers, F. H. 20,570.
Conversion of Waste Products of Coal, etc., into Inflammable Gas. Scott, G. B. 20,651.
Casein Cements. Serle, P. H. W. 20,665.
Ore-concentrating Apparatus. Skudder, W. H. R. 20,778.
Manufacture of Ethylacetate from Paraldehyde. Soc. des Acieries et Forges de Firminy. 20,572.
Agglomeration of Finely Divided Materials. Sutcliffe, E. R. 20,503.
Aluminium, Sodium Silicates, etc. Welford, R. 20,647.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 6d. in stamps to the Comptroller, Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane, W.C.

1917.
Destructive Distillation of Wood, Woody Fibre, Peat and Similar Carbonaceous Substances. Poore, P. 13,321. 131,006
1918.
Ammonium Nitrate. Bailey, C. W.; Denny, H. S.; and Jefferis, A. T. 4,877. 131,017
Chlorosulphonic Acid. Clayton Aniline Co.; Shedler, A.; and Marchant, E. N. 5,199. 131,024
Nitric Acid. Quinan, K. B. 5,397. 131,029
Anhydrous Chlorides. Heap, W.; and Newbery, E. 5,596. 131,039
Rendering Aluminium and Its Alloys More Durable. Coles, S. O. Cowper. 5,710. 131,047
Synthetic Ammonia. Maxted, E. B. 5,741. 131,049
Varnishes or Dopes. Sutherland, D. M.; and Wall Paper Manufacturers, Ltd. 6,909. 131,082
Acetaldehyde. Crossfield and Sons, J.; and Hilditch, T. P. 6,980. 131,084
Dehydration of Tar. Klein, C. A. 7,032. 131,087
Esters. Boake, Roberts, and Co., A.; Durrants, T. H.; and Ellis, W. E. 7,040. 131,088
Liberation of Hydrogen from Mixtures Containing It. L'Air Liquide Soc. Anon. pour l'Etude et l'Exploitation des Procédés Georges Claude. 7,082. 131,091
Kilns for the Incineration of Earth Matters and Dolomites, Limes, and Cements. Hodson, T. 7,623. 131,095
Distillation, Gasification, and the Like of Carbonaceous Materials, and Separation of the Volatile Matter Therefrom. Davies, W. E. 10,895. 131,105
Phenol Formaldehyde Condensation Products, and the Manufacture Thereof. Potter, H. V.; and Damard Lacquer Co. 11,601. 131,112
Removing Tar from Gas. Heise, O. A. L. 13,017. 131,125
Concentration of Ores. Scott, W. A. 13,210. 119,224
Quantitative Estimation of Vapour Pressure in Gases. Davis, H. S.; and Davis, M. D. 13,323. 131,154
Vanillin. Confectionery Ingredients, Ltd.; Matthews, F. E.; King, A. T.; and Kane, T. 13,504. 131,161
Cement. Moncrieff, Sir G. K. Scott; and Hines, J. 13,567. 131,164
Drying, Carbonising, Roasting, or Like Treatment of Materials. Erith's Engineering Co.; and Erith, C. 14,057. 131,179

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

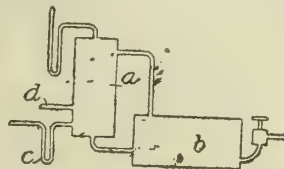
Organic Acid Chlorides. T. H. Durrans, Oxford; and A. Boake, Roberts and Co., Stratford, London. British Patent, 128,270, of 1917.

Organic acid chlorides of the general formula $R.CO.Cl$, where R is an aliphatic or aromatic radical, are prepared by the reaction of sulphur and chlorine on dry alkali or alkaline-earth salts of the acids in about the proportions $2 R.CO : S : 4Cl$, or $3 R.CO : S : 6 Cl$, or proportions inter-

mediate between these. The acid chloride may be distilled off, or extracted by a solvent. Acetyl chloride, benzoyl chloride, and butyryl chloride are specified as products. Specifications 25433/08 and 611/11 are referred to.

Distilling Oils. F. Tinker, Erdington, Birmingham. British Patent, 128,288, of 1917.

In the production of fuel oils from crude oils, the crude oil is mixed in a chamber *a* with hot vapour derived from the distillation in a still *b* of a portion of the treated oil with-



drawn from the chamber *a*. The crude oil enters the top of the tower or chamber *a*, and there mixes with vapours from the still *b*. The petrol and other light hydrocarbons escape in the form of vapours through a pipe *d*. The oil thus "topped" constitutes the improved fuel. The larger portion is withdrawn by a pipe *c*, a small portion flowing to the still *b*. A portion of the heavier constituents of the crude oil remains as residue in the still *b*, and is continuously withdrawn therefrom. The partial elimination of the heavier constituents in this manner decreases the viscosity of the fuel oil.

Sulphuric Acid and Sodium Sulphate. H. M. Dawson, Headingley, Leeds. British Patent, 127,677, of 1917.

Sulphuric acid is obtained from nitre-cake and other acid sodium sulphates by dissolving to produce solutions, the concentration of which is predetermined exactly by the composition of the acid sulphate and the degree of cooling chosen, and then cooling to the selected temperature (below about $0^{\circ}C.$), whereby crystals of sodium sulphate and a solution having the maximum ratio of sulphuric acid to sodium sulphate are obtained. In a modification, water is added during the cooling. Curves are given showing the amount of sodium sulphate that is held in solution in acids of various concentrations at different temperatures, and directions are given for the use of these curves for carrying out the process.

Fat Extraction. W. T. and B. B. Powling, Prittlewell, Essex. British Patent, 128,397, of 1918

Bones or other material are heated in a container of which the only outlet during the extraction process is near the bottom, the vapours and gases generated being drawn downwards through the mass by suction, and the heating and suction continued until all available grease is melted out. The illustration shows a container *H* with steam-heating jacket *H'* connected to a condenser *K* and vacuum pump *L* through a jacketed chamber *J* in which the fat is separated and collected.

In another form of apparatus, the fat collects at the bottom of the heater. After extraction of the fat, the heating may be continued to dry the treated material for use as manure or cattle or poultry food.

Varnishes. S. E. Groves, Felling-on-Tyne; and T. W. H. Ward, London. British Patent, 128,659, of 1917.

A varnish for the planes of aircraft consists of a solution of cellulose ester in acetone, etc., to which is added a hygroscopic substance such as chloride of zinc, calcium, magnesium, or tin, or a mixture of these chlorides. The chloride lowers the viscosity of the dope, so that a smaller quantity of solvent can be used—for instance, 20 per cent. In one example, 1 to 5 per cent. of calcium chloride is added to a solution of celluloid in acetone, alcohol, and benzole. In another example, in which the dope contains 10 per cent. of celluloid, one or more of the above-mentioned chlorides are added in such a proportion that the mixture contains from $\frac{1}{2}$ to 1 per cent. of combined chlorine. In another example, a mixture in molecular proportions of calcium chloride and zinc chloride dissolved in alcohol is added to the dope, the solution having been first neutralised by being boiled with zinc.

Catalytic Apparatus. E. B. Maxted and T. A. Smith, Walsall, Staffordshire. British Patent, 128,623, of 1917.

In a high-pressure furnace for conducting chemical reactions such as the synthesis of ammonia, combustion is effected in a chamber separate from the reaction chamber, and at a pressure approximately the same as that at which the reaction takes place. The apparatus shown comprises a strong steel shell A lined with non-conducting material B. Combustible gas and air are supplied to the chamber K through pipes H, N respectively, and the products escape through a coil L and a relief valve P loaded to blow off at the desired pressure. The nitrogen-hydrogen mixture is supplied by the pipe R, and is circulated by a pump E through the pipe F, over the coil L, and combustion chamber K, through catalytic material C', and back to the pump. When the mixture is used as the combustible gas, a portion is supplied through the non-return valve G

to the combustion chamber K. The ammonia produced is absorbed between the outlet D and the pump E. The combustion chamber may surround the reaction chamber, and the pressure in the latter may be utilised for controlling the valve P.

Purifying Oils.—W. J. Mellersh Jackson, London. A communication from the Twitchell Process Company, Cincinnati, U.S.A. British Patent, 127,159, of 1918.

After petroleum oils have been treated with sulphuric acid to remove unsaturated hydrocarbons and the acid sludge separated in the ordinary way, the oil is treated with sodium hydroxide or other alkali to neutralise dissolved sulpho-acids, and the salts thus formed are extracted by means of a dilute solution of a solvent soluble in water, such as alcohol or acetone. A fifty per cent. solution of methyl alcohol is mentioned as suitable.

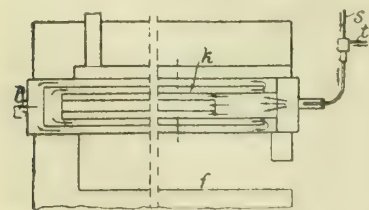
Picric Acid, Etc. British Dyes, Ltd., J. Turner, and L. G. Badier, Huddersfield. British Patent, 126,368, of 1917.

Picric acid is prepared by nitrating phenol trisulphonic acid by concentrated nitric acid in concentrated sulphuric acid solution with the addition of water or steam; the water or steam assists in the replacement of the sulphonic groups by nitro groups. Phenol trisulphonic acid is obtained by sulphonating phenol with a mixture of concentrated and fuming sulphuric acid. *p*-Nitrophenol disulphonic acid is formed as an intermediate product of the nitration.

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Sulphur-burners. M. Krotoff, Haute Vienne, France. British Patent, 128,549. Convention date, June 15, 1918.

To produce a gas rich in sulphur dioxide by the burning of sulphur, regulable quantities of finely powdered sulphur are introduced by the pipe *s* into a blast of air injected into a furnace by the pipe *t*, the resulting sulphur dioxide escaping by the outlet *b*. The furnace *k* comprises a series of concentric tubes upon a hearth *f*. Preheating of the furnace is necessary to start the reaction, but once started, the heat evolved is sufficient to maintain it. The apparatus is stated to be applicable to the combustion of any solid substance for the purpose of producing a gaseous product.



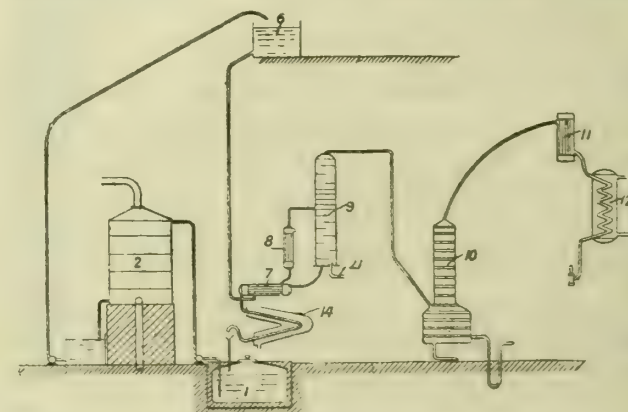
Halohydrins. Commercial Research Company, New York, U.S.A. British Patent, 128,578. Convention date, June 20, 1918.

Halohydrins such as chlorhydrins are prepared by subjecting gaseous unsaturated hydrocarbons such as olefines, under pressure, to the action of an aqueous solution of hypochlorous or similar acid. The reaction is effected in a vessel A filled with an inert packing. Hydrocarbon gases are pumped through an inlet D, and excess escapes through a valve *f* and meter G. Hypochlorous acid solution is sprayed into the vessel A from a pipe H by a pump I. The chlorhydrin solution is discharged by a pipe B to a storage vessel C, from which it may be passed through an apparatus in which hypochlorous acid is formed, and thence is returned to the vessel A to obtain a stronger solution of chlorhydrins. The hypochlorous acid is formed

by passing water or chlorhydrin solution from the vessel C into a mixing-vessel O containing a salt of a weak acid such as sodium bicarbonate, borax, etc., or a mixture of sodium bicarbonate and boric acid, or a basic salt such as magnesium oxychloride. The solution obtained is passed by a pipe P down to a stone-ware column Q, up which chlorine is passed from a container U through a meter T. Excess of chlorine escapes by a pipe *q*. Salts of hypochlorous acid such as magnesium, calcium, or aluminium hypochloride may be used. The gases containing ethylene and propylene obtained by cracking petroleum may be treated by passage in succession through two vessels into which hypochlorous acid is sprayed to obtain propylene chlorhydrin from the first and ethylene chlorhydrin from the second.

Recovering Volatile Solvents. J. H. Brégeat, Paris. British Patent, 128,640. Convention date, May 25, 1917.

Certain volatile solvents used in manufacture are recovered from gaseous mixtures containing them, by absorption in phenolic reagents, such as crude carboic acid or crude cresols, and subsequent distillation and condensation. The solvents in question are:—Methyl alcohol, amyl alcohol, ethyl acetate, amyl acetate, carbon tetrachloride, chloroform, di-, tri-, or tetra-chlorethylene, tetra- and penta-chlorethane, petrol.



Using the apparatus shown, the vapours are washed by a counter current of cresols in the absorption column 2, and the cresol charged with the volatile bodies is pumped to the tank 6, and then flows through a heat-exchanger 7 to a steam heater 8 and cascade evaporator 9 heated by steam from a pipe 21; the volatile bodies pass off with the steam to a distilling column 10, where they are rectified, and thence to condensers 11, 12. The cresols, deprived of the volatile bodies, flow from the evaporator 9 to the heat-exchanger 7, and thence to the cooler 14, and so back to the storage tank 1 for reuse.

REPORTS OF COMPANIES.**British Dyestuffs Corporation, Ltd.**

The statutory meeting of British Dyestuffs Corporation was held on Tuesday at Winchester House, E.C. Sir Henry Birchenough, K.C.M.G., who presided, pointed out that the meeting was purely a formal one, and in answer to questions said that 9,900 applications were received from the public in response to the prospectus, representing 3,276,000 shares, or approximately two-thirds of the whole issue; 876 applications were subsequently received from the underwriters, representing approximately one-third of the issue. In view of the fact that the prospectus was issued immediately after the Victory Loan, and that the industrial outlook at the time in view of the coal strike in Yorkshire was not very favourable, the directors considered the response on the part of the public extremely satisfactory. The total number of shareholders was now approximately 12,000. In regard to the works at Huddersfield, they were designed under the best possible advice as dyeworks, but during the war a large portion had been used for the production of high explosives. He considered the prospects of competing with the German trade were very satisfactory, and that with their modern works and the loyal co-operation of the textile trades they would be able to satisfy the requirements of the whole industry throughout the British Empire, more particularly India.

Mr. Fay inquired if any foreign dyes were at present coming into this country, and if so, from what source?

Lord Moulton said that foreign dyes were coming into this country from Switzerland, but only in small quantities. He believed none were coming in from any other source, and these were coming in relief of the needs of England, because it took some time before the full list of dyes could be produced.

Mr. Beaumont asked if it were not the fact that a good quantity of dyes were coming here from Germany through America?

The Chairman replied that the board had no positive knowledge, but he did not think any dyes were coming into this country at the present time from Germany by way of America.

A number of other questions having been answered, the proceedings closed with a vote of thanks to the chairman.

London Nitrate Company, Ltd.

An extraordinary general meeting was held at Liverpool on August 22, Mr. Frank Tobin, the chairman, presiding, when the following resolution was unanimously passed: "That the directors be and they are hereby authorised to borrow from time to time an amount not exceeding in the aggregate £400,000, at such times, upon such security (if any), and otherwise upon such terms and conditions as the directors may from time to time think fit."

British Vegetable Oil Extraction Company, Ltd.

Report for the year to December 31 states that the operations of the company have continued under the control of the Ministry of Food, and the same difficulties as to class, quantity, and quality of raw material allocated have been experienced as foreseen in the last report. The refinery treated over 4,000 tons of crude oil, and over 1,100 tons of seeds and cake were crushed in the mill. These amounts represent about half of the present capacity of the refinery and about one-seventh of the present capacity of the mill, and it will be readily understood that it was impossible to make a profit on a large plant with only such a small turnover. The loss on the year's working was £28,098., which, with administration expenses and interest on loans, makes a total debit balance of £63,425.

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 4, Queen Anne's Gate Buildings, London, S.W. 1, whence, unless otherwise stated, further information may be obtained:—

Australia.

A Melbourne firm of indentors and importers desire to secure the representation, for Victoria, of United Kingdom manufacturers of heavy chemicals. (Reference No. 412.)

Canada.

H.M. Trade Commissioner at Winnipeg reports that a well-known wholesale company in Edmonton, Alberta, is desirous of securing exclusive agencies in Alberta, Saskatchewan, and British Columbia, for United Kingdom manufacturers of proprietary preparations in druggists' goods, chemicals, and artists' materials. (Reference No. 420.)

South Africa and Rhodesia.

A partner in a firm of South African agents, claiming to have had lengthy commercial experience, is at present in this country, and desires to secure additional agencies for United Kingdom manufacturers of dyes for the Union and Rhodesia. (Reference No. 431.)

A Port Elizabeth firm having their head office in the United Kingdom, and claiming to be in close touch with the principal merchants, storekeepers, and farmers in South Africa, desire to secure agencies, for the Union and Rhodesia, of United Kingdom exporters of fertilisers, Stockholm tar, linseed oil, axle grease, bluestone, caustic soda, and saltpetre. (Reference No. 432.)

British West Indies.

A manufacturers' agent at Port of Spain, Trinidad, desires to get into touch with United Kingdom suppliers of laundry soap, with a view to representing them, for sales on commission, in the West Indies and British Guiana. (Reference No. 433.)

Belgium.

A Belgian inquirer desires an agency for United Kingdom producers of coal and pitch. (Reference No. 435.)

Spain.

A British firm in Barcelona desire to secure agencies for United Kingdom firms exporting metals and raw materials. (Reference No. 467.)

H.M. Commercial Secretary, Madrid, reports that a firm of commission agents in that city desires to represent British exporters of fertilisers. (Reference No. 468.)

Switzerland.

A general commission agent in Lausanne wishes to secure the agencies in Switzerland of United Kingdom manufacturers and exporters of coal and patent fuel, oils, varnishes, paints, edible oils, and soaps. (Reference No. 473.)

A general commission agent at Bâle wishes to secure the representation, for Switzerland, of United Kingdom exporters of rubber, chemicals, and raw materials. (Reference No. 475.)

A British commission agent in Lausanne wishes to get in touch with United Kingdom manufacturers and exporters of chemicals, drugs, and disinfectants. (Reference No. 482.)

Chili.

A general commission agent and importer of Santiago is shortly visiting this country. He is interested in importing the following articles into Chili: Caustic soda, soda ash, paraffin wax, and raw materials for Chilean industries. (Reference No. 492.)

Cuba.

A wholesale druggist (British) in Havana wishes to get into touch with United Kingdom manufacturers of drugs and chemicals, with a view to acting as their agent in Cuba. (Reference No. 495.)

MARKET REPORTS.**TAR AND AMMONIA PRODUCTS.****WEDNESDAY.**

Benzole: London, 90%, 2s.; North, 1s. 10d. to 1s. 11d., 50%, 1s. 10d.; North, 1s. 9½d.; naked. Carbolic acid, crude, 60%, East and West Coast, nominally 1s. 6d. to 1s. 7d.; crystals, 39-40%, 9d. to 9½d., f.o.b. Crude tar, London, 45s. to 50s.; Midlands, 44s. to 46s.; North, 45s. per ton, ex works. Pitch 72s. 6d. to 75s.; East Coast, 65s. to 70s. f.o.b.; West Coast, 55s. to 57s. 6d., f.a.s. Solvent naphtha, naked, London, 90-100%, 2s. 5d.; North, 2s. 3d. to 2s. 4d.; 90-160%,

naked, London, 2s. 3d.; North, 2s. to 2s. 1d. Crude naphtha naked, 30%, 9d.; North, 8d. to 8½d. Refined naphtha-line, £16. to £18.; salts, £6. to £7. Toluol, naked, London, 2s. 6d.; North, 2s. 5d. Creosote, naked, London 6½d.; North, 5½d. to 6d.; heavy oil, 6½d. to 7d. Anthracene, 40-45%, 7d. per unit. Cresylic acid, 95%, 2s. 5d. to 2s. 6d.; 97-99%, 2s. 7d. to 2s. 8d., ex works, London, and f.o.b. other ports. Sulphate of ammonia; home trade, £19. 10s. per ton; basis 24½%. Nitrate of soda, £21. to £22.

LONDON METAL MARKET.

THURSDAY.

Copper: Standard brands, £98. 10s. to £99. cash. £99. 10s. to £100. three months; electrolytic, £110 to £120. Tin: Standard, £271. 10s. to £272.; cash, £267. 5s. to £267. 10s. three months; Straits, £275. 10s.; English, £268. Lead: Soft foreign, £24. 15s.; English, £26. Spelter, £38. 10s.; hard, £29. to £30. Antimony, English regulus, 90%, £42. Aluminium, £150.; Nickel, £205. delivered, packages extra. Quicksilver, £23. 10s. Bismuth, 12s. 6d. Platinum, 442s. per oz. Wolfram, 30s. per unit.

MANCHESTER CHEMICAL MARKET.

THURSDAY.

There is a continued good demand for heavy chemicals, both for home and export trade, and values generally appear to be settling down on a more stable level. Small lots of resale caustic soda, 58% alkali, and refined bicarbonate of soda, however, are still available at recent rates. Bleaching powder quiet, but price steady at £15. softwoods, on rail. For hardwoods £14. f.o.b. is about current value. Saltcake, firm at 60s. per ton, carriage paid. Chlorate of soda, lower at 6½d. per lb. Potash, quiet at 1s. per lb. Recovered rock sulphur, easy at £17, on rail. Home trade prices for bichromates are unaltered at 1s. 6d. and 11d. per lb., respectively, for potash and soda. For sulphate of copper there is no demand, and price remains nominal at £43. f.o.b. Commercial hyposulphite of soda, steady at £16. 10s. Phosphate, £26. per ton. There is no inquiry for concentrated sodium sulphide, and quotation is easy at £18 10s. per ton. Arsenic, still in short supply, and price higher at £58. per ton. Yellow prussiate of potash, dull at 1s. 9d. per lb. Soda, firmer at 7d. per lb. Carbonate of potash is well maintained at recent quotations. There is an improved demand for lead salts, and white acetate is firm at £83. per ton. Brown, lower at £70. Nitrate, £56 per ton. English brown acetate of lime is scarce and firm at £11. per ton; grey, £17. per ton. Miscible and solvent wood naphtha have a downward tendency. Quotations for acetate of soda and acetic acid are well maintained, and there is a fair inquiry. All zinc, tin, and ammonia salts are moving off steadily. Oxalic acid unaltered at 1s. 2½d. per lb.

TURPENTINE MARKET REPORT.

Messrs. James Watt and Son, Limited, of 101, Leadenhall Street, London, E.C.3, report that the stocks of turpentine on August 23 were: American, 32,283 barrels, compared with 6,564 barrels at the corresponding date of 1918; French 45 barrels (14 barrels); and Spanish, 618 barrels (1,535 barrels). Deliveries during the week ended August 23 were 1,750 barrels, against 520 barrels last year, and since January 1, 46,865 barrels, compared with 16,736 barrels in 1918. The price on Saturday last was 127s. 6d. per cwt., compared with 120s. at the corresponding date of last year. September-December delivery was quoted at 128s. 6d. and January-April (1920) 131s.

SWANSEA MARKET REPORT.

THURSDAY.

Timplate prices are unchanged with fair business in export quarters. Copper irregular with a tendency to weaken at £98. per ton prompt and £99. three months. There was an easier tone in tin and a little business was transacted at £272. per ton for prompt and £268. 10s. three months. Lead prices steady and quiet: Spanish at £24. 17s. 6d. per ton prompt and slightly dearer forward; English at £26. Spelter quiet and easier at £39. 5s. 0d. prompt and £40. forward. Zinc sheets £64. f.o.b. New York. English sheets £66. Silver 60½d. per ounce. Quicksilver £23. 10s. 0d. per bottle. Antimony nominal with English regulus 90%, at £42. prompt. Nickel £205. per ton delivered London or equal. Aluminium £150. Bone meal 15s. 3d. per cwt. in bags. Pitch scarce and firm at 53s. per ton. Nitrate of soda quiet and steady at 21s. 6d. per cwt. in bags. Sulphate of ammonia remains very steady at £19. 10s. per ton f.o.r. over current quarter. Sulphate of copper quiet at £43. 10s. per ton for home and export trade in casks f.o.b. less 5%.

LIVERPOOL CHEMICAL MARKET.

THURSDAY.

Chemicals have, on the whole, been more in demand, inquiries having come in more freely for home trade uses, and to a very fair extent on overseas account. Ship painters are on strike, but this strike may end any moment, while a joiners' strike that has dragged wearily on for nearly three months seems to be flickering out from sheer exhaustion. With these exceptions, the first of which may affect the sale

of leads and colourings somewhat, the labour situation in the district is much more settled, and an easier feeling in respect of it prevails in business circles. Bleaching powder has been in very fair demand, and in good supply. Prices are £14. 10s. to £15. per ton, free on rail or conveyance, in buyers' packages, and £17. per ton, for export. Chloride of calcium has been rather more in request, and is £8. to £11. per ton, in casks, f.o.r. Caustic soda has sold more freely, especially on export account. Prices are £24. per ton for 76%; £22. per ton for 70 to 72%; and £19. per ton for 60 to 62%. Nitrate of soda has been quieter, and is £20. 10s. to £21. 10s. per ton. Saltcake has been in good request, and is £6. 10s. per ton, in casks, f.o.b. Soda crystals have been well inquired for and are £5. per ton in 2cwt. bags, f.o.r. at works. Bicarbonate of soda has been in good request, and is £7. 5s. to £10. per ton, according to terms of delivery. Borax has been in rather active demand but has been in very short supply for prompt delivery. Ordinary, is £42. per ton, and powdered £44. per ton, in bags. Ammonia alkali continues to be well inquired for and is £6. to £6. 5s. per ton, f.o.r. at works. Hyposulphite has been rather more in request and is £17. per ton for ordinary and £22. per ton for pea crystals. Sulphite of sodium has been quiet and is £10. per ton for ordinary, and £16. to £18. per ton for pea crystals, in 1cwt. kegs. Bichromate of soda has had a fair inquiry and is 9d. per lb. Phosphate of soda has been in somewhat better request and is £25. per ton. Sulphide of sodium has been in moderate demand and is £20. per ton in casks, and £22. per ton, in drums. Chlorate of potash has been rather more in request, and is 1s. 1d. to 1s. 3d. per lb. Permanganate of potash has again been in fair demand, and is 3s. 6d. per lb. Sulphate of potash has been very quiet and is £40. per ton. Carbonate of potash has had a moderate inquiry and is £90. to £95. per ton for 80 to 85%. Caustic potash has been in good request and is £110. to £120. per ton. Nitrate of potash has been more inquired for and is £55. to £60. per ton for refined and £40. per ton for ordinary. Canadian potashes have been very quiet. Montreal first quality are £200. to £220. per ton and second quality £190. to £210. per ton. Bichromate of potash has been rather more in demand, and is 1s. 6d. to 1s. 7d. per lb. Yellow prussiate of potash has been in moderate request, and is 1s. 9d. to 1s. 10d. per lb. Salammoniac has been in steady demand, and is £80. per ton for lump, £75. per ton for seconds, and £5. per ton extra for ground. Sulphate of ammonia has been but little in request, and is £19. 10s. per ton, less trader's discount of 10s. per ton, free to nearest wharf or station, to September 30. Carbonate of ammonia has been in quietly steady demand, and is 6½d. per lb. Muriate has been but little called for and is £50. to £60. per ton, according to quality. Magnesia has been in very fair request. Carbonate is £3. per cwt., and sulphate £10. to £16. per ton, according to grade. Alum has been well inquired for but has been very scarce for early delivery. Prices are, £18. 10s. per ton for the home trade, and £18. 10s. to £19. 10s. per ton for export. Aluminoferrie has been very quiet and is £8. 10s. to £12. per ton, according to quality. Sulphate of alumina has been inactive and is £12. to £17. per ton, according to grade. Sulphur has been called for rather freely. English kinds are: Flowers, £32. per ton; roll, £28. per ton, and rock, £22. per ton, in bags, f.o.r. Sicilian grades are: Flowers, £28. per ton; roll, £22. 10s. per ton; and rock, £17. 15s. per ton. Cream of tartar has had a fairly free sale and is £11. 10s. to £11. 15s. per cwt. Tartaric acid has been in very fair demand and is 3s. 1d. per lb. Boracic acid has been rather more inquired for, and is £72. per ton for crystals, and £74. per ton for powdered. Oxalic acid has been quiet and is 1s. 3d. per lb. Citric acid has been in quietly steady demand and is 4s. 4d. per lb. White acetate of lead has been but little in request and is £85. to £90 per ton. Arsenic has been quiet, and has been very scarce. The price continues very firm and may be given as £50. per ton for white powdered. Sulphate of copper has been inactive and is £14. per ton for farm purposes in the United Kingdom, and £43. per ton, less 5%, in casks, f.o.b. at Liverpool.

TYNE CHEMICAL REPORT.

TUESDAY

Heavy chemicals (particularly caustic soda and bleaching powder) continue in good inquiry and trade generally is better—there is a strong demand also for soda crystals locally at £5. per ton in 2cwt. bags. Sulphur still very scarce, and firm at £23. and £24. per ton.

The following prices are per ton net:—Bleaching powders, softs and hards, £15. per ton; caustic soda 74/77%, £23. 5s., do., 70%, £22., do., 60%, £20.; recovered sulphur, 2cwt. bags, £24.; hyposulphite of soda, 5/7cwt. casks, £19., 1cwt. kegs, £25.; sulphite of soda, 5/7cwt. casks, £12.; do., 1cwt. kegs, £20.; silicate of soda, 75Tw., £9. 12s. 6d., do., 100Tw., £10., do., 140Tw. £10. 10s.; soda crystals, 2cwt. bags, £5.; sulphate of soda (salt cake) in bulk, £3. 10s.; pure white sulphate of alumina, 14/15%, £19. 10s.; blanc fixe, £22.; chloride of barium, £27.; sulphide of sodium, crystals, £18. do., refined concentrated solid, 60/62%, £25.; hydrate of barium, crystals, £56.

COALS.—Market is very strong, with continued heavy requisitioning on official account, with the result that there is little coal offering for outside markets. Prices are ruling high:—Best Northumberland steam coals, 95s. to 100s. per ton., second qualities, 90s.; Northumberland small coals, 70s. to 75s., seconds, 60s. to 65s.; best Durham gas coals, 72s. 6d. to 75s., seconds, 65s. to 70s.; bunker coal (for metals) 72s. 6d. to 75s., gas coke, 80s. to 85s.

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Wednesday.

During the past week business has been fairly good and the undertone in the market has been steady. Some important deals are reported to have been carried through and prices generally indeed are few and far between and current values

are still rated as follows:—Arsenic, £55. per ton net, Glasgow: bicarbonate of soda, £8. 15s. and £10. per ton for 6-8 casks and 1cwt. kegs, Liverpool: boracic acid crystals, English refined, £72. for 2cwt. bags, and borax crystals, £39. for 2cwt. bags, carriage paid: caustic soda, white, 70-72%, £24. per ton, net Glasgow; chlorate of potash, 1s. 1d. per lb. net, Glasgow: chlorate of soda, £3. 4s. per cwt. net, Glasgow: citric acid, 4s. 4d. per lb. 5% Glasgow: cream of tartar 98% £11. 5s. per cwt. net, Glasgow: paraffin wax, U.K. deliveries 125°, 6½d. to 6¼d., 121-30, 5½d. to 5¼d., 118-20°, 5½d., 110-12°, 4d. to 4½d., and 98-102° 4d. to 4½d.; salammoniac, £80. and £75. per ton, net, any port, for first and second lump respectively: salammoniac crystals, £85. per ton, net, Glasgow: saltpetre, £3. 4s. net, Glasgow: tartaric acid, 3s. 1d. per lb., 5% Glasgow.

Among the sea oils there is still a pronounced scarcity of whale oils and the only variety at present on offer continues to be black—which is still going into consumption at 78s., its old quotation. Pale, yellow and brown are not on offer at all. Newfoundland cod and pale seal are also blank as far as the market is concerned, but there has been a supply of Menhaden going at 86s.

There is no change of consequence so far as the coal trade is concerned and demand keeps fairly steady. Supplies generally are sufficiently plentiful to meet demand, and, if anything, the requirements for both industrial and domestic purposes are now heavier. There is little or nothing doing from the export standpoint and home requirements still take the monopoly.

IMPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

BRISTOL.

*Publication of Official Returns
Suspended.*

GLASGOW.

Week ending August 23.

BARIIUM SULPHATE—
Antwerp, 100 bgs.
BARYTES—
New York, 88 brls.
DYESTUFFS—
Tanning Extract
New York, 133 brls.
GLUE—
Boston, 13 brls.; A'werp, 135 bgs.
IODINE—
New York, 3 bxs.
LEAD CARBONATE—
New York, 35 brls.
MANGANESE ORE—
Dunkirk, 1,500 t.
PARAFFIN SCALE—
New York, 921 brls.
SOAP—
Antwerp, 1 cs.; New York, 150 brls.; Philadelphia, 2,000 bxs.
WHITE LEAD—
New York, 380 brls.

GOOLE.

Week ending August 23.

CARBON (DECOLOURISING)—
Amsterdam, 50 bgs.

GRANGEMOUTH.

Week ending August 23.

NIL.

GRIMSBY.

Week ending August 23.

HYDROSULPHITE—
Dieppe, 30 drms.

HULL.

Week ending August 23.

ACETIC ACID—
New York, 378 brls.

BEE'S WAX—

Matadi, 58 bgs.

BORAX—

New York, 5,125 sks.

CARBON BLACK—

New York, 138 cs.

DEXTRINE—

Rotterdam, 100 brls.

FORMALDEHYDE—

New York, 84 brls.

LITHOPONE—

Rotterdam, 12 cks.; New York, 448 brls.

MANGANESE ORE—

Bombay, 500 t.

PARAFFIN SCALE

New York, 405 brls.

PETROLEUM WAX—

New York, 405 brls.

ROSIN—

Bordeaux, 33 cks.

WAX—

Conakry, 490 pkgs.

WHITE LEAD—

New York, 256 brls.

LEITH.

Week ending August 23.

NIL.

LIVERPOOL.

Week ending August 23.

AMMONIUM BROMIDE—

New York, 20 cs.

BORATE OF LIME—

W.C. S. Africa, 5,417 cks.

CHEMICALS (otherwise undescribed)

Boston, 2 cs.

COPPER PRECIPITATE—

W.C. S. Africa, 220 sks.

CREAM OF TARTAR—

Bordeaux, 365 cks.

DYESTUFFS—

Chestnut Extract
New York, 1,004 brls.

Logwood Extract
Vera Cruz, 1,230 pkgs.

Tanning Extract
Baltimore, 100 brls.; Newport, News, 825 bgs.

DYESTUFFS—

Tanning Extract
New York, 4,176 sks.

FERRO TITANIUM—

Baltimore, 243 bxs.

FISH OIL—

Baltimore, 500 brls.; Lisbon, 50 brls.; New York, 2,493 brls.; St. John's, N.F., 50 cks.

FULLERS EARTH—

New York, 4,560 bgs.

HYDROGEN GAS—

Halifax, 12 cylds.

IRON PYRITES—

Bazerta, 5,950 t.

LITHOPONE—

New York, 93 cks., 650 brls.

MANGANESE PEROXIDE—

Poti, 3,604 t.

MINERAL WHITE—

Bordeaux, 600 bgs.

OCBRE—

Havre, 44 cks.

PARAFFIN SCALE—

New York, 5,066 brls.

PARAFFIN WAX—

New York, 2,120 brls.; Philadelphia, 149 brls.

PARALDEHYDE—

Montreal, 20 cs.

PHOSPHATE—

Stax, 5,217 t.

ROSIN—

Bordeaux, 1,369 cks.; Brunswick, 2,600 brls.; New Orleans, 1,108 brls.

SOAP—

Baltimore, 560 brls.; Boston, 14 bxs.; New York, 400 brls.; Newport News, 2,600 brls.; Valencia, 140 cs.

SODIUM BICROMATE—

New York, 17 cks.

SODIUM NITRATE—

W.C. S. Africa, 10,098 sks.

TALLOW—

Boston, 100 bxs.

TURPENTINE—

Baltimore, 100 brls.

WAX—

New York, 1,013 brls.

WOOD OIL—

Baltimore, 2,247 brls.

ZINC OXIDE—

Boston, 306 brls.; New York, 4,170 brls.; Rotterdam, 125 cs.

LONDON.

Week ending August 23.

ACETIC ACID—

U.S., 39 pkgs.

ARSENIC—

Portugal, 30 t.

BARYTES—

Belgium, 250 bgs.; U.S., 339 cks.

BEE'S WAX—

Morocco, 32 bgs.; Pt. E. Africa, 89 brls., 13 blks., 60 bgs., 782 pkgs.

BONE BLACK—

U.S., 100 brls.

BORIC ACID—

Italy, £7,300.

CAMPHOR—

India, 100 cs.; Natal, 5 cs.

CITRATE OF LIME—

Italy, £10,150. and 84 pkgs.

CITRIC ACID—

Italy, 228 pkgs.

CORAL OXIDE—

Canada, 9 brls.

COPPER ORE—

Panama, 70 t.

COSMIC BLACK—

U.S., 20 brls.

CREAM OF TARTAR—

France, 75 pkgs.

DYESTUFFS—

Aniline Dye
Switzerland, 230 pkgs.

Argols

France, 197 pkgs.; Italy, 730 pkgs.; Portugal, 186 pkgs.

Gambier

Straits, 264 pkgs.

Divi Divi

India, 224 pkgs.

Mimosa Extract

Natal, £2,230.

Myrabolans

India, 45 pkgs.

Sumac

Switzerland, 11 pkgs.

DYESTUFFS—

Tanners Bark
Natal, 447 t.
Tenakaha Bark
N. Zealand, 47 t.
Turnerie
India, 155 pkgs.

FISH OIL—

Japan, 5,000 cs.

FORMALDEHYDE

HYPOSULPHITE—
Switzerland, £1,282.

GELATINE

France, £117.; Holland, £900.

GLUE—

France, £2,245.

GLUE STOCK—

Holland, 10 t.; India, 3 t. 19 c.

HEXAMETHYLENETETRAMINE

U.S., £980.

IRON OXIDE—

Belgium, 165 t.

LACTIC ACID—

U.S., £150.

LITHOPONE—

Holland, 40 brls.; U.S., 1,000 brls.

MAGNESIUM CHLORIDE—

Holland, £200.

METHYL SALICYLATE—

U.S., £71.

MINERAL WHITE—

U.S., 34 brls.

OCHRE—

Spain, 37 cks.

PARAFFIN SCALE—

U.S., 747 t. 16 c.

PARAFFIN WAX—

Brit. India, 75 t.; U.S., 260 t. 8 c.

PARAFORMALDEHYDE—

U.S., £800.

PHENOLPHTHALEIN—

U.S., £845.

PHOSPHATE OF LIME—

Belgium, 130 t.

PLUMBAGO—

Italy, 120 bgs.; Japan, 450 cks.; U.S., 59 brls.

POTASSIUM FERROCYANIDE—

U.S., £350.

POTASSIUM IODIDE—

Japan, 27 cs.

POTASSIUM PRUSSATE—

Holland, 33 pkgs.

PYROGALLIC ACID—

Canada, £511.; U.S., £706.

RED LEAD—

Canada, 42 cks.

ROSIN—

France, 760 cks.; Portugal, 56 cks.; U.S., 310 brls.

SOAP—

France, £108.

SODIUM ACETATE—

Canada, 38 t.

TALLOW—

Argentina, 260 t.; China, 9 t. 19 c.; Chile, 2 t.; N. Zealand, 549 t. 8 c.; Queensland, 297 t. 11 c.; S. Australia, 350 t. 18 c.; Victoria, 123 t.

TANNIC ACID—

Belgium, £147.

TAR—

Sweden, 150 brls.; U.S., 1,200 brls.

TARTARIC ACID—

Italy, 268 pkgs.

THEOBROMINE—

Holland, £76.

VEGETABLE WAX—

Japan, 50 cs.

WAX—

Pt. E. Africa, 6 bgs., 94 bdl.; U.S., 532 bxs.

WHITE LEAD—

Canada, 188 cks.

ZINC OXIDE—

Belgium, 112 brls.; U.S., 1,200 brls.

MANCHESTER.

Week ending August 23.

CARBON BLACK—

New York, 10 cs.

DEXTRINE—

New York, 440 bgs.

GLUE—

Antwerp, 52 brls.

PYROGALLIC ACID—

New York, 6 cs.

SODIUM BICHRIMATE—

New York, 70 brls.

SODIUM PEROXIDE—

Drammen, 30 cs.

TARTAR EMETIC—

New York, 20 kgs.

MIDDLESBROUGH

Week ending August 23.

NIL.

NEWCASTLE-ON-TYNE

Week ending August 23.

NIL.

N. & S. SHIELDS.

Week ending August 23.

NIL.

STOCKTON-ON-TEES.

Week ending August 23.

NIL.

SWANSEA.

Week ending August 23.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

BRISTOL.

Publication of Official Returns Suspended.

GLASGOW.

Week ending August 23.

CHEMICALS (otherwise undescribed)
Barcelona, 9 t. 3 c.; Calcutta, 29 t.; Delagoa Bay, 1 t. 4 c.; Mauritius, 40 t.; Natal, 2 t. 4 c.; Sydney, 4 t. 12 c.; Valencia, 19 t. 17 c.

COAL PRODUCTS (otherwise undescribed)
Aden, £15.; Calcutta, £414.; Delagoa Bay, £3.; Madras, £40.

DYESTUFFS (otherwise undescribed)
Gothenburg, £265.; Sydney, 2 t.

RED LEAD—
Buenos Ayres, 3 t. 15 c.; Madras, 5 c.; Natal, 16 c.

SHEEP DIP—

Buenos Ayres, 967 t. 13 c.; C. Rivadavia, 2 t. 7 c.; Delagoa Bay, 17 t. 4 c.; Descado, 1 t. 3 c.; Gallegos, 23 t. 9 c.; Monte Video, 25 t.; Natal, 17 t. 4 c.; Punta Arenas, 62 t. 8 c.

SOAP—

Monte Video, 5 bxs.

SODIUM BICHRIMATE—

Sydney, 1 t.

SULPHURIC ACID—

Colombo, 1 t. 19 c.

TALLOW—

Kilindini, 1 t.; Mombasa, 1 c.

WAX—

Barcelona, 12 c.

GOOLE.

Week ending August 23.

NIL.

GRANGEMOUTH.

Week ending August 23.

CAUSTIC SODA—

Rotterdam, 14 c.

PARAFFIN WAX—

Rotterdam, 33 t.

SODA ASH—

Rotterdam, 20 t.

SODIUM BICHRIMATE—

Rotterdam, 19 c.

GRIMSBY.

Week ending August 23.

NIL.

HULL.

Week ending August 19.

ALUMINOFERRIC—

Christiania, 4,566 slbs.

AMMONIA SULPHATE—

Antwerp, 3,843 bgs.

ANTIMONY—

Copenhagen, 5 cs.

CARBON—

Naples, 1,041 bgs.

CHEMICALS (otherwise undescribed)

Abo, 6 bgs., 10 cs.; Antwerp, 10 cks., 56 bxs.; Bilbao, 5 cks.; Catavia, 6 cks.; Christiania, 10 bgs.; Copenhagen, 6 cs., 10 cks.; Dunkirk, 100 cks., 12 brls.; Gothenburg, 105 cks.; Genoa, 110 cs., 10 cks., 1 brl.; Leghorn, 1 kg., 5 cks.; New York, 1 kg., 16 cks., 1 drm., 40 cs.; Rotterdam, 25 cks.

COAL PRODUCTS—

Creosote

Oporto, 10 brls.

Creosote Oil

Mossel Bay, 3,000 cks.

Pitch

Fecamp, 240 t.

DISINFECTANTS (otherwise undescribed)

Abo, 200 drms.

FERRO MANGANESE

Genoa, 100 t.

FERTILIZER—

Naples, 500 bgs.

MANGANESE ORE—

Antwerp, 700 t.

MINERAL WHITE—

Genoa, 24 bgs.

PITCH—

Genoa, 12 cks.

RED LEAD—

Genoa, 10 cks.

SALT—

Baffin Land, 200 bgs.

SOAP—

Bilbao, 22 cs.; Baffin Land, 8 cs.; Copenhagen, 632 bxs., 140 brls.; Dunkirk, 106 cs.; Genoa, 2,647 cs.; Leghorn, 1,613 cs.; Rotterdam, 1 cs.

SODA—

Baffin Land, 4 cs.; Christiania, 10 bgs.; Rotterdam, 18 bgs.

TALLOW—

Abo, 11 cks.

TAR—

Abo, 1 cs.

WOOD PRESERVATIVE—

Christiania, 297 drms.; Dunkirk, 50 drms.

LEITH.

Week ending August 23.

AMMONIUM SULPHATE—

Dunkirk, 232 t. 13 c., £5,800.

BITUMEN

Copenhagen, 1 c., £1.

BORIC ACID—

Rotterdam, 6 t., £267.

CAUSTIC SODA—

Amsterdam, 1 t. 10 c., £555.

COAL PRODUCTS—

Carbolic Acid

Copenhagen, 4 t. 7 c., £110.

CREAM OF TARTAR—

Iceland, 10 c., £150.

POTASSIUM BICHRIMATE

Copenhagen, 16 c., £125.; Rouen, 106 t. 15 c., £852.; Rotterdam, 3 t. 3 c., £507.

SODIUM BICARBONATE

Copenhagen, 5 t., £80.; Iceland, 10 t., £20.

SODIUM BICHRIMATE

Rouen, 644 t., £2,014.; Rotterdam, 13 t., 10 c.

SODIUM HYPOSULPHATE—

Iceland, 1 t., £5.

LIVERPOOL.

Week ending August 23.

ACETATE OF LIME—

Rotterdam, 15 t. 1 c., £237.

ACETIC ACID—

Antwerp, 10 t., £600.; Piraeus, 5 c., £37.; Salonica, 2 t. 18 c., £331.; Volo, 1 t. 10 c., £197.

ALUM—

Demerara, 1 t. 7 c., £25.; Galatz, 2 t. 17 c., £55.; Lagos, 2 c., £3.; Rantschank, 2 t., £37.; Samarang, 5 t. 18 c., £109.; Salonica, 6 t., £106.; Soerabaya, 5 t. 17 c., £100.; Talcahuano, 2 t. 4 c., £40.

ALUMINA SULPHATE—

Antwerp, 40 t., £541.; Calcutta, 7 t., £91.

ALUMINOFERRIC—

Calcutta, 33 t. 8 c., £808.

AMMONIA—

Durban, 5 c., £15.; Koko, 1 c., £6.; Mollendo, 1 c., £12.; Nantes 1 t., £38.

AMMONIUM CARBONATE—

Buenos Ayres, 3 t. 10 c., £231.; Marseilles, 1 t., £66.; Monte Video, 5 c., £17.

AMMONIUM MURIATE—

Alexandria, 10 t., £634.; Madagascar, 3 c., £9.; Salonica, 10 c., £28.

ANILINE OIL—

Dunkirk, 14 drms.

ARSENIC—

Bahia, 10 c., £62.

BARIUM CHLORIDE—

Barcelona, 6 t., £144.

BITUMEN—

Nantes, 1 c., £3.; Sierra Leone, 4 c., £4.

BLEACHING POWDER—

Bombay, 20 t. 1 c., £341.; Nantes, 29 t. 8 c., £429.; Paris 19½ t., £235.; Piraeus, 4 t., £80.

BORATE OF LIME—

Marseilles, 10 c., £19.

BORAX—

Adelaide, 1 t., £43.; Antwerp, 22 t. 10 c., £992.; Belize, 1 c., £1.; Marseilles, 2 t., £90.; Mollendo, 2 c., £15.; Rangoon, 1 t. 5 c., £53.; Trieste, 10 c., £22.

- BORAX**—
Rotterdam, 48 t. 10 c., £1,415.
- BORIC ACID**—
Antwerp, 18 c., £72.; Mollendo, 2 c., £20.
- CALCIUM CARBIDE**—
Accra, 1 c., £17.; Calabar, 2 c., £6.; Lome, 1 t. 12 c., £64.
- CALCIUM CHLORATE**—
Calcutta, 11 c., £4.
- CALCIUM CHLORIDE**—
Antofagasta, 5 t., £39.; Hong Kong, 20 t. 2 c., £152.; Nantes, 20 t. 1 c., £138.; Penang, 13 t., 15 c., £105.; Rouen, 10 t. 1 c., £71.; Shanghai, 80 t. 1 c., £602.; Sydney, 7 t. 13 c., £53.
- CARBIDE**—
Idro, 1 c., £2.; Stanley, 3 t.
- CAUSTIC SODA**—
Aden, 87 pkgs.; Adelaide, 138 drms.; Alexandria, 200 drms.; Auckland, 244 drms.; Antofagasta, 85 pkgs.; Barcelona, 15 drms.; Batavia, 30 drms.; Bari, 30 pkgs.; Bombay, 817 drms.; Beira, 10 drms.; Christiania, 100 drms.; Calicut, 322 pkgs.; Delagoa Bay, 195 pkgs.; Fremantle, 22 pkgs.; Galatz, 117 drms.; Genoa, 205 bxs.; Gibraltar, 13 drms.; Gefle, 100 pkgs.; Karachi, 974 drms.; Kobe, 926 pkgs.; Kuala Lumpur, 60 drms.; Las Palmas, 20 drms.; Melbourne, 473 drms.; Newcastle, N.S.W., 93 pkgs.; Novorossisk, 1,900 drms.; Piraeus, 240 drms.; Patras, 204 drms.; Padang, 153 drms.; Porto Alegre, 1,260 drms.; Rotterdam, 79 drms.; Valencia, 29 pkgs., 9 drms.; Yokohama, 1,088 pkgs., 1,230 drms.
- CHEMICALS (otherwise undescribed)**
Antwerp, 10 t., £415.; Copenhagen, 3 t., £89.; St. John's, N.F., 5 c., £19.
- CHINA CLAY**—
Melbourne, 10 t.
- CHLOROFORM**—
Piraeus, 3 c., £72.
- COAL PRODUCTS (otherwise undescribed)**
Montreal, 10 t. 1 c., £2,587.; New York, 10 c., £301.
- COAL PRODUCTS**—
Betanaphthol—
Antwerp, 6 t. 3 c., £1,388.
Carbolacene
Grand Canary, 2 c., £4.
Carbolic Acid
Barcelona, 5 t. 14 c., £44.; Belize, 2 c., £7.; Marseilles, 5 t., £200.; Sydney, 14 c., £43.
Creosote
Tientsin, 240 t., £7,000.
Dyes
Boston, 7 t. 10 c., £3,217.; Gothenburg, 4 c., £110.; Madras, 1 c., £12.
Pitch
Galatz, 3 t., £35.
Tar
Abonema, 18 c., £3.; Accra, 2 t. 2 c., £22.; Bathurst, 4 c., £2.; Bekwar, 4 c., £2.; Galatz, 20 t., £140.; Grand Bassam, 1 t. 6 c., £12.; Lome, 13 t., £140.; Monrovia, 4 c., £5.; Patras, 1 t., £9.; Saltpond, 4 c., £4.; Secondee, 2 t. 15 c., £38.; Sierra Leone, 2 t. 13 c., £29.; Stanley, 17 c., £8.; Winnebuh, 5 t., £63.
- COPPER SULPHATE**—
Bombay, 10 c., £22.; Monte Video, 9 t. 16 c., £403.; Rotterdam, 1 t., £40.
- CREAM OF TARTAR**—
Copenhagen, 2 t., £520.
- CRESYLIC ACID**—
Boston, 12 t., £330.; Montreal, 20 t., £346.
- DISINFECTANTS (otherwise undescribed)**
Bombay, 4 c., £11.; Calcutta, 5 c., £11.; Colombo, 1 t., £7.; Kilindini, 2 t. 12 c., £119.; Lome, 4 c., £9.; Lyttleton, 12 c., £33.; Mollendo, 2 c., £12.; Monrovia, 2 c., £3.; Natal, 4 t. 18 c., £135.; Opobo, 3 c., £12.; Oran, 10 c., £10.; Pt.
- DISINFECTANTS (otherwise undescribed)**
Harcourt, 4 c., £16.; Rangoon, 9 t. 7 c., £300.; Rotterdam, 6 t., £120.; Sapele, 1 c., £2.; Secondee, 1 c., £5.; S. Leone, 1 c., £5.; Stanley, 18 c., £99.
- DYESTUFFS (otherwise undescribed)**
Antwerp, 96 t. 17 c., £20,173.; Lisbon, 1 c., £17.; Rio de Janeiro, 2 t. 7 c., £1,278.; Toronto, 4 c., £47.
- DYESTUFFS**—
Aniline Dye
Antwerp, 44 t. 12 c., £10,789.; Bordeaux, 4 c., £140.; Calcutta, 6 c., £221.; Genoa, 10 c., £210.; Iloilo, 1 c., £38.; Kobe, 42 t. 1 c., £1,657.; Montreal, 15 c., £201.; Santos, 5 c., £232.
- FERRO CHROME**—
Philadelphia, 28 t.
- FERRO MANGANESE**—
Baltimore, 450 t.
- FERRO TUNGSTEN**—
Rotterdam, 5 t.
- FORMALDEHYDE**—
Antwerp, 13 c., £89.
- FORMIC ACID**—
Antwerp, 19 c., £120.
- FULLERS EARTH**—
New Orleans, 150 t.
- GLUE**—
Ghent, 100 pkgs.; Lyttleton, 2 pkgs.; Norroking, 20 pkgs.
- GLUE, SIZE, AND GELATINE**—
Auckland, 207 pkgs.; Boston, 25 pkgs.; Barcelona, 20 pkgs.; Callao, 25 pkgs.; Fiume, 100 pkgs.; Melbourne, 2 pkgs.; Vigo, 150 pkgs.; Volo, 2 pkgs.
- GLYCERINE**—
Canton, 5 c., £32.; Hong Kong, 6 c., £38.; Nantes, 1 t., £137.; Piraeus, 1 t., £117.
- IODELITE**—
Melbourne, 1 t. 9 c., £36.; Perth, 2 t. 9 c., £47.
- IODOFORM**—
Akuse, 3 c., £154.
- MAGNESIA (CALCINED)**—
Copenhagen, 4 c., £23.; Guayaquil, 1 c., £9.; Sydney, 2 t., £880.
- MAGNESITE**—
Rouen, 10 t.
- MAGNESIUM CHLORIDE**—
Bombay, 23 t. 19 c., £379.; New York, 2 c., £3.
- MAGNESIUM CITRATE**—
Callao, 1 c., £12.; Guatemala, 1 c., £25.
- MAGNESIUM SULPHATE**—
Accra, 6 c., £27.; Addah, 1 c., £4.; Belize, 3 c., £6.; Cape Coast, 2 c., £5.; Curacao, 1 c., £2.; Mollendo, 1 c., £2.; Nantes, 1 t., £18.; Rouen, 12 t., £165.; Secondee, 1 c., £2.; San Juan del Sur, 10 c., £23.; Sierra Leone, 1 c., £2.; Saltpond, 1 c., £3.
- MANGANESE ORE**—
Rouen, 31 t. 12 c.
- MURIATIC ACID**—
Arica, 9 c., £49.
- NICKEL SULPH**—
Lisbon, 12 c., £34.
- NITRIC ACID**—
Arica, 3 c., £22.
- PARAFFIN WAX**—
Barcelona, 20 pkgs.
- PITCH**—
Bathurst, 7 c., £2.; Grand Bassa, 12 c., £9.; Sierrama Leone, 1 t. 16 c., £16.
- PITCH TAR**—
Sherbro, 6 c., £5.
- POTASSIUM ARSENATE**—
Aden, 2 t. 5 c., £451.
- POTASSIUM BICROMATE**—
Bekwar, 13 t., £3,146.; Constantinople, 1 t. 3 c., £200.; Rouen, 1 t. 12 c., £251.; Sydney, 5 c., £43.; Volo, 11 c., £85.
- POTASSIUM CHLORATE**—
Piraeus, 6 c., £38.; Volo, 2 c., £14.
- POTASSIUM IODIDE**—
Guatemala, 1 c., £25.; Opobo, 6 c., £712.
- POTASSIUM NITRATE**—
Sierra Leone, 2 c., £8.; Teneriffe, 50 lbs., £2.; Zanzibar, 2 c., £8.
- POTASSIUM SULPH**—
Oratavia, 23 t., £802.
- QUEBRACHO EXTRACT**—
Zakupsyt, 12 pkgs.
- ROSIN**—
Callao, 26 cks.
- SALAMMONIAC**—
Famagusta, 2 c., £7.; Piraeus, 4 c., £11.; Sierra Leone, 2 c., £8.
- SALT**—
Kara Sea, 100 t.; Lagos, 40 t.; Quebec, 400 t.
- SALTCAKE**—
Sao Paulo, 50 t., £210.
- SALTPETRE**—
Lagos, 2 c., £7.; Monrovia, 2 c., £5.
- SHEEP DIP**—
Bahia, 43 t. 14 c., £3 614.; Beira, 32 t. 16 c., £1,712.; Blenheim, 7 c., £31.; Bluff Hbr., 2 t. 15 c., £177.; Buenos Ayres, 18 t. 15 c., £700.; Dunedin, 6 t. 13 c., £424.; Lyttleton, 19 t. 7 c., £1,252.; Punta Arenas, 57 t. 13 c., £2,188.; Stanley, 10 t., £400.; Timaru, 5 t., £319.; Wellington, 9 c., £31.
- SOAP**—
Algiers, 1,200 cs.; Alexandria, 7 cs.; Antofagasta, 74 bxs.; Antwerp, 8,669 bxs., 7,574 cs.; Athens, 113 cs.; Barranquilla, 65 pkgs.; Bathurst, 752 bxs.; Bermuda, 20 pkgs.; Bombay, 10,431 bxs.; Buenaventura, 8 cs.; Buenos Ayres, 3,634 bxs.; Callao, 4 bxs.; Cape Palmas, 65 cs.; Casablanca, 10 bxs.; Colombo, 237 cs.; Colon, 1,500 cs.; Catania, 27 cs.; Comodoro Rivadavia, 20 cs.; Copenhagen, 109 bxs., 1,099 cs.; Dakar, 200 bxs.; Demerara, 65 cs.; Dixcove, 10 cs.; Dominica, 80 cs.; Duala, 130 cs.; Genoa, 205 bxs.; Gibraltar, 1,387 bxs.; 794 cs.; Guayaquil, 1,270 bxs.; Kingston, 900 bxs.; Karachi, 344 bxs.; Lagos, 256 cs.; Las Palmas, 709 bxs.; Lisbon, 10 cs.; Macassar, 225 pkgs.; Madras, 247 pkgs.; Mainz, 200 bxs.; Monte Video, 70 cs., 4 bxs.; Oleh-Leh, 50 pkgs.; Oporto, 30 cs.; Patras, 66 bxs.; Pt. of Spain, 2,613 bxs.; Piraeus, 10 pkgs., 67 bxs.; Pt. Stanley, 89 bxs.; Rabat, 825 pkgs.; Rangoon, 480 bxs.; Singapore, 6 pkgs.; Soerabaya, 502 cs.; Sabang, 30 cs.; Samarang, 509 cs.; Sierra Leone, 16 cs.; Sherbro, 12 pkgs.; Santa Cruz, 443 bxs., 452 cs.; Valparaiso, 9 bxs.; Wellington, 1 bx.; Zanzibar, 200 pkgs.
- SODA ASH**—
Antofagasta, 100 pkgs.; Bombay, 5 pkgs.; Callao, 100 pkgs.; Copenhagen, 2,800 pkgs.; Lisbon, 22 pkgs.; Moiti, 1,135 drms.; Melbourne, 24 pkgs.; Patras, 305 pkgs.; Rotterdam, 2,000 pkgs.; Shanghai, 5,870 pkgs.; Sydney, 99 pkgs.; Volo, 180 pkgs.; Yokohama, 5,853 pkgs.
- SODA CRYSTALS**—
Antofagasta, 100 pkgs.; Bombay, 250 pkgs.
- SODIUM BICARBONATE**—
Abo, 100 pkgs.; Aden, 37 pkgs.; Amsterdam, 150 pkgs.; Antofagasta, 10 pkgs.; Bombay, 400 pkgs.; Colombo, 360 pkgs.; Christiania, 120 pkgs.; Cochín, 1,000 pkgs.; Dunedin, 40 pkgs.; Fremantle, 66 pkgs.; Lisbon, 60 pkgs.; Melbourne, 21 pkgs.; Patras, 100 pkgs.; Pt. of Spain, 50 pkgs.; Salonica, 40 pkgs.; Santos, 100 pkgs.; San Fernando, 12 pkgs.; Singapore, 150 pkgs.; Timaru, 20 pkgs.; Varna, 230 pkgs.
- SODIUM BICROMATE**—
San Juan del Sur, 4 c., £8.
- SODIUM CYANIDE**—
Barranquilla, 25 pkgs.; La Union, 50 cs.; Secondee, 210 pkgs.
- SODIUM SILICATE**—
Alexandria, 64 pkgs.; Amsterdam, 100 pkgs.; Balik Pappan, 3 pkgs.; Boston, 20 pkgs.; Calcutta, 48 pkgs.; Cape Town, 20 pkgs.; Manzanillo, 156 bgs.; Montreal, 82 pkgs.; Penang, 16 pkgs.; Rotterdam, 100 pkgs.; Samarang, 20 pkgs.; Santos, 50 pkgs.; Secondee, 64 cks.; Valparaiso, 100 pkgs.
- SODIUM SULPHATE**—
Kilindini, 10 c., £9.
- STEARINE**—
Durban, 89 brls.; Patras, 16 bgs.
- SULPHUR (FLOWERS)**—
Calabar, 5 c., £9.
- SULPHURIC ACID**—
Arica, 1 c., £4.; Valparaiso, 7 c., £14.
- SUPERPHOSPHATE (otherwise undescribed)**—
Montreal, 30 t.; S. Cruz, 59 t.
- SUPERPHOSPHATE OF BONE**—
Las Palmas, 197 bgs.
- SUPERPHOSPHATE OF LIME**—
Antwerp, 9 t. 17 c., £99.
- TALLOW**—
Accra, 20 pkgs.; Alexandria, 10 brls.; Antwerp, 6 pkgs.; Rotterdam, 68 pkgs.
- TAR**—
Beira, 1 c., £2.
- TAR (STOCKHOLM)**—
Opobo, 5 c., £8.
- TARTARIC ACID**—
Stanley, 2 c., £12.
- WAX**—
Samarang, 6 pkgs.; Valencia, 14 bgs.
- WHITE LEAD**—
Christiania, 2 t. 2 c.
- WOOD PRESERVATIVE**—
Barbados, 1 t. 18 c., £45.; Batavia, 10 c., £25.
- ZINC CHLORIDE**—
Adelaide, 18 c., £72.; Alexandria, 6 t. 6 c., £328.; Melbourne, 9 c., £23.; Sydney, 9 c., £24.
- ZINC SULPH**—
Wellington, 5 c., £7.

LONDON.

Week ending August 20.

- ACETIC ACID**—
Alexandria, 1 ck., £20.; Athens, (F.), 2 cbys., £9.; Amsterdam, 1 cs., £10.; Bombay, 19 cs. (pt.), £5.; Jaffa, 2 cs., £8.; Piraeus, 3 brls., £50.; Rotterdam (F.), 17 cks., £200.; Toronto, 2 cs., £6.
- ACETO SALICYLIC ACID**—
Amsterdam, 2 cs., £180.; Alexandria (F.), 2 cs. (pt.), £22.; Melbourne, 1 cs. (pt.), £23.; Shanghai (F.), 1 cs., £15.; Sydney, 1 cs., £23.
- ACETONE**—
Amsterdam, 2 drms., £6.
- ALUM**—
Maceio, 6 c., £8.; Pt. Elizabeth, 11 c., £18.
- ALUM (CHROME)**—
Cape Town, 1 ck., £7.; Bombay, 1 kg., £10.
- ALUMINA HYDRATE**—
Paris, 1 ck., £6.
- ALUMINA SULPHATE**—
Barranquilla, 9 c., £15.
- ALUMONIA**—
Alexandria, 2 drms., £34.; Antwerp, 29 drms., £360.; Beira, 6 cs., £12.; Brussels, 8 cs., £16.; Calais, 34 drms., £301.; Cape Town, 28 cs., £56.; Colombo, 8 cs., £17.; Demerara, 4 cs., £6.; Durban, 10 cs., £20.; Hankow, 4 cs., £8.; Hong Kong, 8 cs., £14.; Malta, 8 cs., £16.;

AMMONIA—
Rangoon, 5 cs., £10.; Santos,
6 cs., £16.

AMMONIA (ANHYDROUS)—
Antwerp, 15 cylds., £131.; Hong
Kong, 5 cylds., £61.; Karachi,
4 cylds., £51.; Singapore, 2 cylds.,
£26.

AMMONIUM ACETATE
Hong Kong, 28 pkgs., £6.

AMMONIUM BROMIDE—
Bombay, 1 cs. (pt.), £8.

AMMONIUM CARBONATE—
Antwerp, 15 pkgs., £60.; Ant-
werp, Switzerland, via, 12 c.,
£38.; Bahia, 2 c., £10.; Cal-
cutta, 10 c., £62.; Constanti-
nople, 18 c., £103.; Maceio,
2 c., £11.; Melbourne, 1 c., £12.;
Paris, 2 t., £125.; Penang, 2 c.,
£15.; Porto Alegre, 15 c., £66.;
Rio de Janeiro, 5 t. 1 c., £483.;
Sao Paulo, 2 c., £11.; Sydney,
1 t., £67.

AMMONIUM CHLORIDE—
Constantinople, 2 cks., £24.;
Calcutta, 2 cs., 1 cs. (pt.), £26.

AMMONIUM HYDRATE—
Calcutta, 1 cs. (pt.), £11.

AMMONIUM MOLYBDATE—
Paris, 3 cs., £191.

AMMONIUM MURIATE—
Alexandria, 4 c., £18.; Bombay,
5 t. 2 c., £369.; Constantinople,
5 c., £21.; Malta, 3 c., £12.

AMMONIUM NITRATE—
Melbourne, 40 t., £1,000.

AMMONIUM SULPHATE—
Dunkirk, 90 t., £2,250.

AMYL ACETATE—
Adelaide, 1 cs., £10.; Melbourne,
1 dm., £12.

ANTIMONY OXIDE—
Alexandria, 1 cs. (pt.), £7.

ANTIMONY PERCHLORIDE—
Melbourne, 1 cs., £5.

ANTIMONY REGULUS—
Antwerp, 10 t.; Rotterdam, 10 t.

ANTIMONY SULPHIDE—
Antwerp, 2 cks., £41.; Boulogne,
6 cks., £72.; Brussels, 3 cks.,
£168.; Genoa, 2 cks., £35.;
Lisbon, 15 cks., £135.; Montreal,
1 cks., £62.; New York, 10 cks.,
£151.

ANTIMONY TARTRATE—
Santos, 1 ck., £9.

ARSENIC—
Beyrouit (F.), 10 c., £32.;
Salonica, 4 c., £11.

BARBITONE—
Sydney (F.), 1 cs. (pt.), £35.

BARIUM NITRATE—
Bombay, 15 cks., £98.

BARIUM SULPHIDE—
Alexandria, 1 cs. (pt.), £8.;
Calcutta, 1 cs. (pt.), £5.; Mel-
bourne, 1 cs., £6.

BISMUTH CARBONATE—
Bangkok, 1 cs. (pt.), £9.; Cape
Town, 2 cs. (pt.), £33.; Con-
stantinople, 1 cs. (pt.), £18.;
Melbourne, 1 cs., £41.; Penang,
1 cs. (pt.), £6.; Rotterdam, 1 cs.
(pt.), £17.; Sydney, 2 cs. (pt.),
1 cs., £197.

BISMUTH OXIDE—
Sydney, 2 cs. (pt.), £11.

BISMUTH SALICYLATE—
Sydney, 1 cs. (pt.), £19.

BISMUTH SALTS—
Amsterdam, 1 cs. (pt.), £8.;
Adelaide, 1 cs. (pt.), £44.

BISMUTH SUBGALLATE—
Amsterdam, 1 cs. (pt.), £25.;
Rotterdam, 1 cs. (pt.), £84.

BISMUTH SUBNITRATE—
Penang, 1 cs. (pt.), £6.; Rotter-
dam, 2 cs. (pt.), £190.; Sydney,
2 cs. (pt.), £29.; Switzerland,
6 cs., £455.; Trondhjem, 1 cs.
(pt.), £47.

BISMUTH SUBSALICYLATE—
Odense, 2 cs. (pt.), £114.; Rotter-
dam, 1 cs. (pt.), £23.

BISMUTH TANNATE—
Rotterdam, 1 cs. (pt.), £5.

BORAX—
Aden, 5 c., £11.; Antwerp,
19 t. 15 c., £775.; Bocas del
Toro, 1 c., £5.; Constantinople,
16 c., £48.; Dantzig, 9 t. 17 c.,
£403.; Fremantle, 8 t., £800.;
Gibraltar, 10 c., £20.; Hamburg,
5 t. 2 c., £284.; Maceio, 2 c.,
£5.; Madras, 8 c., £42.; Malta,
13 c., £27.; Mauritius, 5 c., £10.;
Paris, 10 t., £390.; Rotterdam,
45 t. 10 c., £1,883.; Salonica,
10 c., £20.; Shanghai, 5 c., £15.;
Singapore, 10 c., £26.; Sydney,
2 t., £210.

BORIC ACID—
Alexandria, 2 c., £11.; Bangkok,
2 c., £10.; Calcutta, 5 c., £23.;
Cape Town, 2 c., £8.; Canton,
1 c., £6.; Constantinople, 3 c.,
£17.; Copenhagen, 4 c., £11.;
Dantzig, 2 t. 19 c., £220.;
Latakia, 2 c., £6.; Maceio,
2 c., £9.; Malta, 2 c., £12.;
Penang, 1 c., £5.; Rio Grande
do Sol, 5 c., £26.; Rotterdam,
12 c., £43.; Rotterdam,
1 t., £83.; Shanghai, 7 c., £39.;
Wellington, 1 c., £5.

CALCIUM CHLORIDE—
Boulogne, 10 t., £90.; Rangoon,
12 c., £29.

CALCIUM GLYCEROPHOSPHATE—
Alexandria (F.), 2 cs. (pt.), £47.

CALCIUM HYPO—
Rotterdam, 1 cs. (pt.), £5.

CALCIUM LACTATE—
Adelaide, 1 cs. (pt.), £6.; Mel-
bourne, 1 cs. (pt.), £8.

CALCIUM OXIDE—
Calcutta, 1 cs. (pt.), £6.

CARBIDE—
Bukuru, 1 t. 1 c., £25.; Pt.
Harcourt, 11 c., £12.; Secondee,
18 c., £24.

CARBONATE OF LIME—
Barcelona, 21 bgs., £27.

CARNAUBA WAX—
Amsterdam, 5 c.

CAUSTIC POTASH—
Adelaide, 1 cs., £29.; Bombay,
1 cs., £11.

CAUSTIC SODA—
Osaka, 5 t., £150.; Secondee,
5 c., £10.

CERESINE WAX—
Amsterdam, 3 t. 8 c.; Antwerp,
5 t. 16 c.; Calais, 6 c.

CHEMICALS (otherwise undescribed)
Alexandria, 1 cs., £12.; Abo,
2 cs. (pt.), £22.; Adelaide, 12
pkgs., £115.; Alicante, 1 cs.
(pt.), £43.; Amsterdam, 13
pkgs., £142.; Brussels, 4 pkgs.,
£138.; Brussels, 17 pkgs., £214.;
Bangkok, 4 cs., £31.; Beira, 1 cs.,
£9.; Buenos Ayres, 1 cs., £31.;
Italy, via Calais, 14 pkgs., £165.;
Brisbane, 1 cs., £11.; Colombo,
8 cs., £22.; Delagoa Bay, 2
pkgs., £35.; Durban, 10 pkgs.
(pt.), £41.; East London, 6
pkgs. (pt.), £12.; Fremantle,
3 cs., £17.; Hong Kong, 4 pkgs.,
£37.; Hankow, 2 cs., £17.;
Lagos, 1 ck., £10.; Latakia,
8 pkgs., £24.; Melbourne, 25
pkgs., £286.; Ostend, 1 cs., £70.;
Penang, 5 cs., £51.; Rio de
Janeiro, 2 cs., £106.; Sydney,
8 pkgs. (pt.), £159.

CHRYSOGRAPHIC ACID—
Paris, 2 cs. (pt.), £78.

CITRIC ACID—
Alexandria, 1 cs. (F.), £11.;
Bombay, 6 c., £137.; Calcutta,
3 c., £88.; Madras, 1 c., £13.;
Montreal, 1 c., £24.; New York,
8 c., £3,770.; Wellington (liquid),
10 c., £80.

COAL PRODUCTS—
Aniline Dye
Adelaide, 3 cs., £59.; Bombay,
26 pkgs. (pt.), £603.; Durban,
1 kg., £20.; Genoa, 5 pkgs.,
£216.; Melbourne, 33 pkgs.,
£1,496.; Sydney, 13 pkgs., £518.

COAL PRODUCTS—
Benzonaphthol
Santiago (Chile), 1 cs. (pt.), £11.
Bitumen
Bombay, 113 cks., £800.
Bitumen Solution
Beira, 20 drms., £76.

Carbolic Acid
Adelaide, 45 pkgs., £50.; Alex-
andria, 1 dm., £17.; Athens,
2 cs., £12.; Bathurst, 13 cs.,
£16.; Brussels, 3 cs., £8.;
Copenhagen, 2 cs., £11.; Kobe,
92 pkgs., £735.; Osaka, 68
drms., £590.; Switzerland, 7
kgs., £70.; Rotterdam, 6 drms.,
£9.; Yokohama, 93 pkgs., £742.

Cressol
New York, 100 cks., £883.;
Swatow, 7 cks., £37.

Cressote
Delagoa Bay, 125 drms., £78.

Dimethylaniline
Granada (F.), 2 drms., £285.

Green Oil
Trelleborg, 100 cks., £215.

Naphthalene
Canton, 2 cs., £7.; Jamaica,
3 cs., £12.; Mombasa, 45 cks.,
£144.; Monte Video, 60 cs.,
£140.; Montreal, 40 cks., £130.;
Paris, 16 cks., £115.

Pitch
Alexandria, 60 brls., £120.;
Hong Kong, 400 bxs., £101.

Tar
Beira, 1 brls., £6.; Cape Town,
5 brls., £10.; Colombo, 100 brls.,
£154.

Terebine
Melbourne, 1 cs., £6.

COPPER SUBOXIDE—
Copenhagen, 10 drms., £102.

COPPER SULPHATE—
Bilbao, 6 c., £14.; Alexandria,
15 c., £35.; Constantinople,
1 t. 5 c., £58.; Seychelles, 2 c., £5.

CREAM OF TARTAR—
Bombay, 1 c. (F.), £28.; Karachi,
1 cs., (F.), £5.; Maceio, 1 cs.
(pt.), (F.), £5.; Pt. Elizabeth,
1 c., £15.; Pt. Moresby, 1 c. (F.),
£8.; Rio de Janeiro, 1 cs., £11.;
Salonica, 3 c. (F.), £31.

DISINFECTANTS (otherwise undes.)
Alexandria, 6 c., £30.; Antwerp,
11 c., £21.; Athens, 4 c., £22.;
Barbados, 4 c., £7.; Beira, 4 c.,
£15.; Buenos Ayres, 4 t. 11 c.,
£316.; Bombay, 13 t. 10 c.,
£763.; Brisbane, 2 t. 16 c., £130.;
Calcutta, 2 t. 11 c., £109.; Cocos,
2 c., £5.; Constantinople, 5 c.,
£25.; Copenhagen, 2 t. 1 c.,
£79.; Durban, 3 c., £12.;
Karachi, 4 t. 9 c., £192.; Lat-
akia, 3 c., £5.; Osaka, 2 t. 5 c.,
£105.; Paris, 9 t. 12 c., £250.;
Penang, 2 c., £22.; Perth, 4 c.,
£7.; Pt. Elizabeth, 12 c., £62.;
Pt. Said, 1 c., £14.; Shanghai,
10 c., £34.; Singapore, 5 c., £13.;
Sydney, 7 c., £28.; Vancouver,
1 c., £8.

ETHER—
Adelaide, 1 cs., £5.; East Lon-
don, 5 cs., £29.; Wellington,
1 cs., £44.

ETHER (METHYLIC)—
Canton, 1 cs., £15.

ETHYL CHLORIDE—
Malmo, 1 cs., £16.

FATTY ACID—
Bordeaux, £1,350.; Rouen, 7 t.
8 c.

FLUORIC ACID—
Sydney, 2 cs., £6.

FORMIC ACID—
Melbourne (F.), 90 cs., £598.;
Sydney (F.), 37 cs., £253.

FULLER'S EARTH—
Baltimore, 120 t.; Barcelona,
160 t.

GELATINE—
Pt. Elizabeth, 1 c.

GLUE—
Christiania, 3 t.; Lisbon, 10 c.;
Melbourne, 2 c.; Pt. Said, 10 t.
18 c.

GLUE, SIZE, AND GELATINE—
Antwerp, 10 t. 12 c.; Barran-
quilla, 1 c.; Bergen, 1 t.; Bom-
bay, 2 c.; Calcutta, 1 c.;
Canary Islands, 1 c.; Cape
Town, 4 c.; Christiania, 2 c.;
Cologne, 10 t. 7 c.; Constanti-
nople, 4 t. 5 c.; Copenhagen,
6 t.; Cyprus, 2 t. 6 c.; Freman-
tle, 5 c.; Ghent, 1 t. 2 c.;
Karachi, 3 c.; Montreal, 5 t.
18 c.; Rangoon, 16 c.; Shanghai
4 c.; Toronto, 5 t.; Wellington,
10 c.; Yokohama, 2 t. 10 c.

GLYCERINE—
Barranquilla, 3 c., £30.; Cal-
cutta, 4 c., £39.; Canton, 3 c.,
£22.; Paris (distilled), 5 t., £601.;
Pt. Said, 2 c., £16.; Tientsin,
1 cs. (pt.), £5.

HYDROCHLORIC ACID—
Alexandria, 2 c., £10.; Beira,
3 c., £12.; Beyrouit, 10 c., £30.;
Bombay, 3 c., £12.; Haifa, 3 c.,
£15.; Secondee, 7 c., £45.;
Shanghai, 5 cs., £17.

HYDROFLUORIC ACID—
Antwerp, 11 brls., £35.; Ade-
laide, 10 cs., £18.

HYDROGEN PEROXIDE—
Durban, 6 cs., 3 cs. (pt.), £61.;
Jamaica, 1 cs., £5.

HYPOPHOSPHITE OF LIME—
Sydney, 2 cs., £41.

IODINE (RESUBLIMED)—
Amsterdam, 1 cs. (pt.), £12.;
Singapore, 3 cs. (pt.), £12.;
Sydney, 2 cs. (pt.), £71.

**IRON AND AMMONIUM
CITRATE**—
Adelaide, 1 cs. (pt.), £6.; Amster-
dam, 1 cs., £19.; Constantinople,
1 cs. (pt.), £21.; Rotterdam,
2 cs., £166.; Shanghai, 1 cs.
(pt.), £8.; Stockholm, 1 cs., £53.

IRON GLYCEROPHOSPHATE
Trondhjem, 3 cs., £263.

IRON PERCHLORIDE—
Sydney, 2 cs., £8.

LACTIC ACID—
Melbourne (F.), 1 cs. (pt.), £38.

LEAD ACETATE—
Amsterdam, 1 cs. (pt.), £12.;
Bombay, 100 kgs., £338.; Cal-
cutta, 10 kgs., £45.; Demerara,
1 ck.; Fremantle, 6 kgs., £92.;
Genoa, 4 cks., £85.

LEAD NITRATE—
Genoa, 1 ck., £60.

MAGNESIA (CALCINED)—
Alexandria, 2 cs., £8.; Pernam-
buco, 1 cs., £14.; Santos, 3 cs.,
£59.

MAGNESIUM CARBONATE—
Boulogne, 40 bgs., £115.; Genoa,
23 bgs., £36.; St. John's, N.B.,
2 cs., £9.

MAGNESIUM CITRATE—
Bombay, 1 cs. (pt.), £7.

MAGNESIUM SULPHATE—
Aden, 2 c., £6.; Ascension, 2 c.,
£5.; Barranquilla, 10 c., £17.;
Bombay, 1 t. 2 c., £61.; Cal-
cutta, 5 c., £9.; Karachi, 3 c.,
£8.; Latakia, 6 c., £7.; Mel-
bourne, 2 t. 4 c., £84.; Monte
Video, 4 c., £6.; Rio Grande do
Sol, 6 c., £15.; Sierra Leone,
12 c., £27.; Sydney, 2 t. 2 c.,
£84.

MANGANESE BORATE—
Genoa, 5 cks., £162.

MANGANESE HYDRATE—
Rotterdam, 1 ck., £5.

MERCURY BICHLORIDE—
Constantinople, 1 cs., £79.;
Paris, 2 cs., £150.; Rotterdam,
6 cs., £356.

MERCURY CHLORIDE—
Odense, 1 cs. (pt.), £24.

MERCURY PERCHLORIDE—
Calcutta, 1 cs. (pt.), £9.

METHYL SALICYLATE—
Barranquilla, 1 cs. (pt.), £10.;
Amsterdam (F.), 1 cs., £14.;
Durban, 2 cs., £12.

MOLYBDIC ACID—
Paris, 2 cs., £191.

- NICKEL SULPHATE**—
Bilbao, 14 cks., £161.; Cologne, 20 cks., £260.
- NITRIC ACID**—
Beyrouth, 10 c., £23.; Alexandria, 1 c., £8.; Bombay, 2 c., £12.; Colombo, 5 c., £23.; Haifa, 1 c., £8.; Penang, 2 c., £13.
- OXALIC ACID**—
Barranquilla, 1 ck., £6.; Melbourne (F.), 3 kgs., £23.
- PARAFFIN WAX**—
Amsterdam, 18 c.; Calais, 2 c.; New York, 10 t.
- PARALDEHYDE**—
Sydney (F.), 1 cs., £15.
- PHOSPHORIC ACID**—
Fremantle, 2 cs., £20.; Paris, 50 crbys., £382.
- PHOSPHORUS**—
Brussels, 1 cs., £7.; Canton, 1 cs., £6.
- PHOSPHORUS AMORPHOUS**—
Alexandria, 2 cks., £31.
- PLUMBAGO**—
Bombay, 2 c.; Calcutta, 12 t. 10 c.; Cape Town, 7 c.; Durban, 3 c.
- POTASSIUM ACETATE**—
Bombay, 1 cs. (pt.), £5.; Calcutta, 3 cs. (pt.), £17.; Durban, 1 cs. £5.; Karachi, 1 cs. (pt.), £10.
- POTASSIUM BICARBONATE**—
Calcutta, 1 cs., £8.; Paris, 5 brls., £75.
- POTASSIUM BICHROMATE**—
Brisbane, 2 kgs., £19.; Constantinople, 1 kg., £19.; Athens, 1 kg., £13.; Fremantle, 1 kg., £9.; Melbourne, 3 kgs., £31.; Paris, 8 cks., £532.
- POTASSIUM BROMIDE**—
Bombay, 1 cs. (pt.), £8.; Calcutta, 1 cs., 1 cs. (pt.), £17.; Fremantle (F.), 3 cs. (pt.), £15.; Karachi, 1 cs. (pt.), £9.; Melbourne, 1 cs. (pt.), £8.; Sydney (F.), 1 cs. (pt.), £8.
- POTASSIUM CARBONATE**—
Alexandria, 1 cs. (pt.), £6.; Bombay, 1 cs., £10.; Maceio, 5 c., £14.; Rotterdam (F.), 39 t. 3 c., £3,383.
- POTASSIUM CHLORIDE**—
Brussels, 17 c., £123.
- POTASSIUM CITRATE**—
Calcutta, 1 cs., £29.; Melbourne, 2 cs., £62.
- POTASSIUM CYANIDE**—
Bombay, 2 c., £45.; Calcutta, 4 c., £45.; Shanghai, 1 cs., £14.
- POTASSIUM HYDRATE**—
Karachi, 1 cs. (pt.), £6.
- POTASSIUM IODIDE**—
Amsterdam, 1 cs., £150.; Barcelona, 2 cs. (pt.), £32.; Barranquilla, 1 cs. (pt.), £19.; Bombay, 1 cs. (pt.), £12.; Calcutta, 1 cs., £78.; Hong Kong, 28 cs. (pt.), £3.; Melbourne, 2 cs., £61.; Rotterdam, 1 cs. (pt.), 1 cs., £375.; Santiago (Chile), 1 cs. (pt.), £10.; Singapore, 3 cs. (pt.), £82.; Sydney, 1 cs., £41.; Wiborg (F.), 1 cs. (pt.), £38.
- POTASSIUM METABISULPHATE**—
Paris, 9 cks., £126.; Sydney, 1 cs. (pt.), £6.
- POTASSIUM OXALATE**—
Paris, 7 brls., £200.
- POTASSIUM PRUSSIAN**—
Barranquilla, 2 kgs., £38.
- POTASSIUM PERMANGANATE**—
Beyrouth, 1 brl., £44.; Karachi, 1 cs. (pt.), £5.
- POTASSIUM SULPHOGUAIA-COLATE**—
Santiago (Chile), 1 cs. (pt.), £12.
- PRUSSIAN BLUE**—
Boulogne, 1 kg., £12.
- PYROGALLIC ACID**—
Hong Kong, 1 cs., £8.
- QUININE**—
Alicante, 34 ozs.; Alexandria, 664 ozs.; Bombay, 1,000 ozs.; Calcutta, 2,150 ozs.
- SALICYLIC ACID**—
Auckland, 2 cs., £19.
- SALT**—
Auckland, 40 t.; Freetown, 5 c.; Madras, 2 t.; Pt. Elizabeth, 2 t.
- SALT CAKE**—
Ghent, 190 t. 13 c., £763.
- SALTPETRE**—
Adelaide, 10 c., £33.; Calcutta, 3 c., £17.; Malta, 3 c., £13.; Pt. Elizabeth, 11 c., £40.; Rio de Janeiro, 2 t. 4 c., £132.
- SHEEP DIP**—
Durban, 10 t. 4 c., £42.; Limon, 1 t. 18 c., £69.
- SILVER NITRATE**—
Amsterdam, 1 cs. (pt.), £29.; Calcutta, 1 cs. (pt.), £107.; Christiania, 1 cs., £250.; Durban, 1 cs. (pt.), £67.; Hong Kong, 1 cs., £76.
- SIZE**—
Lima, 2 c.
- SOAP**—
Aalesund, 1 c.; Adelaide, 1 c.; Alexandria, 1 t. 7 c.; Amsterdam, 17 c.; Antwerp, 239 t. 9 c.; Arequipa, 5 c.; Auckland, 2 c.; Bangkok, 5 c.; Barbados, 4 c.; Barranquilla, 2 c.; Beira, 5 c.; Beyrouth, 5 c.; Bergen, 6 c.; Bombay, 5 t. 10 c.; Bordeaux, 43 t. 2 c.; Boulogne, 27 t. 6 c.; Calcutta, 2 t. 1 c.; Canary Is., 1 c.; Cape Town, 19 c.; Christchurch, 19 c.; Christiania, 2 c.; Copenhagen, 17 t.; Cologne, 87 t. 11 c.; Colombo, 2 t. 19 c.; Constantinople, 10 t.; Durban, 8 c.; Dantzig, 32 t.; Delagoa Bay, 1 c.; Dunkirk, 4 t.; Galatz, 9 t. 3 c.; Gibraltar, 10 c.; Havre, 5 t. 16 c.; Helsingborg, 1 c.; Hong Kong, 1 t. 14 c.; Italy, 17 c.; Karachi, 3 c.; Leghorn, 3 c.; Lisbon, 1 c.; Madras, 1 t. 16 c.; Mazagan, 22 t. 15 c.; Malmö, 9 c.; Melbourne, 2 c.; Melilla, 3 c.; Mauritius, 14 c.; Mombasa, 1 c.; Messina, 4 t. 16 c.; Melbourne, 3 c.; New York, 2 t. 1 c.; Ostend, 5 c.; Penang, 4 c.; Perth, 2 c.; Paris, 8 t. 16 c.; Piræus, 10 t.; Pt. Elizabeth, 2 c.; Pt. Said, 10 c.; Rotterdam, 16 t. 18 c.; Shanghai, 15 c.; Singapore, 4 c.; Seville, 2 c.; Smyrna, 1 c.; Stavanger, 4 c.; Trondhjem, 4 t. 7 c.; Tuticorin, 1 c.; Wellington, 7 c.; Zanzibar, 2 c.
- SODA ASH**—
Genoa, 12 t., £120.
- SODIUM ACETATE**—
Adelaide, 1 cs., £6.
- SODIUM & POTASSIUM TARTRATE**—
Fremantle, 2 cks., £91.
- SODIUM BENZOATE**—
Calcutta, 1 cs. (pt.), £6.; Constantinople, 1 kg., £50.; Santos, (F.), 5 cs. (pt.), 2 cs., £44.
- SODIUM BICARBONATE**—
Antofagasta, 1 t. 4 c., £25.; Barranquilla, 16 c., £28.; Beira, 4 c., £8.; Calcutta, 5 c., £14.; Maceio, 8 c., £6.; Melbourne, 5 c., £11.
- SODIUM BISULPHITE**—
Bilbao, 5 c., £8.; Bordeaux, 5 t. 14 c., £217.; Singapore, 3 drms., £26.
- SODIUM BORATE**—
Beira, 3 c., £9.
- SODIUM CARBONATE**—
Hong Kong, 3 cks. (pt.), £5.; Rotterdam, 2 cks., £263.
- SODIUM CINNAMATE**—
Paris, 5 cs., £89.
- SODIUM GLYCEROPHOSPHATE**—
Durban (F.), 1 cs. (pt.), £6.; Rotterdam, 1 cs., £65.
- SODIUM HYDROSULPHITE**—
Alexandria, 10 c., £12.; Genoa, 2 kgs., £37.; Malmö, 9 kgs., £189.
- SODIUM HYPO**—
Durban, 1 t., £23.; Melbourne, 3 t., £164.; Rotterdam, 1 cs. (pt.), £5.
- SODIUM HYPOSULPHITE**—
Bombay, 3 t. 18 c., £88.; Calcutta, 1 t. 2 c., £25.; Colombo, 4 c., £5.; Hong Kong, 8 c., £9.; Sydney, 1 cs., £22.
- SODIUM IODIDE**—
Adelaide, 1 cs. (pt.), £5.; Barcelona, 2 cs. (pt.), £37.; Calcutta, 1 cs. (pt.), 1 ck. (pt.), £42.; Rotterdam, 1 cs. (pt.), £21.
- SODIUM PHOSPHATE**—
Bilbao, 2 c., £5.
- SODIUM PRUSSIAN**—
New York, 10 t. 1 c., £671.
- SODIUM SALICYLATE**—
Amsterdam (F.), 2 kgs., £88.; Paris, 12 kgs., £180.; Sydney, 1 cs. (pt.), 1 cs., £53.
- SODIUM SILICATE**—
Durban, 20 cs., £26.; Pt. Elizabeth, 3 cs., £5.
- SODIUM SULPHATE**—
Rouen, 5 t. 1 c., £100.
- SODIUM SULPHIDE**—
Brussels, 19 c., £14.; Hong Kong, 1 dr., £13.
- SODIUM SULPHITE**—
Bombay, 3 c., £6.; Jesselton, 3 drms., £7.; Hankow, 5 c., £6.; Pt. Swettenham, 2 t. 10 c., £60.
- SODIUM TARTRATE**—
Melbourne, 1 cks., £29.; Montreal, 3 cks., £105.; Sydney, 8 cks., £285.
- SODIUM TUNGSTATE**—
Rotterdam, 1 cs., £6.
- SULPHUR**—
Antwerp, 3 t., £90.; Brussels, 1 t. 3 c., £35.; Barranquilla, 2 c., £13.; Maceio, 20 t. 1 c., £517.; Melbourne, 2 c., £7.; Mossel Bay, 8 c., £11.
- SULPHUR (ROLL)**—
Maceio, 1 t. 15 c., £19.
- SULPHURIC ACID**—
Alexandria, 10 t. 2 c., £2,066.; Abo, 5 c., £32.; Antofagasta, 1 t., £56.; Beira, 8 c., £18.; Beyrouth, 10 c., £12.; Bombay, 3 c., £13.; Cape Town, 5 c., £23.; Demerara, 10 t., £184.; Trinidad, 7 t., £222.
- TANNIC ACID**—
Boulogne, 4 cks., £100.; Cape Town, 1 ck., £10.; Constantinople (F.), 1 ck., £36.; Rotterdam, 1 ck., £30.; Sydney (F.), 2 cs. (pt.), £12.
- TARTARIC ACID**—
Aalborg, 10 c. (F.), £196.; Bergen, 5 c., £100.; Bombay, 7 c., £125.; Calcutta, 1 c. (F.), £24.; Cyprus, 1 cs. (F.), £7.; Durban, 1 c., £18.; East London, 3 c., £56.; Maceio, 1 c. (F.), £12.; Madras, 2 c., £42.; Malta, 1 c., £6.; Montreal, 2 t. 3 c., £621.; New York, 4 t. 10 c., £1,382.; Perth, 2 c., £31.
- TURPENTINE**—
Antwerp, 60 t.
- WAX**—
Galatz, 4 t.; Melbourne, 1 t. 10 c.; Paris, 6 t. 10 c.
- WHITE ACID**—
Sydney, 1 cs., £6.
- WHITE LEAD**—
Aden, £7.; Antwerp, £1,031.; Bangkok, £35.; Barcelona, £55.; Colombo, £5.; Maceio, £12.; Rangoon, £34.; Rotterdam, £130.
- ZINC CHLORIDE**—
Amsterdam, 1 cs. (pt.), £6.
- BARIUM SULPHOCYANIDE**—
Boston, 14 cks.
- BLEACHING POWDER**—
Oporto, 18 cks.
- CALCIUM CHLORIDE**—
Marseilles, 57 drms.
- CAUSTIC SODA**—
Oporto, 150 drms.
- COAL PRODUCTS (otherwise undes.)**—
Antwerp, £72.; Bombay, £4,135.; Boston, £16,126.; Ghent, £120.; Montreal, £74.; Rouen, £270.
- PITCH**—
Rouen, 20 cks.
- SALT**—
Montreal, 4,800 sks.; Quebec, 5,600 sks.
- SOAP**—
Bombay, 53 cs.; Antwerp, 2,095 cs.; Ghent, 1 ck.; Karachi, 7 cs.; Lyttleton, 33 cs.; Marseilles, 617 brls.
- SODA**—
Melbourne, 15 drms.
- SODIUM BISULPHATE**—
Bombay, 10 drms.; Marseilles, 20 cks.
- SODIUM CARBONATE**—
Antwerp, 200 bgs.
- SODIUM HYDROSULPHATE**—
Rouen, 1 ck.
- SODIUM PHOSPHATE**—
Bombay, 25 cks.
- SODIUM SULPHIDE**—
Oporto, 6 drms.

MIDDLESBROUGH.

Week ending August 23.

AMMONIUM SULPHATE—
Kobe, 534 t. 19 c., £10,208.; Yokohama, 271 t. 3 c., £5,211.

SALT—
Helsingborg, 268 t. 10 c., £857.

NEWCASTLE-ON-TYNE

Week ending August 23.

ANTIMONY—
Copenhagen, 30 t.

BLEACHING POWDER—
Gothenburg, 15 t.

CAUSTIC SODA—
Copenhagen, 5 t.

COPPER SULPHATE—
Bergen, 1 t.

CRENYLIC ACID—
Gothenburg, 6 t.

FERRO TITANIUM—
Bergen, 2 t.

GLUE—
Archangel, 11 c.

RED LEAD—
Archangel, 10 t.; Gothenburg, 5 t. 12 c.; Copenhagen, 1 t.

SOAP—
Archangel, 26 t. 5 c.

SODA—
Archangel, 5 t.

SODIUM SILICATE—
Gothenburg, 5 t. 2 c.

SULPHUR—
Gothenburg, 50 t.

TAR—
Gothenburg, 5 t. 4 c.

N. & S. SHIELDS.

Week ending August 23.

NIL.

STOCKTON-ON-TEES.

Week ending August 23.

NIL.

SWANSEA.

Week ending August 23.

NIL.

PRICES CURRENT.

THURSDAY, August 28, 1919

PREPARED BY MESSRS. HIGGINBOTTOM AND CO., 21, SPRING GARDENS, MANCHESTER.

The values stated are F.O.R. at makers' works, or at usual ports of shipment in U.K., unless otherwise specified.
The prices in different localities may vary

Acids:—

*Acetic, 40% and 60% per cwt.	31/- & 47/-
* " Glacial per ton	85 0 0
Arsenic, S.G. 2,000 per ton	70 0 0
Boric, Crystals per lb.	72 0 0
*Fluoric per lb.	0 0 7
*Muriatic (Tower Salts), 28° Tw. per carboy	0 6 6
*Nitric, 80° Tw. per ton	31 0 0
Oxalic per lb.	0 1 2½
Phosphoric, 1,750° per ton	0 1 9
*Sulphuric (fuming, 70%) per ton	—
* " (Pyrites, 168°) per ton	7 18 9
* " (" 140°) per ton	4 10 0
* " (free from arsenic, 144°) per ton	5 7 4
Tannic (commercial) per lb.	0 2 6
Tartaric (crystals) per ton	0 3 1
*Acetone per ton	80 0 0
*Alum, loose lump (delivered) per ton	17 0 0
Alumina Sulphate (pure) per ton	17 0 0
Aluminoferic (in slabs) per ton	8 10 0
Aluminium (Ingots Metal, 98/99%) per ton	150 0 0
*Ammonia, Anhydrous per lb.	0 1 10
* " *880 per ton	33 0 0
* " *920 per ton	20 0 0
" Carbonate per lb.	0 0 6½
" Muriate (grey) per ton	47 10 0
" " (sal ammoniac) 1st & 2nd, per cwt.	80/- & 75/-
" Nitrate per ton	60 0 0
" Phosphate per ton	110 0 0
" Sulphate (grey), London, net	—
" " Hull	—
" " Manchester	—
*Aniline Oil (pure) per lb.	0 1 2
Aniline Salt per ton	0 1 2
Antimony per ton	45 0 0
" (tartar emetic, 43/44%) per lb.	0 3 4
" (golden sulphide) per lb.	0 1 3
Arsenic, white powdered per ton	58 0 0
Barium Chloride (in casks) per ton	24 0 0
" Carbonate (native), 92/94% per ton	11 10 0
" Sulphate (native levigated) per ton	£7 to £14
Baryta Chlorate per lb.	0 1 3
*Bisulphide of Carbon per ton	55 0 0
Bleaching Powder, 35% per ton	15 0 0
* " Liquor, 7% per ton	6 0 0
Casein (commercial) per ton	85 0 0
Chromium Acetate (crystals) per lb.	0 1 6
Calcium Chloride per ton	8 0 0
China Clay (at Runcorn), in bulk per ton	70/- to 90/-

Coal-tar Products and Dyes:—

Alizarine (artificial), 20% per lb.	0 2 0
Magenta per lb.	18/- to 35/-
Anthracene, 40/50% A, f.o.b., L'don, per unit,	0 0 7
Benzol, 90's (naked) per gal.	0 2 0
" 50/90's per gal.	0 1 10
Carbolic Acid (crude, 60°) per lb.	0 1 6½
" (crystallised, 40°) per lb.	0 0 9½
" Acid (pale liquid, 97/98%) per gal.	0 2 9
*Creosote (ordinary), naked per ton	0 0 6½
*Crude Naphtha, 30% at 120°C. per ton	0 0 9
*Grease Oils, 18° Tw. (naked) per ton	6 10 0
Pitch, f.o.b., Liverpool or Garston per ton	2 16 6
*Solvent Naphtha, 90% at 160° per gal.	0 2 3
Copper per ton	99 0 0
" Sulphate per ton	43 0 0
" Oxide (copper scales) per ton	90 0 0
Dross Salts per ton	39 0 0
*Glycerine (crude), 80% per ton	72 0 0
* " (industrial, S.G. 1,260) per ton	110 0 0
*Iodine per oz.	0 1 0
*Iron Nitrate, 80° Tw. per ton	12 0 0
" Sulphate (copperas), delivered per ton	4 10 0
" Sulphide per ton	7 15 0
Lead (Foreign Pig) per ton	25 0 0
" Litharge Flake per ton	45 0 0
" Acetate (white) per ton	83 0 0
" (brown) per ton	71 0 0

Lead, Carbonate (White lead), pure per ton	£ 51 0 0
" Nitrate per ton	56 0 0
Lime, Acetate (brown) per ton	11 0 0
" (grey), 80% per ton	17 0 0
Magnesium Chloride per ton	15 10 0
" Carbonate (light) per cwt.	2 7 6
" Calcined Magnesite per ton	21 10 0
" Sulphate (Epsom Salts) (coml.) per ton	11 0 0
" (druggists) per ton	16 0 0
Manganese, Sulphate per ton	80 0 0
" Borate per ton	100 0 0
*Methylated Spirit, 64° (industrial) per gal.	0 5 7
*Naphtha (Wood), Solvent per ton	0 10 0
" " Miscible, 60° p. per ton	0 10 0

Oils:—

*Cottonseed per ton	135 0 0
*Linseed per ton	135 0 0
Stearine, 115-120° M.P. per ton	95 0 0
Potassium, Bichromate per lb.	0 1 6
" Carbonate, 80/82% per ton	95 0 0
" Chlorate per lb.	0 1 0
" Hydrate (Caustic Potash) 90% per ton	160 0 0
" " 75/80% per ton	140 0 0
" Potash Hydrate Liquid, 38° Bé per ton	70 0 0
" Nitrate (refined) per ton	60 0 0
" Permanganate (B.P. crystals) per lb.	0 3 5
" Prussiate (yellow) per ton	0 1 9
" (red) per ton	0 5 6
" Sulphate, 90% (ex ship) per ton	40 0 0
" Muriate, 80% per ton	30 0 0
Silver (metal) per oz.	0 5 1½
Sodium (metal) per lb.	0 1 3
" Acetate per ton	52 0 0
" Arseniate, 45% per ton	60 0 0
" Borate (Borax), Crystals per ton	39 0 0
" Bicarbonate (1 cwt. kegs) per ton	9 10 0
" Bichromate per lb.	0 0 11
" Carb. (Caustic Soda-ash), 48% per ton	12 10 0
" (Alkali), 58% (bags) f.o.r. {	6 0 0
" (Soda Crystals), (bags) wks. {	4 2 6
" Chlorate per lb.	0 0 6½
" Cyanide (100% basis) per ton	0 0 10
" Hydrate (76% C. Soda) (f.o.r.) per ton	24 0 0
" " (74% C. Soda) per ton	23 5 0
" " (70% C. Soda) per ton	22 0 0
" " (60% C. Soda) per ton	21 0 0
" (pure liquid, 90° Tw.) per ton	10 2 6
" 77/78% Powdered (99%) Hydrate per ton	24 10 0
" Hyposulphite (commercial) per ton	16 10 0
" Manganate, 25% per ton	65 0 0
" Nitrate, 96%, refd., f.o.r., L'pool per ton	21 0 0
" Nitrite, 100% per ton	60 0 0
" Phosphate per ton	26 0 0
" Prussiate per lb.	0 0 7½
" Silicate (glass) Alkaline per ton	12 5 0
" (liquid, 100° Tw.) per ton	9 10 0
" Sulphate (Saltcake), delivered per ton	3 0 0
" (Glauber's Salt) per ton	3 10 0
" Sulphide (conc.), 60/65% casks per ton	19 0 0
" Sulphite per ton	9 0 0
Sulphocyanide, Ammonium, 95% per lb.	0 2 0
" Barium, 95% per lb.	0 1 4
" Potassium per lb.	0 2 4
" Calcium, 70% per lb.	0 1 4
Sulphur, (Flowers) Sicilian per ton	23 0 0
" (Roll Brimstone) per ton	21 0 0
" Brimstone (best thirds) per ton	14 10 0
" (ex ship) per ton	100 0 0
Tallow per lb.	0 1 10
Tin Crystals per ton	269 0 0
" English Ingots per ton	0 1 6
Titanium, Potass. Oxalate per cwt.	10 0 0
Titanous Chloride per ton	39 0 0
Zinc (Spelter) per ton	70 0 0
" Powder, 88/92% per ton	23 10 0
" Chloride (solution, 102° Tw.) per ton	22 0 0
" Sulphate, Crystal per ton	22 0 0

* Packages extra or returnable; otherwise, prices usually include packages.

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No. 1685.

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NOTICES.

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Articles, reports, and correspondence on all matters of interest to the chemical and allied industries, home and foreign, are solicited. Correspondents should condense their matter as much as possible, write on one side only of the paper, and in all cases give their names and addresses, not necessarily for publication. Sketches should be sent on separate sheets.

Readers are invited to forward items of intelligence, company reports and balance-sheets, or cuttings from local newspapers of interest to the trades concerned.

CURRENT TOPICS.

SCIENTIFIC AND INDUSTRIAL RESEARCH.

THE fourth annual report of the Privy Council Committee for Scientific and Industrial Research, for the year 1918-19, gives an interesting account of the activities of the Department during the period under review—a period during which, to quote the words of the report, steady progress has been made with the formation and development of research associations. Up to now the work has been more or less of a pioneer character, but the manner in which the scheme has been welcomed by industry leads the Committee to assert that, so far as the Government are concerned, its success is assured. A number of research associations are already in existence, and others are in process of formation. Some time will elapse before the whole of the associations are in working order, and their influence is felt by the industries which they represent, but a vast amount of spade work has already been done, and the way cleared for some, at least, of the bodies to commence serious operations. As to the future of the research associations, this, as the Committee rightly point out, rests with the industries themselves. Beyond assisting in the task of creating the necessary organisation, and rendering financial assistance from the fund established by the Government for that purpose, the Department can do little to ensure the success of any particular research association that may be formed. As in all research work, results will depend largely upon the personnel of the research staff, who in turn will derive no little benefit from the encouragement they receive from the manufacturers on whose behalf the work is undertaken. Whilst a good many branches of industry have taken advantage of the scheme, others, for various reasons, have preferred to leave it alone. On the whole, these reasons may broadly be divided into two classes, and to a large extent they serve to explain why the heavy chemical industries have, from the inauguration of the scheme, held entirely aloof from it. In certain industries—explosives and dye manufacture are quoted as examples—where operations are conducted on a vast scale, and where control is very largely centralised,

research can be, and is, carried out very thoroughly without the necessity for recourse to the aid of a research association. In other cases—the heavy chemical industries are an outstanding example—the nature of the manufacturing processes is such as to render firms indisposed to joining an organisation the results of whose investigations become common property. This feeling of exclusiveness in some cases may possibly be modified as time goes on, but it is too deeply rooted in the chemical industries to be lightly swept aside. Two of the more recent associations are the British Photographic Research Association and the British Scientific Instrument Research Association, the latter of which has received exceptional financial terms, "because the industry falls wholly within the class of 'key' industries." This has led the Advisory Council to define what they understand is meant by a "key" industry—by no means an easy task, as they admit.

MANUFACTURE OF CALCIUM CARBIDE AND OTHER PRODUCTS IN INDIA.*

By DR. L. L. FERMOR.

LACK of detailed information prevents the setting forth of a definite scheme showing costs and possible profits, except in a very approximate manner. But such figures as are available suggest that there would be a considerable margin of profit on the manufacture of calcium carbide in India, in consequence of which it would probably pay to manufacture not only all the carbide required in India, but also other products manufactured from carbide—namely, the impure calcium cyanamide known commercially as nitrolim, and sodium cyanide. It is thought, however, that the Indian consumption of these materials may not be sufficient to justify the installation of an economic unit of plant. Consequently the proposal is made that the plant should be designed to produce 6,000 tons of carbide annually, which would be disposed of as follows:—

- 1,000 tons for sale in India,
- 1,000 tons for sale in Eastern Markets,
- 4,000 tons for transference to the cyanamide factory yielding 5,000 tons nitrolim to be utilised as follows:—
- 4,600 tons for sale as manure in India, Ceylon, Java, Sumatra, etc.
- 400 tons for conversion to sodium cyanide.

Four possible sites for such an industry are mentioned, two using electric power generated from Mond gas, and two using hydro-electric power. The site selected for investigation is Burhar, in Rewa State. The production here of 6,000 tons of carbide annually by the use of electric power generated from Mond gas, with recovery of ammonia as sulphate, would require:—

<i>Electric energy</i> —	£
4,000 k.w.-yrs. at £4.75 per k.w.-yr. (from 24,000 tons low-grade coal)	19,000
<i>For production of carbide</i> —	
5,800 tons of first-class coal at Rs. 6-8-0	2,513
4,711 tons of lime at Rs. 13-0-0	4,083
180 tons of electrode carbons at £15	2,700
<i>For production of cyanamide</i> —	
1,750 tons of liquid nitrogen—cost of production not known—original value nil	—
<i>For production of cyanide</i> —	
431 tons of salt (duty free) at £1.5 approximately ..	647
Total	£28,913

The quantity and approximate value of the products, annually, would be:—

2,000 tons of calcium carbide (80 per cent. CaC_2) at £13.5	27,000
4,600 tons nitrolim (20-22 per cent. N) at £12.2	56,120
825 tons sodium cyanide mixture—250 tons NaCN at £70	17,500
Total value of products	£100,620

It is very difficult to obtain reliable information on such matters, but from a careful analysis of the very imperfect data available, it seems likely that the capital outlay on the

cyanamide and cyanide plants would be about £50,000, and £5,000, respectively.† The total capital outlay required for the whole scheme would then be:—

Power plant	£101,000
Carbide plant	30,000
Cyanamide plant	50,000
Cyanide plant	5,000
Total	£189,000

On this basis the annual outlay would be, roughly:—

Cost of energy	£19,000
Cost of materials	9,943
Labour and administration	12,000
Depreciation at 10 per cent. on £85,000	8,500
Repairs and renewals at 3 per cent. on £85,000	2,550
Packing in drums 2,000 tons of carbide and 825 tons of cyanide mixture at £1.5 per ton	4,238
Packing in bags 4,600 tons of nitrolim at £0.5 per ton	2,300
Loss in dust (carbide)	1,050
Total expenditure	£59,581

Value of products	100,620
Therefore, profits	41,039
To this must be added 5 per cent. interest on capital cost of power plant (£104,000) included in cost of power	5,200
Total profit	£46,239

The above figures show a profit of 48 per cent. on the capital cost of the chemical plant alone, or of 24 per cent. on the total cost of chemical and power plants. The data on which this estimate is based are admittedly inadequate, but the figures are probably approximately of the right order, and the amount of profit shown leaves an ample margin for such charges as interest on cost of acquisition of land, for increased cost should this enterprise be undertaken under abnormal conditions, or for decrease in the value of the products after the war should there be cutting of prices due to over-production in Europe. The figures, however, are sufficiently encouraging to show that the scheme outlined in this note is worthy of serious investigation by duly qualified people.

In this note no consideration has been given to the further industries dependent upon nitrolim or calcium cyanamide as raw material—viz., the manufacture of ammonia from cyanamide, with conversion into ammonium sulphate, nitrate or phosphate for use as fertilisers, and the further oxidation of ammonia to nitric acid by one of the Ostwald group of processes for the provision of the nitric acid required in such large quantities in the manufacture of explosives, amongst which ammonium nitrate may be mentioned.

Before any such scheme as that outlined in this note can be carried out, very careful consideration will have to be given to the competitive effects of ammonium sulphate obtained as a by-product from coke ovens, and via the Haber process.

It is only necessary to make a passing reference to the industries dependent upon cheap supplies of acetylene derivable from calcium carbide, such as the manufacture of acetic acid and acetone, and the use of the oxy-acetylene flame for welding, liquid oxygen suitable for this purpose being obtained as a by-product in the manufacture of calcium cyanamide.

Should the scheme here outlined be subsequently supplemented by the plant necessary for the production of ammonia and nitric acid, we should be providing India with a very desirable Janus-like or double-faced scheme capable of providing fertilisers in times of peace and explosives in times of war.

ELECTRICAL PRECIPITATION OF TAR FOG.—The removal of tar fog from coal gas is a troublesome operation, but is very essential, in the direct ammonia process. According to a communication presented by G. Davidson to the Canadian Mining Institute, the Cottrell process of electric precipitation is quite able to deal with the crude gases produced in the distillation of coal, wood, and petroleum, even at the high temperatures used in modern industrial processes, whilst the usual methods of tar fog removal in extractors require cooling of the gases. Davidson obtained cleaner distillates with electric precipitation than formerly. The treater chamber he used consisted of an iron pipe, 15ft. high and 12in. in diameter, provided with fused quartz insulators; he passed about a million cub. ft. of gas through his heater per day, and his heater requires about 2H.P. or 3H.P.

* Indian Munitions Board Handbook, 1919.

† Judging from information received since this note was written, the scale of operations suggested is too small, and should be at least twice as extensive. This would mean a greater reliance on export to commence with.

‡ The estimates of capital costs are presumed to be on a pre-war basis.

PACKING OF CHEMICALS FOR SHIPMENT.*

By C. P. BEISTLE.†

NO argument is necessary to show the absurdity of concentrating the efforts of efficiency engineers on minimising manufacturing costs and getting maximum yields in a manufacturing plant without utilising the same talent in the protection of these manufactured products from loss during transportation. The problem of securing safe transportation involves numerous factors. The nature of the material to be shipped must be considered with respect to the results liable to follow from leakage from shipping containers. In some cases only the loss of the material is involved, while in others disastrous fires, involving the loss of much additional property, may result, either by the effect of the exposure of leaking material to air and moisture, or by ignition of inflammable material. In some cases the material shipped is liable to act chemically on the container. The nature of the material shipped and the design and construction of the container must be considered also from the standpoint of safe storage of the article, as well as safe transportation of it by rail. In many cases deterioration of containers during storage has a direct effect upon the safety of subsequent transportation of the package. The mechanical engineer who designs shipping containers must appreciate the stresses that are liable to act on his container during transit, and the loading and bracing of these containers in a freight car must be scientifically planned and executed. The amount of material packed in a container has an important influence also on the design of the container. Finally, the various factors calling for a maximum of strength and endurance must be analysed against the permissible costs. In settling the permissible costs we must consider whether the package is designed for one journey or for continued use. In many cases the expensive package is the cheap one, the saving being due to its long life and continued service.

Steel Barrels and Drums.

The specification steel drum required for inflammable liquids serves the purpose admirably; failures in this container generally result from too long service, porous bungs, or improper gaskets. It is a fact not generally known that ordinary cast-iron bungs in noticeable proportions are sufficiently porous or flawed to permit leakage through the metal. This is more noticeable with light and volatile liquids, such as gasoline or ether. The remedy is to use steel bungs, or to subject all cast-iron ones to severe test for porosity before use.

Difficulties with these metal drums may be divided into three classes: First, poor welding; second, closing devices; and third, corrosion and rough handling.

Poor welding can ordinarily be controlled only by the most careful supervision of the manufacturer. An air test of 15lb. is prescribed for each package, but small holes may be covered with scale or closed by oxide, so that leakage will develop after use. Such a test made before each shipment, especially if the package is hammered with a wooden mallet along the chime and side weld, would eliminate practically all chance of leakage due to defective welding. The apparatus and test would not be very expensive, and would probably pay in the case of a large shipper, for the railroads are fast coming to the conclusion that claims on leaking packages should not be paid unless injury actually occurs in transit. A small shipper can get fair results by laying the package on its side after filling, and allowing it to remain for several hours, and examining for leakage while hammering with a wooden mallet along the chime and side weld. Repairing of leaks by soldering does not pay in the long run, and should not be allowed. They should be welded.

The efficiency of closing devices can be easily controlled by the purchaser, even if the manufacturer is careless. All that is necessary is a careful and intelligent inspection of packages upon receipt, and the use of a new gasket at each shipment. Bungs when screwed in about three-quarters of the distance should show a fairly close fit in the threads, otherwise they will soon strip. The thread in the bung-hole should have at least five complete threads, and that on the bung should be sufficiently long to engage in all of the five threads in the bung-hole. Bungs should screw up to an even bearing when gaskets are removed. Gaskets should be at least $\frac{1}{8}$ in. thick by $\frac{1}{2}$ in. wide.

The use of a proper gasket is essential to tight closure of drums. The material from which the gaskets are made must

be chosen with regard to the material to be shipped, and also to the physical qualities, such as hardness, durability, and elasticity. Satisfactory gaskets may be made from numerous materials, such as hard fibre, leather, rubberised asbestos, etc. One of the principal causes of failures in gaskets is the fact that they are used too often. It would probably be a safe rule to require that no gasket should be used more than once.

Wooden Barrels.

The transportation of dangerous articles in wooden barrels and kegs will always result in accidents as long as those packages are authorised. This is especially true in connection with the lighter of the inflammable liquids and the more dangerous inflammable solids. The troubles lie principally in the inherent liability to slow leakage of barrels of the tight variety, and sifting of contents through cracks in slack barrels.

The shipment of alcohol in wooden barrels has resulted in comparatively large losses. In addition to the original weakness of the package these accidents are due to shippers using second-hand barrels without properly recoopering them, or barrels which do not actually come up to the standards prescribed. Faulty methods of loading may also contribute to the losses, since these packages are especially susceptible to damage through shock.

For new barrels the user is urged to require the manufacturer to certify to the fact that his product complies with the specifications, and to mark them to show such compliance. This responsibility placed upon the manufacturer of the package will secure some improvement.

For second-hand barrels only the most careful recoopering should be allowed, and care should also be taken that only those barrels actually complying with the specifications on original manufacture should be used for the dangerous articles.

The shipment of permanganate of potassium, the chlorates, and similar articles in slack barrels and kegs, is also giving some trouble. If these accidents continue, it will probably be necessary to limit these articles to metal containers. The present container, the slack barrel, is dangerous even after the contents are removed, and some fires have been caused by their use as second-hand packages for other articles.

Failures of shipping containers for inflammable liquids have often been due to overloading the container and the expansion due to rise in temperature. To determine the proper outage it is necessary to know the coefficient of expansion of the liquid and the maximum temperature range to which it may be subjected in transit or storage. Generally the more volatile and lighter liquids have the higher expansion coefficient.

Inflammable Solids.

The principal requirement for shipping containers of inflammable solids is the exclusion of air or moisture. Contact with air causes spontaneous oxidation with many of these substances, and often with sufficient degree to cause ignition. The degree of activity varies with these materials, and the attendant hazard of exposure to air is in proportion to this activity. Phosphorus, metallic sodium, fused sodium sulphide, and cobalt resinate are included in the class of inflammable solids.

The shipping containers for phosphorus commonly consist of sealed tin cans containing the phosphorus submerged in water; these cans are shipped in outside wooden boxes. This type of container has been satisfactory in direct shipment from factory to consumer. Where the material has been subjected to long storage before shipment, trouble has been caused by the slow rusting of the tin cans, allowing the escape of the water, the entrance of air, and in some cases the actual ignition of the phosphorus. It will be necessary to modify the specification of this container either by having a much heavier coating of tin on the tin can, or by requiring that the outer wooden box be provided with a hermetically sealed metallic lining. The latter will probably be the safer, as, no matter how secure the single inner package is, it is liable to be burst by the freezing of the water in cold weather.

Metallic sodium, while highly active, has caused very little trouble in shipments, owing to the fact that the shipping container is practically satisfactory. Large shipments are commonly made in the form of bricks or ingots, which are packed in heavy steel drums tightly closed. Smaller shipments are packed in hermetically sealed tin cans, packed in boxes, also immersed in oil in glass bottles surrounded by tin

* Abstract of paper read before the New York Section of the Society of Chemical Industry.

† U.S. Bureau of Explosives.

cans, the entire inner package being placed in a wooden box. Carload shipments are also made with the sodium cast solid in sheet-iron drums, such as are used for caustic soda. This package, while satisfactory for inter-plant shipments in solid carloads, is not permissible for general use.

Fused sodium sulphide is required to be shipped in tight iron drums, as when in wooden barrels it is liable to spontaneous heating and ignition, particularly in hot and damp weather. The crystallised sodium sulphide is more hazardous.

Oxidising Materials.

Materials classed as oxidising materials for transportation purposes include sodium peroxide, barium peroxide, potassium permanganate, potassium chlorate, and others of less activity and hazard. Sodium peroxide is inherently the most hazardous of these compounds, but owing to the effectiveness of the containers—tight steel drums or tight tins packed in wooden barrels or boxes—very little difficulty has been experienced in shipments. Barium peroxide formerly caused numerous fires, accompanied by heavy losses. At that time shipments were made in heavy and apparently tight wooden barrels. The barium peroxide was in the form of a fine but heavy powder. This powder in small quantities worked through the joints in the barrel, and it was found that friction of this powder between dry wooden surfaces readily produced fire. As a result of this investigation steel containers were required for shipments, and since this type of container has been used no fires have been reported in these shipments. The loss of the steamer *Volturno* by fire some six years ago is believed to have been caused by the ignition of barium peroxide shipped in wooden barrels.

Potassium permanganate and potassium chlorate are now shipped in wooden barrels or kegs. This practice is not entirely satisfactory, for there is a chance of fires being caused by friction if the contents escape from the package. Also, if the chlorate gets into a fire it occasionally causes quite severe explosions. An unexpected risk pertaining to wooden containers for chlorates has recently been noted. Fires have been caused by shipments of metal and hardware in second-hand chlorate kegs. The inner surface of these kegs was slightly crusted and impregnated with sodium chlorate. The friction of the metal pieces against the chlorate-impregnated surface started the fires. Immediate discovery and control of two fires disclosed definitely the cause. It is quite possible that other fires have been caused in this manner, and that the cause was never determined.

Corrosive Liquids.

The shipping containers used for corrosive liquids consist principally of tank cars, steel drums, glass carboys, and glass bottles. For sulphuric acid and mixing nitrating acid the tank car is very satisfactory, and the steel drum reasonably so. The glass carboy at its best is a fragile package. Sulphuric acid of 92 to 96 per cent. strength has but slight effect on iron or steel, but the stronger acid, oleum, has a much more marked effect. This effect is not uniform over the surface, but causes irregular pitting. This effect may be due to local impurities in the metal, but it is quite pronounced in the grade of steel used in making steel drums. Owing to the proposed development of air nitric acid plants, it is desired to ship strong nitric in tank cars with the minimum mixture of sulphuric acid which will serve to protect the steel from undue corrosion. So far as known, the least amount of sulphuric acid which has been successfully used for this purpose has been approximately 15 per cent. by weight of the total mixed acid. The corrosion of the steel depends not only on the amount of sulphuric acid, but also on the amount of water in the mixture. Investigations on this subject are still incomplete. The shipment of nitric acid has been the cause of heavy losses, not only of acid but also of equipment. These shipments must necessarily be made in glass carboys.

When the glass is not affected by the acid, frequent fires have occurred owing to the breakage of the carboys. The glass carboy of the usual capacity, about 12 gallons, is extremely fragile, and even with the best available packing there is considerable breakage due to the shocks caused by shifting and coupling of cars, or by train movement. The regulations require that no material, such as hay, straw, or similar combustible material, should be used as packing for nitric acid carboys. The packings most used are mineral wool and the so-called Stahl packing, which consists of four grooved, vertical wooden strips whose elasticity serves as the cushioning agent. While both of these packings are safer than hay for nitric acid carboys, nevertheless, numerous fires have occurred in shipments in both types of these carboys.

It is desirable that a carboy-box for nitric acid should have a metal or other liner that will hold the acid after the carboy

is broken, and not permit it to come in contact with the wooden boxes or the wooden floor and lining of the car. As yet, such a shipping container has not been developed to a commercial stage.

In the development of the carboy and its container it was necessary to determine accurately the resistance of the various combinations to severe stresses. In railroad transportation observation has shown that packages receive their greatest stresses in a direction parallel to the length of the car. These maximum stresses are due to coupling, switching, and sudden stops in train operation. The straight-sided carboy now in use is naturally more resistant to vertical stresses than to lateral ones, hence the freight car and the carboy make a combination in which the greatest stress comes on the weakest part of the carboy. As far as possible the packing serves to overcome this inherent weakness of the package.

Considerable difficulty has been caused at times by bursting of nitric acid carboys from internal pressure, due to expansion of the acid by heat or by decomposition of the acid by light. Experiments showed that with tightly closed bottles of nitric acid filled to 90 per cent. of capacity, and exposed to direct sunlight, a pressure of 17 lb. per sq. in. developed in three days. A considerably less pressure was produced by diffused daylight, and practically none in the absence of light. These tests showed the necessity of venting of nitric acid carboys, especially when ground-glass stoppers were used for chemically pure acid. Work is also being carried on in the development of porous stoppers for commercial acids which will permit the escape of vapours produced in transit.

Until recently, carboys were commonly closed by a loosely fitting earthen stopper held more or less securely in place by clay, plaster of Paris, and burlap. These stoppers were generally in fair condition when loaded in the car, but by the vibration and shocks of transportation they worked loose and in many cases jarred completely out of the necks of the carboys. This condition caused splashing of the acid from the carboys, which in some cases caused fire or injury to employees, and always caused rapid deterioration of the carboy boxes, the car floor, and lining.

Boxed carboys for the transportation of inflammable liquids and acids are a prolific source of trouble. Probably for nitric acid it will be necessary to adopt eventually a metal-lined box to retain the acid in case of accident. For ordinary acids, however, it is believed that careful attention to the following points will largely eliminate accidents due to the package: first, cushioning; second, closing device; third, repair.

Poor and insufficient cushioning cannot be cheap in the long run. It will cause accidents, and it will increase repair. The cushioning material should be 1½ in. to 2 in. in thickness all around the carboy, and should be carefully put in. A thin cushioning will give insufficient protection, and will quickly wear through by the constant rubbing of the carboy, while one full of lumps will cause the pressures to be brought on small areas of the carboy and cause breakage. A 1 in. thickness does not give space for proper packing or sufficient cushioning.

The use of elastic wooden strips for cushioning decreases initial costs, but has not proved successful from the standpoint of safety and final costs. Great care must be taken in manufacture and assembly, the elasticity of the wood is liable to be quickly destroyed by acid or acid fumes, and finally the repair and readjustment costs are certain to be high unless efficiency is neglected. I believe that some improvement will be obtained if packages cushioned with elastic wooden strips are used only where reshipments will not occur.

The closing device appears to be simply a question of cost. If a stopper is well made, an efficient gasket applied, and a strong metal fastening used, there will be no leakage. Already the improvements along this line have been great, but there is room for more.

The lack of proper repair of packing is probably one of the greatest causes for breakage of carboys. The carboy is fundamentally an improper package and unduly subject to breakage, and when the outside box and the cushioning deteriorate, the resulting package is exceedingly inefficient. Periodical and efficient repacking should be required.

Fires have been occasionally caused by the use of organic packing, such as sawdust, around bottles and jugs of bromine. This packing was improved later by saturation of the packing with the so-called bitter water, but still fires occurred at times, and it was finally required that bromine bottles or jugs should be packed in entirely incombustible packing.

Fires resulting in shipment of phosphorus trichloride necessitated the prohibition of any organic material as packing around the bottles or of any packing which will combine in any way with the phosphorus trichloride.

Compressed Gases.

The specifications for shipping containers for compressed or liquefied gases have been exceptionally successful in preventing losses and accidents. This is due to the fact that the pressure in cylinders of compressed or liquefied gases can be accurately determined and controlled. The cylinders can be made of a metal selected to have the proper chemical composition and the required tensile strength, elastic limit, and working qualities. Further, each cylinder, after being designed and made with a view to meeting these requirements, is subjected to a hydrostatic pressure test at a pressure sufficiently above any reasonable working pressure to ensure a proper factor of safety. It is required that when subjected to this pressure test the permanent expansion must not exceed 10 per cent. of the temporary expansion. A test of this nature assures that the actual bursting pressure will considerably exceed the test pressures, and at the same time the metal will not be overstrained, weakened, or hardened by the test. In the manufacture of compressed gas cylinders there is the advantage that the cylinders last for a long time, and hence the expense is distributed over a long series of shipments. Carbon dioxide cylinders have been in general use in the United States for a longer period than any other type of compressed gas cylinders. Many cylinders have been in use for more than 20 years. Many of the earlier cylinders were made according to specifications which would not at present be approved, yet there have been relatively few failures. Where cylinders of this type have failed it has generally been due not so much to excess pressure, but to brittleness of the metal. In most cases the bursting of the cylinders was caused by a shock such as is produced by a cylinder falling over or dropping from a car or wagon.

Acetylene cylinders have presented a peculiarly different problem in design and construction, because of the property of acetylene which causes it under certain conditions to dissociate with explosive violence when compressed to a pressure above two atmospheres. It can readily be liquefied, but in this condition is almost as dangerous as nitroglycerine. Experience has shown that the only safe way to store and ship compressed acetylene is in solution in acetone, which in turn is held in a porous filling mass in a steel cylinder. Asbestos blocks or other porous materials are used for this mass. This mass must have a porosity of not greater than 80 per cent., and must have no large voids in which an explosive reaction may start. The mass must be of sufficiently fine texture to be safe, and sufficiently rigid and durable to prevent sagging away from the walls of cylinder, even after long use and severe handling.

Aside from the tests of the cylinder by the usual hydrostatic tests, the filled and charged cylinders are tested as to liability to explosive dissociation of contents and bursting of the cylinders. The tests commonly applied are, first, placing charged cylinder in fire and observing whether gas escapes quietly by the safety vents or bursts cylinder; second, placing a charge of dynamite on cylinder sufficiently heavy to make deep dent in side wall, and yet not sufficient to break wall; third, burning a hole through wall of cylinder with a charge of thermit.

Shipping container specifications, as has been indicated, have been gradually developed to their present state. They are neither completed nor perfected; they do not always represent the best possible container, because they must be made within certain limiting costs to be available for commercial use. They represent the joint results of the experience of shippers of the commodities, manufacturers of the shipping containers, and of the carriers, plus thorough study of all the conditions. Additional specifications are being prepared from time to time as needed, and modifications and improvements are made in those previously drawn up. Further knowledge of the materials to be shipped, improvements in materials and manufacturing processes will suggest future developments and improvements in shipping containers.

AMERICA AND INDUSTRIAL ALCOHOL.—Despite prohibition the output of alcohol in the United States is expected to increase greatly, according to a bulletin issued by the American Chemical Society. The great development in industrial and engineering chemical activities which grew out of the war requires vast quantities of alcohol as a solvent. The millions of gallons that have been used for beverages will now be devoted to making this country independent of German chemical monopolies. A bill has been introduced in Congress called "The manufacture and sale of high-proof spirits for other than beverage purposes, and to insure an ample supply of alcohol and promote its use in scientific research and in the development of fuel, dye and other lawful industries."

IMPORTATION OF SHEEP DIPS INTO AUSTRALIA.

REASONS FOR PROHIBITION.

A DETAILED statement regarding the prohibition placed by the Commonwealth Government upon the importation of sheep dips was furnished to the Australian House of Representatives recently by the Minister of Customs, in reply to a series of questions.

The Minister said that towards the end of 1917, owing to the lack of shipping facilities, the position with regard to the supply of sheep dip was becoming acute, and the wool-producing interests, which were dependent on supplies of dip from overseas, were threatened with serious loss. All the raw materials used in the manufacture of dips were also urgently required for munition purposes by the British Government, and it was not considered desirable to continue drawing upon Great Britain for these essential supplies used in the prosecution of the war, if other arrangements could be made. As the position was becoming daily more acute, negotiations were commenced on behalf of the Commonwealth by Sir John Higgins, in the hope that one of the largest British sheep dip manufacturers would establish a factory in the Commonwealth. Various proposals were made to Messrs. Cooper and Nephews, with a view to inducing them to manufacture their dips in Australia, but the company sought special conditions regarding plant and machinery, labour, etc., which could not be granted to any applicant. Negotiations were then opened up with the Victor Leggo company—one of the largest arsenic producers in Australia—to undertake the manufacture of arsenical sheep and cattle dips. That company immediately agreed to accept the responsibility of erecting works, and expended several thousands of pounds in plant and equipment. He understood that this firm entered into negotiations with other manufacturers which enabled them jointly to guarantee the necessary quantity of dips for Australian requirements. Any firms who were prepared to manufacture dips were promised by Mr. Hughes support against overseas manufacturers. When it became apparent that the requirements of Australia could be fully met by local manufacturers, a cable was sent to the Ministry of Munitions in England, which controlled the issue of raw materials to manufacturers and the priority of shipping space, in the following terms:—

Sheep Dip. Commonwealth Central Wool Committee, after careful consideration, advise unnecessary obtain sheep dips Great Britain, as requirements can be effectively met by local manufacturers.

The British Munitions department subsequently inquired through the High Commissioner whether Australia actually needed any sheep dip from the United Kingdom. A reply was sent through the same channel, in which it was stated—"Please give definite assurance Ministry Munitions importations unnecessary." Notwithstanding that the central wool committee advised the Government that the imported sheep dip was not required, and the Commonwealth Government advised the British Government accordingly, and notwithstanding, also, that the Commonwealth Government was constantly pressing the British Government for space for urgently, and in some cases desperately, needed goods, a portion of the shipping space still continued to be occupied by sheep dip, and not by things the Government pressed and asked for. There was therefore no option but to impose an embargo on the importation of dips.

Sheep and cattle dips, added the Minister, might be classified under two main divisions—arsenical and carbolic or phenol. Australia produced arsenic as a by-product in the treatment of auriferous arsenical ores, and in quantities not only sufficient for all Commonwealth requirements, but also for exportation. Shipments of Australian white arsenic had been made to sheep dip manufacturers in Great Britain. During the war many parcels of arsenical compound had been shipped to Great Britain. From coal tar, millions of gallons of which were produced annually at gasworks in Australia, ample raw material was available for the production of all phenol dips. There were now two Australian manufacturers of powder and phenol dips respectively, operating on a large scale. There were also other companies operating on a smaller scale. An exhaustive analytical and physical examination had been made of the several imported Australian dips—powder, paste and liquid—on the market, with the result that the Australian article had been found to differ in no material respect from the imported dip, and, value for value, to be a cheaper article.

ACID PRODUCTION IN THE UNITED STATES.

THE production of sulphuric acid in the United States increased gradually from 1913 to 1918, as is shown in the following table:—

	Calculated as 100 per cent. acid.
	Short tons.
1913.....	2,250,000
1914.....	2,365,000
1915.....	2,610,000
1916.....	3,930,000
1917.....	4,460,000
1918.....	4,705,000

Germany produced 1,495,000 tons of sulphuric acid in 1912, and Italy 571,000 tons in 1914. Great Britain produced 1,348,000 tons of monohydrate (100 per cent. sulphuric acid) in 1917.

The consumption of sulphuric acid in industry in the United States, as estimated in the summer of 1918, was as follows: (1) Explosives (directly or indirectly), including phenol and nitric acid, 35 per cent.; (2) fertilisers, 27.8 per cent.; (3) oil refineries, 11.2 per cent.; (4) chemicals and drugs, including hydrochloric acid, nitric acid for purposes other than explosives, and ammonium sulphate, 9.6 per cent.; (5) steel pickling and galvanising, 9.1 per cent.; (6) miscellaneous, 7.3 per cent. The estimated quantity of this acid used in 1918 in the manufacture of military explosives was 1,646,000 tons (calculated as 100 per cent. acid).

On January 1, 1918, it was estimated that 28.8 per cent. of the country's production of sulphuric acid was being made by the contact process, and 71.2 per cent. by the chamber process. Similarly, of the estimated production of 66° Bé. acid on the same date, 41.6 per cent. was made by concentration from the weaker chamber acid and 58.4 per cent. directly by the contact process. The country was producing sulphuric acid in the fall of 1918 to only 89 per cent. of its rated production capacity. Difficulties in the fuel and labour supply, as well as in domestic transportation of raw commodities, hindered production. Of the entire sulphuric acid production capacity of the United States on November 1, 1918, 10.8 per cent. was at Government plants, 11.7 per cent. at plants making explosives, and 77.5 per cent. at all other plants.

The quantity of 50° Bé. sulphuric acid produced from the various sulphur material for 1918 as estimated in the summer of 1918 is shown in the following table:—

Source of sulphur.	Tons of 50° Bé. Acid Produced.
Sulphur	4,270,000
Domestic pyrites	1,150,000
Zinc ore fumes	900,000
Copper ore fumes	800,000
Spanish pyrites	600,000
Canadian pyrites	480,000
Total	8,200,000

The tonnage of 42° Bé. nitric acid produced increased from 54,000 in 1904 to 78,000 in 1914, to 602,000 in 1917, and to 945,000 in 1918. The production in 1917 was, however, only 74 per cent. of the rated capacity as estimated by the producers. Of the large tonnage produced in 1917, 55.5 per cent. was used in the manufacture of military explosives.

Hydrochloric acid production statistics are available only for 1914 and 1918. The tonnage, calculated as 20° Bé. acid, increased from 168,000 in 1914 to 223,000 in 1918. The increase in the production of hydrochloric acid since 1899 has been relatively uniform as compared with that of sulphuric and nitric acids.

The production of domestic pyrites increased only 35 per cent. from 1913 to 1918, or, expressed in long tons, from 341,338 to 460,000 (estimated). On the other hand, the production of domestic brimstone in 1918 was 470 per cent. of the 1913 production. There are several reasons for this extreme divergence. The sulphuric acid manufacturers were adjusted very largely to the use of pyrites, but required only slightly different conditions for burning brimstone. Inasmuch as considerable time is necessary to develop a pyrites mine, while enormous deposits of practically pure brimstone were available with comparatively small additions or development, the latter were given the greater attention.

Every effort was made to utilise to the best advantage the sulphur fumes obtained in the roasting of copper and zinc ores. The production of sulphuric acid from this source averaged 24.4 per cent. of the total production during the period 1911-1916, and remained remarkably constant. However, the new apparatus required for the recovery of the sulphur dioxide from the waste gases at the small plants

roasting zinc ores was expensive. In general, these plants could be arranged to make this conservation in spite of larger costs.

SULPHATE OF AMMONIA.

HIGHER PRICES FOR FUTURE DELIVERY.

THE Board of Agriculture and Fisheries have come to an agreement with the makers of sulphate of ammonia with regard to the maximum prices to be charged for this fertiliser for home agricultural use, for delivery in the eight months October, 1919, to May, 1920. These prices are appreciably higher than those ruling during last season, owing to the fact that the Government subsidy given to makers during the war has now been withdrawn. The agreed maximum prices are fixed on a commercial basis which has to cover the substantial increases which have occurred since last year in the cost of coal, wages, and raw materials. The Board consider that these prices are not more than are necessary to secure to the manufacturers a reasonable trade profit.

The agreed maximum prices for sale in lots of not less than two tons for delivery by rail or water to purchaser's nearest railway station or wharf in Great Britain, less a trade discount to agricultural merchants, dealers, and co-operative societies, are as follows:—

Month of Delivery.	Price per ton in bags, net cash.
	£ s. d.
October, 1919	20 10 0
November	20 15 0
December	21 0 0
January, 1920	21 7 6
February	21 15 0
March, April, and May	22 0 0

The above prices are for 24½ per cent. ammonia, and will be increased by 4s. per ton for each complete .25 per cent. ammonia over 24½ per cent, and by a further 5s. per ton if sellers guarantee the free acid not to exceed .25 per cent.; and should be reduced by 4s. per ton if the content of ammonia is less than 24½ per cent. but not less than 24½ per cent.; by 8s. per ton if the content of ammonia is less than 24½ per cent. but not less than 24 per cent.; and so on. The quantitative increases and reductions apply only to deliveries of 20wts. and over. If the sulphate is specially ground or pulverised at buyer's request, an additional charge not exceeding 5s. per ton may be made.

The above prices are delivered free in two-ton lots and upwards to buyer's or consumer's nearest railway station or wharf in Great Britain (or f.o.b. British port when the ultimate destination is Ireland, Isle of Man, or Channel Islands); or ex works free to road vehicle to be supplied by the buyer; and packed in single bags containing about 20wts. net to be supplied free by sellers, tare allowed. The seller is not bound to make any allowance if the buyer elects to take delivery by road vehicle ex works. When credit is given, a reasonable extra charge may be made, but the discount allowed for prompt payment should be quoted on the invoice.

For deliveries of less than two tons the following extra charges may be made:—

1 ton and over, but less than 2 tons, 10/- per ton over 2-ton price.
2 cwt. and over, but less than 1 ton, 1/- per cwt. over 2-ton price.
1 cwt. and over, but less than 2 cwt., 2/- per cwt. over 2-ton price.
28 lb. and over, but less than 1 cwt., 3/- per cwt. over 2-ton price.
14 lb. and over, but less than 28 lb., 4/- per cwt. over 2-ton price.

A commission of 10s. per ton will be allowed to fertiliser mixers, agricultural merchants, and co-operative societies on all deliveries of two tons and over. Orders should be sent to the Sulphate of Ammonia Association, 84, Horseferry Road, S W. 1.

LICENCES UNDER GERMAN DYE PATENTS.—British Dyes, Ltd., have been granted licences to work 49 patents, ranging from the year 1904 to 1914, in the name of Farbenfabriken vorm. Friedrich Bayer and Co. Messrs. L. B. Holliday and Co. have also been granted licences to work two patents—one in the name of L. Haas, and the other in the name of Leopold Cassella and Co.

SCIENTIFIC AND INDUSTRIAL RESEARCH.

PRIVY COUNCIL COMMITTEE'S ANNUAL REPORT.

THE fourth annual report of the Committee of the Privy Council for Scientific and Industrial Research for the year ending July 31, 1919, has just been issued. The Advisory Council's report (Sir William S. McCormick, LL.D., administrative chairman) is divided into three parts. Part I. describes the progress made in the establishing of research associations; Part II. deals with the growing organisation of research for national purposes; and Part III. describes the more important developments that have taken place in the conduct of researches initiated by other bodies and aided by grants from the Department.

Industrial Research Organisations.

At the time of the issue of the last annual report, some thirty industries were actively engaged in preliminary work for the establishment of research associations. Licences had been issued to the British Photographic Research Association, the British Scientific Instrument Research Association, and the British Research Association for the Woollen and Worsted Industries; the memoranda and articles of the British Cotton Industry Research Association, the British Portland Cement Research Association, the Research Association of British Rubber and Tyre Manufacturers, and the British Motor and Allied Manufacturers, were approaching completion. Six other industries were engaged in drafting articles, and the remainder were considering the necessary preliminary negotiations.

During the past year steady progress has been made with the formation and development of research associations. The British Photographic Research Association has completed its preliminary survey of the field of research, and has drafted a valuable and comprehensive scheme of work, which other research associations might usefully consult as an example of the way in which their plans of campaign may be attractively presented to their members. The Research Association has decided to attack the problems which confront it not only by the empirical methods which have brought the photographic industry the success it has already achieved, but also by investigating fundamental principles. This is a long-sighted view which is welcome. A number of investigations of direct industrial application have already been completed. For instance, useful experiments have been conducted on gelatine and on photographic emulsions, and a successful process, which it is intended to patent, has been discovered by which it is possible to stain wood black or grey right through. This process is expected to be quite economical and suitable for use on a large scale; and it is interesting to note that the research was guided by a knowledge of the methods used in dyeing cotton. The Association also makes a point of publishing all results of research which are likely to be of general interest and not of immediate use for application to specific problems of the industry.

The British Scientific Instrument Research Association, which was planned at the outset "on lines broad enough to include all scientific instrument makers," began by being mainly an association of makers of optical instruments, although it included several important firms outside the optical instrument industry. During the year the prospect, foreshadowed in the last report, of its becoming the representative industrial body dealing with the application of science to the manufacture of instruments of precision, has been closely approached, for the bulk of the important firms in the X-ray electro-medical instrument industry and the electrical scientific instrument industry joined it. It has, therefore, been necessary to extend the scale of grants to this Association. Under the original agreement the Department guaranteed a total expenditure by the Association of not more than £40,000. during the first five years on a scheme of research approved annually by the Advisory Council, on condition that the members of the Association made an immediate contribution of £4,000. out of the net revenue account. Under the extended agreement the Department has guaranteed an additional expenditure of £24,000. to £30,000. on condition that the newly admitted members make an immediate contribution of £2,400. to £3,000. out of their net revenue account. These very exceptional terms have been given to the British Scientific Instrument Research Association because their industry falls wholly within the class of "key" industries. Another industry falling partly into this class is glass manufacture. The making of scientific glassware in this country is essential to the national interests, and can only be

developed in connection with the manufacture of other kinds of glass. Accordingly, an arrangement has been made with the Glass Research Association that the Department will guarantee an expenditure of £20,000. a year for five years on condition that the members of the Association raise £5,000. a year during the same period.

"Key" Industries.

The reference in last year's report to the special Government encouragement recommended for certain "key" industries by the Committee on Commercial and Industrial Policy after the War appears to have given rise to some misunderstanding. It has been suggested to the Department that it should make grants at a higher rate than pound for pound to certain industries, because other industries are dependent upon them for their welfare or existence, and that these industries should therefore be regarded as "key" or "pivotal."

In an old industrial country such as this, where trade has been joined to trade and industry to industry for generations, the resulting structure has become so complex that there are few industries on which others are not dependent to a greater or less degree. Thus, no industry using power can be carried on without the help of the coal industry or the engineering industry, while most industries depend more or less upon the building trade, the chemical industry, the leather industry, or one or other of the textile industries. In a sense, therefore, a large proportion of our trades can be regarded as "pivotal."

If claims for exceptional treatment by the Department are to be justified, the definition of a "pivotal" industry must be narrowed. This can readily be done by considering the purpose for which the Department's funds are intended. Their sole aim is the stimulation and prosecution of research, and accordingly they can only be made at a high rate to industries for which the cost of the necessary research is great in relation to their means.

Further, they can only be given on a scale higher than the normal when it can be shown that the industry concerned is essential to the existence of larger industries and to the defence of the realm. If the Government were on these grounds to accord preferential treatment to a particular industry or group of industries by special adjustments of their general commercial policy, this action would in itself justify the Department in refusing to make abnormal grants to any others. But even in these cases the Department would not be justified in making abnormal grants without further inquiry, since it would be necessary to have proof that the special commercial advantages to individual firms which the Government policy might be expected to afford did not in themselves constitute adequate assistance from the State. This proof, so far as the Department is concerned, would only be complete if it showed that the cost of the research required for the maintenance and development of the industry in question is so large a factor in the necessary costs of production that the ordinary grants of the Department would be insufficient.

New Research Associations.

A number of industries depending for their raw materials on supplies imported from tropical countries have taken active steps to ensure that the problems arising in their processes shall receive scientific investigation, and accordingly the British Empire Sugar Research Association has been established, and the Research Association of British Rubber and Tyre Manufacturers will shortly come into existence.

Reference was made in last year's report to the difficulties encountered in securing joint action between the makers and users of refractories in the task of organising research on these important materials, and it was suggested that the most accessible line of advance would be found in the makers organising themselves, and then encouraging the users to come in as and when they felt inclined to do so. It is therefore of great interest to be able to record the fact that a separate research association for the makers of refractories is just about to be launched, and that its promoters have secured the support of a number of users of these materials. The users of refractories have also been active, and in addition to the Glass Research Association, to which reference has already been made, a Portland Cement Research Association is now at work, while the scheme drawn up by the representatives of the Non-ferrous Metals Research Association has been approved by the Department, and its memorandum and articles of association are under consideration by the Board of Trade.

The task of providing munitions of war, and the difficulties of placing industry once more on a peace basis, have necessarily absorbed much of the time and energies of the leaders

of industry, and consequently the fact that research associations have been approved at the rate of about one a month during the year may be regarded as very satisfactory, since it indicates a real intention on the part of manufacturers to see that workshop and mill practice is based on sound scientific principles. Doubts as to the future organisation of the industry have, however, for the present, completely put an end to the movement of the Mining Association of Great Britain, mentioned in the last report, towards the establishment of a single research association for the whole kingdom. The increased cost of labour has caused the outlook for the shale-oil industry to be so anxious that the establishment of the Research Association, which had been approved, has been suspended, although the firms had already paid in their subscriptions.

Improved Conditions of Grant.

In January of this year revised conditions of grant were issued making it quite clear that all results of investigation obtained by research associations belong to the associations themselves, which hold them in trust for the benefit of their members. The ownership is, however, subject to two conditions.

The Department, acting in the national interest, may (a) after consultation with the Council of the Association, secure that the results of investigations shall be communicated to other industries on such terms of payment and such other conditions as the Department, after consultation with the Council of the Association concerned and with other co-operating bodies and persons, deem fair and reasonable; (b) prohibit the communication of any results to any foreign person or body or to any person or body under foreign control.

This modification has been welcomed by manufacturers because it fulfils more completely the intention of the Government to entrust to them as full powers in connection with research for their industry as are compatible with State assistance.

Workers Under Research Associations.

The conditions of employment offered by the associations to their scientific workers, whether directly engaged or attached to a university or college, will need very careful study. The war has made the scientific man realise his vital importance to the community as a means of defence, and a certain class-consciousness has arisen among the younger men, of which account must be taken. The need of the community may be, and we believe is, no less urgent in time of peace. But it is not so insistent, because the processes of peace, owing to their relative complexity, are so much slower, and this fact also must be brought into reckoning. Yet discussion of the terms of employment offered by firms, and of the status and remuneration of scientific and technical workers under Government, can only do good, and the proposals or criticisms which have recently appeared will no doubt be carefully considered by the research associations. It has been claimed by some that research workers employed by a firm or a research association should have the right to patent and exploit for their own benefit any discoveries they may make which their employers may be unwilling to take up. This claim has, at first sight, the appearance of justice, but, on the other hand, it has been well pointed out that the work done in the research laboratories of firms and research associations is essentially team-work in which the contribution of each member is part of a whole, and that no arrangement which encourages individuals to play for their own hands is consistent with the well-being either of their colleagues or of their employers. The true solution is to be found in the adoption of an enlightened and generous policy by the association or firm.

Closely connected with this matter is the attitude of research associations to the consultant and analyst. The position of the consultant or analyst is one of great importance to the industrial community. The work of this profession ranges from analysis or testing of a more or less routine kind to research of a high order. Many firms, and even whole industries, have relied entirely in the past upon the professional consultant for such research as they have wished to undertake.

It would not be surprising if some members of a profession which has won for itself a reputation for high accuracy and skilful technique, and which includes among its leaders original workers of the highest order, should view with doubt the possible inclusion of powerful trade associations into their own field of work. It is accordingly very important that research associations should define clearly, and from the beginning, their attitude in this important matter. It will be

impossible for even the most powerful and wealthy associations to cover the whole field of investigation opened up by the needs of their industry, and the independent specialist is at least as likely to be called to their aid as the worker in college or university. Moreover, individual firms which are progressive will often need to have problems worked out for their own purposes, some of them doubtless suggested by the work of the association to which they belong. These problems are as likely to be entrusted to their independent consultant as to the association itself, and particularly so if the independent worker has specialised in that direction. The real danger lies, and will continue to lie for many years ahead, in the serious shortage of competent research workers in every field of activity.

Research into Accessories.

Again, the continued progress of knowledge leads inevitably to the development of subjects having two or more sciences as their foundation, and consequently of interest to each of them. Similarly the advance of industry and the development of systematic research in relation to it will lead, and indeed has already led, to the recognition of problems which, though they are not perhaps of vital importance to any one industry, are yet of great interest to several. How is research into topics of this kind to be organised? The memoranda and articles of association approved by the Department provide for co-operation between two or more associations in objects of interest common to each, but the method of co-operation has still to be devised. The study of adhesives is an example of the kind of problem we have in mind. It is possible that in due course a new industry may emerge, the object of which will be to produce in a systematic way all the many types of adhesive that are needed. Such an industry would necessarily be of a highly scientific kind, and at present it does not exist in any organised form. Meantime how should those industries which use adhesives, or which produce the raw or intermediate materials from which adhesives could be made, approach this urgent problem? It is possible that the establishment of a joint committee financed by the several associations interested in the question might be a suitable device.

Proposed Records Bureau.

The most important of the questions before the recent conference of research associations was undoubtedly that of a Records Bureau. Proposals have been made from time to time to the Department from many sources that it should establish a national clearing-house for the results of research, or even, in the opinion of the more optimistic, for technical information of all kinds. The Advisory Council have carefully considered these proposals as they have arisen, but they have decided to take no action with regard to them. What is needed in this country is not so much additional machinery for collecting the raw material of knowledge, as more adequate means for the systematic review of existing collections of information, and its presentation by properly trained workers in a form which will place the important and the less important in perspective for the benefit of those who need to apply it in practice.

It seems certain none the less that the Department can, under suitable conditions and within carefully defined limits, play an important part as a bureau of information relating to research. The research associations expect to gain through the Department much knowledge of the work of other research organisations. This appears to the Advisory Council to be a reasonable expectation, and it is from this point that their proposals start. What limits should be set to them? In the first place, the Department must only undertake work which it can do efficiently. Further, its information must be thoroughly reliable. These two conditions suggest that the Department should be officially responsible for receiving, abstracting, filing, and collating only formal written communications from research workers, boards, institutions, or associations related to or supervised by the Department. This information will be regarded as confidential and will not be communicated, except in writing, and after consultation with the research worker or organisation from which it has been received. Although the Records Bureau will not attempt to make a comprehensive collection of information relating to the results of research, it is certain that a good deal of miscellaneous information of this kind will come into the possession of the Department, and the Bureau will not exclude the collection, filing, and communication of non-confidential information of evident or probable value. Any information received from other Government Departments as to the results of research conducted by or for them will similarly be communicated—if confidential in nature—under the rules above

described. Even with these limitations, however, it is obvious that the work of the Bureau will be a large undertaking. Research for the Department is now, or will be, carried out under the following headings:—

- (a) Research institutions, such as the National Physical Laboratory and the Fuel Research Station.
- (b) Research conducted by other research boards or committees of the Department.
- (c) Research associations.
- (d) Researches by scientific and professional bodies aided by the Department.
- (e) Researches by individuals aided by grants from the Department.

When to the results of the work of these organisations and individuals are added the bulky compilations dealing with the researches of other Departments of State the mass of material may necessitate a considerable subdivision of the work of the Bureau. But the safe course will be to begin on a small scale, and to develop gradually in the light of the experience gained during the initial stages. It is suggested that the Bureau may also prove useful in two ancillary directions. It occasionally happens that lists of materials and apparatus which might be of use for research are received from dealers in this country and abroad. It will be unnecessary to record all these lists, but specific items in them may be of interest and importance, to one or other of the organisations connected with the Department, and such information will from time to time be circulated. Further, since the waste product of one industry is often the raw material of another, it is possible that a research association may draw attention to a by-product of which the industry it represents finds it difficult to dispose. The Bureau will record the existence of such by-products and notify them to other research associations with a view to their being tested and utilised.

The National Physical Laboratory.

The cessation of hostilities has naturally caused a large reduction in the amount of work done by the Laboratory for the War Departments, but other Government work has grown. In the physics department an interesting measuring instrument and a steady source of current have been devised for the calibration of frequency meters, and an improved method of comparing tuning forks of low frequency has been successfully used. Work on the specific heats and thermal conductivities of lubricating oils have been investigated in connection with the research into these oils undertaken in the engineering department at the request of the Advisory Council's Lubricants and Lubrication Inquiry Committee. Interesting tests have also been made to determine the heat necessary to raise the temperature of certain vegetable oils intended for varnish-making from that of the room to 350° C. A beginning has been made with the testing of chemical glassware of the highest grade (Class A), and it is hoped that the regulations for testing Class B ware will soon be settled.

Great progress has been made in the metallurgy department with the study of the constitution of the groups of ternary alloys which are likely to prove important for practical purposes, and the possibilities of some of them "which have very remarkable properties have now been placed on a secure foundation." The causes of failure in boiler plates have been further studied, and the results communicated to the Iron and Steel Institute, while much work has been done on the case-hardening and heat treatment of alloy steels. The research on magnet steels has made good progress, and, with a view to placing the study of tungsten steels on a better basis, an investigation has begun into the constitution of the alloys of iron and tungsten. The work on the production of crucibles resistant to the attack of molten glass has also been continued.

The Fuel Research Board.

In their last report the Advisory Council stated that the actual erection of the Research Station at East Greenwich had been taken over by H.M. Office of Works. It was then anticipated that some of the buildings would be ready for occupation in the autumn of 1918. Owing, however, to shortage of labour and materials, as well as to serious difficulties with the foundations, the main buildings are only now nearing completion. The laboratories and offices have been partly in use, and some members of the permanent staff have been regularly at the station since February. The Lord President, on the advice of the Director of Fuel Research, has appointed Engineer Commander Fraser Shaw, R.N., to be engineer-in-chief of the station.

In view of the cessation of war conditions and of the recent developments in the coal-mining industry, the Fuel Research

Board feel it to be desirable that they should reconsider the whole outlook as regards their researches into the more economical use of the fuel resources of the nation. In a report which they propose to issue shortly they intend to deal with this subject.

The Fuel Research Board, having given most careful attention to both the principal and the supplementary reports of the Irish Peat Inquiry Committee, have submitted their views to the Committee of Council. The matter is still under the consideration of the Government.

Professor Pierce F. Purcell, Assoc. M.Inst.C.E., who rendered valuable service as secretary of the Irish Peat Inquiry Committee, also placed his experience and expert knowledge at the disposal of the Coal Controller in his efforts to augment fuel supplies by encouraging the winning and use of peat in England. Professor Purcell inspected and reported upon many of the bogs in this country. He also prepared a leaflet descriptive of the most satisfactory methods of winning peat by hand, which was issued by the Coal Controller.

Power Alcohol.

In October last Mr. Walter Long appointed an inter-departmental Committee to consider and report upon—

- (1) The various available sources of supply of alcohol, the methods of manufacture, and the cost of the product.
- (2) The suitability of alcohol, either alone or in admixture with solid, liquid, or gaseous combustible substances, for use in internal-combustion engines and the modifications necessary to the attainment of efficiency.
- (3) The question of denaturing the alcohol, and the alterations to be made in the present Excise arrangements.

Mr. Long invited the Department to nominate a representative to sit on the committee, and, upon the advice of the Director of Fuel Research, and having regard to the general questions of policy raised, the Committee of Council selected the secretary of the Department to serve. The committee presented an interesting report on June 23 last, in which the wide range of possible sources for "power alcohol" was reviewed, the directions in which further inquiry and investigation are desirable were indicated, and improvements in present arrangements for denaturing, importation, and distribution were suggested. The Government will no doubt give careful consideration to the recommendations of the committee. Meantime the Advisory Council desire to associate themselves with their view that should any permanent organisation be established as the committee desire, it is of great importance that the arrangements made should be such as to bring the study of alcohol as a fuel into close association with that of other forms of fuel, whether solid, liquid, or gaseous, for the economic factor will in the end inevitably condition the possibilities of its extended application. The price, in other words, will be found to be the decisive element in its use.

The Food Investigation Board.

The Oils and Fats Committee of the Food Investigation Board was appointed to investigate certain problems submitted to the Department by the Ministry of Food. The refining of fine edible oils is practically a new industry in this country, and a Chemical Sub-committee has been at work on the many problems that are involved. The question of discovering substitutes for edible oils used in industry was one of considerable importance during the war, and was entrusted to a special sub-committee, but more recently other problems referred by the Ministry of Food have gained in relative urgency. In particular, the distribution of accessory food-stuffs in edible fats of various origin and history is a matter of vital effect upon the health of the masses of the people, and especially of the very young. With the assistance of the Medical Research Committee this important question is now engaging active attention.

The Tin and Tungsten Research Board.

The Tin and Tungsten Research Board, which was established last year, has now issued its first annual report. The contributions from local mineowners and landlords amounted to £2,753 16s., and the expenditure on research and incidental expenses to £2,512 14s. 7d., half of which has been met by the Committee of Council, leaving a balance in hand (including interest from invested funds and from the sum transferred by the Institution of Mining and Metallurgy) of £2,001 16s. 6d., which will be carried forward to next year's account. The work of the Board has been hampered by the shortage of materials and research workers, but six papers have been read before the Institution of Mining and Metallurgy, in which the results of some of the investigations have

been described; while Professor Truscott, assisted by Messrs. J. H. Goodchild, K. S. Low, and H. L. Burnie, has completed his research into slime treatment on Cornish frames, and his conclusions have been published in Bulletin No. 175 of the Institution. As a result of the whole series of tests, modifications of two fundamental factors in policy have suggested themselves, one being in favour of rapid enrichment, in place of the present practice of gradual enrichment, the other being in favour of extending the practice of fine grinding the sand residues. Professor Truscott claims that by a systematic adoption of these two practices an increase of 11 per cent. of the present recovery of tin would be gained. A number of other investigations carried out for the Board are described in the notes by Sir Thomas Kirke Rose, the chairman of the Research Committee, which are appended to the Board's report. It is anticipated that more rapid progress will be possible during the current year, as arrangements have been made to attack systematically the chemico-physical problems which underlie the extraction of metals from their ores with special regard to the recovery of tin and tungsten.

The governing bodies of the Imperial College of Science and Technology and of the School of Metalliferous Mining (Cornwall) have continued to afford laboratory facilities, and various Cornish mineowners have supplied ores free of charge, and made arrangements for carrying out tests on their dressing floors. We desire to tender our thanks to them and to those investigators who have gratuitously given their services to the work.

(To be continued.)

IMPORT RESTRICTIONS AND HIGH PRICES OF CHEMICALS.

At a recent meeting of the Advisory Committee on Drugs, Chemicals, and Dyestuffs of the American Chamber of Commerce in London—Mr. Irving A. Keene (chairman) presiding,—it was stated that import licences were being refused for all coal-tar derivatives, and also for phenacetin, aspirin, and acentanilid, the reason being given that the quantity manufactured in this country was sufficient to supply the demand. The committee were agreed that because the demand was so much greater than the supply, which was limited owing to the fact that none was coming into the country, the prices were prohibitive. Some members, however, were of the opinion that the Government were fully alive to this fact, and were watching the situation closely. As soon as they had satisfied themselves that any supplies were being held up in order to sell when the price should rise, the Government would allow freer imports to bring down the price. It was decided that it would be well to point out to the Board of Trade that the prices had been forced up by the import prohibition.

Mr. R. Frothingham suggested that the price argument might not produce results in regard to phenacetin if it were really impossible at present for British manufacturers to manufacture it here at a lower price. The Board of Trade would probably be inclined to protect this industry in so far as seemed called for. The best argument with the Board of Trade would seem to be a presentation of the consumers' part.

The following resolution was drafted and proposed by Mr. A. Withy, seconded by Dr. J. Bebie, and carried: "While it is understood that the British Government are fully justified in protecting home industries to the greatest extent, we venture to suggest that consumers should also be considered; and inasmuch as salicylates, phenacetin, vanillin, phenolphthalein, coumarine, etc., have practically doubled in price since the import restrictions were in force, the American Chamber of Commerce in London would respectfully suggest that licenses be more freely granted commensurate with the laws of supply and demand, as quantities now being manufactured here are far too inadequate to meet the demand."

Dye Imports.

The secretary reported that Mr. Mason, of the British Chemical Trades Association, had written the Chamber that his Association had appointed four members to sit on a joint sub-committee with four members of the Chamber's Advisory Committee on Drugs, Chemicals, and Dyestuffs, to investigate the methods and requirements of the Central Dye Importing Agency at Manchester, and to make recommendations on any features prejudicial to the interests of the importing and merchandising trades. The names suggested by the Chemical Trades' Association were as follows: Mr. William Mann (Mann and Cook), Mr. Hugh Griffiths (Griffiths and Talbot), and Mr. S. J. C. Mason.

Mr. Keene stated he would appoint three other members of the Advisory Committee to serve with himself on the proposed joint sub-committee. Their names and the whole idea could then be submitted to the Chamber's Executive Committee for approval.

PHOSPHATE INDUSTRY OF TUNIS.

H.M. CONSUL-GENERAL at Tunis writes as follows regarding the situation of the Tunisian phosphate industry:

Tunis comes second to the United States as regards the production of phosphates. Exploitation began in 1899, and in 1913 the production was over 2,000,000 tons. Tunisian phosphates can be classed under two categories: 58-63 and 63-68 per cent. of phosphate tricalcite with less than 2 per cent. iron and alumina combined. Before the war, sales of phosphates were quoted c.i.f. port of loading, and were dealt with by the head office of the exploiting companies for France, and by the agents of these societies in the principal importing ports—London, Genoa, Antwerp, etc.

The activity of the phosphate mines was greatly restricted during the war by lack of labour, high wages, lack of fuel and raw materials necessary for working and for the upkeep of underground galleries, new material, plant, etc. The requirements of sulphuric acid for war purposes increased gradually to the detriment of those factories manufacturing superphosphates. Together with this, the shortage of tonnage greatly impeded the supplies of those factories as regards phosphates and pyrites. The demand of agriculture, although reduced, has only been partially supplied, and that after considerable delay owing to the congestion on the railways. Moreover, the prices of superphosphates have been affected like those of most other commodities by a great increase, 30 francs per 100 kilos instead of 5 to 6 francs before the war.

A certain number of important markets in enemy countries were quite closed to phosphates and superphosphates. Moreover, neutral countries and even some allied countries have not been able to obtain the quantities they required on account of shortage of tonnage. On the whole, the demands for raw phosphates were less as regards tonnage than the demand before the war, but these demands could only be supplied within the limits of the tonnage available.

The following table shows the quantities of phosphates exported from Tunis according to countries in 1913 and in 1918.

	1913 Tons.	1914 Tons.	1917 Tons.	1918 (1st half-year) Tons.
United Kingdom ..	181,305	193,397	204,645	219,343
France	698,529	399,529	142,281	80,767
Italy	453,183	412,810	225,908	72,344
Portugal	40,404	36,508	12,730	—
Spain	52,985	49,295	16,315	4,960
Denmark	12,437	7,025	10,562	—
Other Countries ..	546,037	328,597	—	290
Total	1,984,880	1,427,161	612,441	377,704

As regards the direction of the exports, it will be seen that there were no exports to enemy countries, Belgium, Russia, Roumania, and Japan. Exports to neutral countries, after a slight decline in 1914-15, reached the figure of 189,000 tons in 1916, which is greater than that of 1913 (177,000 tons), on account of the greatly increased demand of Denmark (37,000 tons in 1915 and 77,000 in 1916, as against 12,000 tons only in 1913.) On account of the measures taken to limit the tonnage to destinations which might appear doubtful, the exports to neutral countries fell to 27,000 tons in 1917 and 5,250 tons during the first half-year of 1918.

Before the war, the two greatest consumers of Tunisian phosphates were France and Italy. As regards France, exports fell from 700,000 tons in 1913 to 142,000 tons in 1917. The first half of 1918 seems to show a slight increase with 81,000 tons. As regards Italy, the decrease was less acute—450,000 tons in 1913 and 205,000 tons in 1917,—and the first half-year of 1918 shows a very great decrease to 72,000 tons. The United Kingdom, on the other hand, increased her demands from 181,000 tons in 1913 to 205,000 tons in 1917, and the first half of 1918 shows a considerable increase to 219,000 tons. This result is due to the fact that the United Kingdom before the war imported great quantities of phosphates from Florida, and that for the moment she could only get her supplies from North Africa. It is, moreover, evident that the British market will now be more open to African phosphates than it was before 1913.

ITEMS OF INTEREST.

ARSENIC IN BORAX.—At the Wallasey Police Court on Friday of last week, Oliver Marsh, chemist and druggist, Liscard Road, was fined £1. and costs on a charge of selling borax adulterated with an excess of arsenic.

LEAD MINE EXPLOSION.—A serious explosion occurred last week at Rhandirmwyn Lead Works, Llandovery, Carmarthenshire, while the men were at work. One workman named Charles Beddison was killed, and another man was seriously injured.

NEWCASTLE CHEMICAL INDUSTRY CLUB.—The members of the Newcastle Chemical Industry Club have arranged for a field-day on Saturday, September 27, when Durham City is to be visited. Arrangements have been made for a programme of sports, including boating, golfing, and bowls.

SWEDISH EXPORT PROHIBITIONS RELAXED.—A Swedish Royal Decree of July 16, withdraws the prohibition formerly in force on the exportation from Sweden of a large number of articles as from July 28. The *Board of Trade Journal* of August 28 contains a list of the only goods the exportation of which from Sweden is now prohibited.

CHEMICAL WORKS EXTENSION.—At a recent meeting of the Aberdeen Dean of Guild Court plans were submitted on behalf of Messrs. John Miller and Co. (Sandilands Chemical Works) for permission to erect new cold-storage sheds at their premises. The plans were found to be all in order, and permission to proceed with the work was granted.

OILWORKS ACCIDENT.—Two of the employees—Robert Neilson, the manager, and William Faulds, a labourer, were severely burned on Monday in the premises of Messrs. Malcolm Graham and Co., oil refiners, 51, Wilkie Street, Glasgow. They were carrying a mixture of naphtha, pitch and resin when the fumes became ignited by the heat from a boiler furnace, the door of which happened to be open. The flames burned both men on the face, hand and arms.

DISPOSAL OF FRENCH STOCKS OF PERCHLORATE OF AMMONIA.—According to *Reuter's* Paris correspondent, a telegram from Bonneville states that a stock of 5,000 tons of perchlorate of ammonia, which represents a total value of £800,000., has been thrown into the River Arve, as the simplest way of disposing of it. Apart from the financial loss entailed by such a proceeding, the chemical has poisoned the river at least as far as its junction with the Rhone, killing all living things in the water.

NATIONAL PHYSICAL LABORATORY.—The Lord President of the Council has appointed Professor Joseph Ernest Petavel, D.Sc., F.R.S., M.I.Mech.E., etc., to be Director of the National Physical Laboratory in succession to Sir Richard Glazebrook, C.B., F.R.S., who retires on reaching the age limit on September 18 next. Professor Petavel is Professor of Engineering and Director of the Whitworth Laboratory in the University of Manchester. He is a member of the Advisory Committee for Aeronautics of the Air Ministry. He was educated at University College, London, and undertook scientific research at the Royal Institution and at the Davy Faraday Laboratory until 1898. He was elected John Harling Fellow of the Owens College, Manchester, in 1900, and was Scientific Manager of the Low Temperature Exhibit of the British Royal Commission for the St. Louis Exhibition, 1904.

SOUTH-WESTERN POLYTECHNIC INSTITUTE.—The South-Western Polytechnic Institute, Chelsea, S.W. 3, offers facilities for academic and technical education in many branches of chemistry and metallurgy. The department gives facilities for both day and evening courses, to meet the many requirements of these professions in London, including complete courses in general chemistry, metallurgy, and assaying requisite for the B.Sc. and A.I.C. examinations, and also technical courses. A feature of the laboratory work is the opportunity given for specialising in any particular branch of the above subjects, thus supplying much-needed facilities to men who have neither the time nor the necessity for attending a degree course. The various lecturers will be pleased to advise intending students with regard to selection of courses. The department is under the control of Mr. J. B. Coleman, A.R.C.S., F.I.C., F.C.S., and the aim of the Institute is to make its courses of sound practical use to those engaged in the chemistry industries. Further particulars may be obtained on application to the Secretary (Room 80).

ZINC AND ZINC DUST PRICES.—Prompt supplies are very short and the bulk of the business at present is for forward shipment from Australia. The prices of Australian high-grade zinc dust (88-92% metallic zinc) is unchanged at £68. to £70. per ton c.i.f. The price of Australian electrolytic zinc, containing 99-95% metallic zinc, remains the same, i.e. £42. per ton f.o.b. Australia for direct shipment to New Zealand, India, South Africa and the Far East.

EXPLOSION OF CALCIUM CARBIDE.—At an inquest on Thursday of last week, at Wallasey, on William Pattie, donkey man and storekeeper of the Cardiff collier *Relentless*, who was killed by an explosion on the vessel, it was stated that the explosion was caused by the deceased using calcium carbide in mistake for caustic soda for cleaning the ship's boiler. Another man, named Alderson, who was badly burned, is still in hospital.

FRENCH ACADEMY OF SCIENCES.—At a recent meeting of the French Academy of Sciences in Paris, MM. A. Gautier and P. Clausmann, in the course of a paper on "The Action of Fluorides on Vegetation," gave the results of some field-culture experiments. The fluorine in these experiments was added in the form of amorphous calcium fluoride; it was found to be favourable to the growth of wheat, oats, carrot, broad bean, cabbage, pea, poppy, potato, and hemp. No effect was observed with barley, rye, bean, buckwheat, and mustard, whilst beetroot, turnip, and onion were prejudicially affected by fluorides. MM. P. Sabatier and A. Mailhe communicated a paper on "The Catalytic Formation of Alkyl Chlorides, Starting with the Primary Alcohols." The authors stated that a mixture of hydrochloric acid and alcohol vapour, passed over alumina heated to 370° to 450° C., gives the alkyl chloride mixed with the ethylenic hydrocarbon produced by the dehydration of the alcohol. Primary, secondary, and tertiary chlorides may be formed in this reaction.

ACTION OF FERTILISERS.—Mr. J. B. Henderson, at a meeting of the Queensland section of the Australian Chemical Institute, gave a paper on the hypothesis which has been advanced by certain investigators to explain the action of fertilisers. It was pointed out that the generally held theory that fertilisers act solely as plant foods is unable adequately to explain certain observed facts, such as the richness of exhausted fields in fertilising elements, the immense quantities of plant food made available to roots by average agricultural soils, and the prolongation of fertility by the practice of rotation. In order to meet these facts, it has been suggested that fertilisers act as neutralising agents to toxic substances produced by the growing crop. Chemical bodies inimical to plant growth have been extracted from infertile soils; and further evidence is to be found in the phenomena of the adverse influence of weeds on cultivated crops, soil sickness, and the stimulating influence of small quantities of certain fertilisers. Tith and aeration play the part of rendering these bodies harmless to crops.

DRUG AND CHEMICAL WORKERS' CLAIM FOR HIGHER WAGES. A conference of employers and workpeople in the drug and fine chemical business was held in London on August 28, to consider the position in the trade, which had become acute. It was stated that a national settlement had been reached, and the following statement was made by Mr. P. C. Hoffman (organiser of the National Amalgamated Union of Shop Assistants, Warehousemen, and Clerks, one of the unions concerned):—"We have had an agreement with the Drug and Fine Chemical Manufacturers' Association for some considerable time in regard to wages and general working conditions. The gradings are as follows:—For men 21 years of age and over, class 1, 55s.; class 2, 52s. 6d.; class 3, 50s.; For women, 18 years of age and over, class 1, 40s.; class 2, 38s.; class 3, 35s. 6d.; class 4, 32s. 6d. Junior rates were for males under 15, 16s. 6d., up to 47s. at 20 years of age, and females under 15, 15s. 6d. up to 24s. 6d. up to 18. The employers have agreed to offer, as from August 1, apart from the 5s. advance on the minimum rates for adult males, a 5s. advance on the earnings of all male employees, except to those who are receiving 15s. above the minimum rates, and these shall receive such advances as will bring them up to 20s. above the minimum rates. We have not been able to come to any agreement with regard to any advance in wages for the women, but the unions concerned have agreed to recommend to their members to accept this offer of the employers, reserving to themselves the right to raise the question of the women's wages at an early date." The above settlement does not affect the members of the Society of Drug and Chemical Workers who were not represented at the conference.

NEWS FROM THE ANTIPODES.

[FROM OUR OWN CORRESPONDENT.]

SYDNEY, July 19.

Methylated Spirit Shortage.—A very unsatisfactory position exists with regard to local supplies of methylated spirits. For months past the public has experienced considerable difficulty in securing adequate quantities of this necessary commodity. The situation became acute towards the end of last year, and now, after a short period of temporary relief, another famine has arisen. There are over one hundred different trades in which extensive use is made of methylated spirits, and they are all suffering more or less severely from the present shortage of supplies. Unless the position is speedily relieved a serious dislocation of industry is feared, with consequent unemployment.

Sulphur as Fertiliser.—At a recent meeting of the advisory council of the Agricultural High School, Ballarat, the principal, Mr. Refshange, reported that an experiment in connection with the application of sulphur to one-eighth of an acre of potatoes grown on buck-shot land in the school farm had given very satisfactory results. The yield averaged about 13 tons to the acre, which was much higher than the ordinary crop from that class of land.

Importation of Dyes.—The Collector of Customs advises, with reference to proclamation dated February 26 last, prohibiting the importation of dyes other than those of British origin, unless with the consent of the Minister for Trade and Customs, that it has been decided to relax the restriction somewhat on the importation of dyes from foreign countries. Applications from importers for permission to import foreign dyes will be considered subject to the following conditions: (a) That an unsuccessful effort has been made to place the order for the dye (or an effective substitute therefor) with British manufacturers. (b) That the quantity for which permit is required shall not exceed the actual requirements of the importer or of the parties for whom the dyes are imported, up to December 31, 1919. In this connection figures should be given showing the consumption during, say, the last two years of the particular line in respect of which permission to import is sought.

Supplies of Potash.—In reply to a question asked in the House of Representatives, the Minister of Customs outlined the steps taken by the Commonwealth Government with a view to obtaining supplies of potash for the use of fruit growers and others. He said that since February last the question had formed the subject of numerous cable messages between the Government and the High Commissioner, who had advised that he was obtaining information as to prices from the French Government, who would control supplies of Alsatian potash. Prices at present were very high. A cablegram was sent recently to the High Commissioner asking him to advise the Government immediately supplies were available, and to quote quantity, grade, and prices. A reply had been received stating that Australian agents had been appointed, and supplies should therefore soon be obtainable through ordinary trade channels.

Higher Soap Prices.—Within the last few weeks local manufacturers of household and toilet soaps have raised their prices, owing—as their intimations to retailers have put it—to the increased cost of the raw material. This movement in manufacturers' costs has been most substantial in regard to tallow, quotations for which have moved sharply upwards at each successive weekly auction in Melbourne since the British Government withdrew the war-time restrictions from the London market. In that centre there was material enhancement, and as provision has been made lately for freight for a fairly considerable quantity of Victorian make for the United Kingdom, there has been a variation in prices in practically all of the Australian selling centres in the direction of a parity basis.

Chemical Market.—Chemicals are still irregular in parcels, but there is said to be a noticeable strengthening in values for many lines. Reports from England and America show that stocks could not be landed for anything like the rates quoted locally for a great majority of lines. The following is a list of distributing prices, and parcels were to be had at reductions in most cases:—Alum: Japanese £30., English £33. per ton. Arsenic: White £65., grey £60. per ton. Bluestone: Macleodfield's £54., Japanese £44., U.S.A. £50. per ton. Boracic Acid: £96. per ton. Borax: Powdered or lump, £55. per ton. Carbide: Japanese, 34s. per 100 lb. drum. Carbon Bisulphide: Colonial, 10d. per lb. Carbolic

Acid: English, 98%, 9s. 6d.; Colonial, 9s. per gallon. Citric Acid: 3s. 6d. net, per lb. Tartaric Acid: 3s. 3d. net, per lb. Cream of Tartar: 95%, 3s. 1½d.; 99%, 3s. 1½d. per lb. Cyanide: 98%, 1s. 3d. per lb., in one to four case lots. Quick-silver: 6s. per lb. Resin: G grade £36. per ton, N grade £40. per ton. Soda: Silicate, liquid, £26.; bicarbonate, in kegs, £15.; soda ash, £15.; soda crystals, £9. 10s.; caustic soda, English, 70-72%, £30.; 76-77%, £33. per ton. Sulphur: American flowers, £36.; Japanese, common, £18. per ton. Oxalic Acid: 2s. 9d. per lb. Chloride of calcium: £20. per ton.

THE COLOUR OF INORGANIC COMPOUNDS.

THE study especially of organic compounds, derivatives of which can be prepared in endless varieties, points to a connection between structure and colour. Though the nature of that connection is by no means understood, there is a good deal of evidence in favour of the view that the electrons involved in selective absorption—which, when in the visible spectrum, gives rise to colour—are the same electrons which take part in the chemical union of elements, that is, the valency-electrons. Some elements like the alkali metals are only credited with one, non-variable, valency; to other elements variable valencies are assigned, three or five, e.g., to nitrogen, and one of these valencies is considered the "normal valency;" but there is considerable disagreement as to this normal valency and to the possible variable valencies. We know little about the forces determining the stability of the electronic arrangements, i.e., the forces which resist small displacements of the electrons from their equilibrium position. Those forces will, however, be a measure of the resistivity of a compound, which is connected with the possibility of an element's existing in different valency-states, but which has no direct connection with the thermodynamic stability of a compound or of a valency-state; that thermodynamic stability is measured by the total work necessary to separate the parts of a molecule.

According now to the magneton theory of the structure of the atom, proposed by Parson and chemically developed by G. N. Lewis, there is for all atoms—except those of hydrogen and helium, which stand apart—one particular arrangement of the electrons which has maximum stability. In this arrangement the number of electrons, grouped around the positive nucleus or in it, is either 8 or 0. All other arrangements of electrons, consisting of 2, 4, 6, 10, and to a still greater extent, arrangements of odd numbers of electrons, are less stable. To understand the colour rules which F. Russel von Bichowsky has deduced from these special atoms of Lewis (*Journal of the American Chemical Society*, of March 1918, and later issues) we should first give a few of the "normal" valencies: Sodium, copper and silver, as well as fluorine, have the normal valency 1; mercury, 2; thallium, 3; tin, 4; nitrogen, 5; oxygen, sulphur, tungsten, 6; chlorine, bromine, iodine, 7; iron, manganese, nickel, platinum, 8. Thus chlorine would be surrounded by seven dots, if a dot represent an electron, sodium would have one dot, and in sodium chloride the chlorine would be symmetrically surrounded by eight electrons (two dots on each of the four sides.)

A substance like sodium chloride has maximum stability and zero colour, (i.e., it is colourless) according to Bichowsky, the selective absorption being confined to the invisible ultra-violet. Titanium has several valencies and gives the chlorides $TiCl_3$, $TiCl_2$, $TiCl$, the first colourless, the second yellow (absorption in the violet), the third blue (absorption in the red.) In these chlorides the electron groups round the titanium atom contain 6, 4, 2 electrons respectively, and the general rule is that in salts of the same elements the colour changes from colourless to yellow, green, blue, violet, black as the groups vary from 8 to 6, 4, 2 and 1, 3, 5, 7, or in that order. The atom-colour of every element itself in its normal state is zero, and compounds of the non-variable valency atoms are likewise colourless; when the valency is variable, the colour turns more blue when the valency changes from the normal; thus the copper fluoride CuF is colourless, the CuF_2 is blue. The colours of compounds are sometimes merely additive; sometimes the colour may be more blue than the sum of the colours would indicate. The colours of the elements themselves are those of their ions, and not many elements are sufficiently known in the ionic state. The rules proposed by Bichowsky are not simple; but the arguments are suggestive, especially also as they concern inorganic as well as organic components. —*Engineering*.

BRITISH ASSOCIATION OF CHEMISTS.

"If we don't hang together we shall assuredly all hang separately."
—JOHN HANCOCK, when signing the Declaration of Independence.

Hon. Registrar: DR. FRANCIS W. KAY,
Chemical Department, The University,
Liverpool.

NOTICES.

NOTICES and reports from secretaries of local Sections and articles and correspondence for these pages should be sent to the hon. editor, Dr. E. H. Rodd, 7, Mauldeth Road West, Withington, Manchester, and not to the *Chemical Trade Journal and Chemical Engineer*.

The hon. editor will be glad to receive short articles on the views of members with respect to the B.A.C., its aims and aspirations, for publication in these pages. Such articles should be accompanied by the name and address of the writer, not necessarily for publication.

Reprints of the proceedings of the British Association of Chemists as published in the *Chemical Trade Journal and Chemical Engineer* can be obtained from the hon. editor on payment of an annual subscription of 4s.

Applications for membership of the B.A.C. should be sent to the Registrar, Dr. F. W. Kay, not to the Editor.

ADDRESSES WANTED.

Name.	Late address.
Gee, F. H., B.Sc.:	86, Ridgeway, Edgbaston, Birmingham.
Gee, J. H., B.Sc.:	93, Common Lane, Wood End, Birmingham.
Guild, E. J.:	Thornhill Villa, Maidstone, Kent.
Maxfield, H. L.:	54, Glasgow Road, Cheetham Hill, Manchester.
Wilson, A. B.:	Edon Villa, Victoria Avenue, Borrowash, near Derby; and Airedale, Ferryside, Yorks.

Notifications of change of address should be sent to the Registrar, and not to the Editor.

THE PROCEEDINGS OF THE ASSOCIATION.

The Council.

A meeting of the Council was held on Saturday, August 23, at the St. James's Hotel, Derby, Professor J. W. Hinchley in the chair.

Nominations Committee.—On the recommendation of the Nominations Committee, seven candidates were admitted full members, ten as probationers, and six as students. The names were also submitted of 56 candidates for membership, 17 for probationership, and one for studentship, whose applications had been scrutinised and approved by the local assessors, and these were referred to the Nominations Committee for their final decision.

Whitley Councils Committee.—This Committee reported the results of the Conferences that had been called at its initiation to bring about concerted action amongst scientific and technical organisations in order to secure proper representation on Whitley Councils. The invitations were extended to scientific and technical associations organised on a professional basis, and were accepted by the National Association of Industrial Chemists, the British Association of Chemists, the Oil and Colour Chemists' Association, the National Union of Scientific Workers, the Society of Technical Engineers, the Electrical Power Engineers' Association, the Junior Gas Association, and the Association of Engineering and Ship-building Draughtsmen, the last-named, however, retiring after the first conference.

The attempt was first made to bring about a Federation of Chemical Organisations, and a similar one of Engineering Organisations, with a view to finally uniting them in one common larger federation. This, unfortunately, failed, in consequence of the difficulty of including one of the constituent associations in the scheme, and it was eventually decided to adopt the principle of a general federation of all the associations.

As, however, during the course of the negotiations certain constituent societies attending the conferences took concurrently the first steps towards forming amongst themselves a federation with the same aims, it was eventually decided to accept this as a nucleus, to request it to publicly advertise for adherence on a trade-union basis, and to meet on September 6 to establish the constitution of a General Federation. The Council nominated a Committee of five members to attend this meeting.

Munitions Chemists' Case.—The President read correspondence which had taken place between the Association and the

Labour Party, and which had led to the matter being ventilated in the House of Commons, as reported in the issues of this *Journal* (August 9, page 150, and August 16, page 173). These replies were considered unsatisfactory, and it was decided that the matter should be followed up when Parliament reopens.

The help thus given was very much appreciated by the Council, and it was resolved that a cordial vote of thanks should be sent to Messrs. Clynes, Sith, and Young, and also to the Labour Party, who had taken such an interest in the matter.

The subject is further commented upon in a separate article in this issue.

Widnes Election.—It was decided that questions on the attitude of the Government to chemists and on the chemists' interests generally should be submitted to both candidates, and the replies published through the Press. These will be found on a later page of this issue.

Salaries.—A scheme of salaries drawn up after consultation with the Sections was unanimously adopted, and it was decided to issue it as a confidential document for the information of the Association's officials. Following up a resolution proposed by the London Section, the Council approved that in the propaganda work of the Association the only salary mentioned should be a minimum salary for a fully qualified and experienced chemist of £350. per annum.

Propaganda.—A circular setting forth tersely the primary objects of the Association and underlining its economic aspects was approved, and 4,000 were copies ordered for circulation along with the address of Mr. Todd on the Whitley Councils Scheme.

Price Advertisement.—A letter was read to the Council, received from a professor of standing, stating with respect to the £100. advertisement for a chemical process that he had been asked to adjudicate upon it, but that he had refused to do so, as it was possible that the action might be regarded as an attempt to exploit chemists. The Council expressed their appreciation of the attitude thus taken.

Treasurer's Report.—A statement was submitted by the Treasurer showing the Association to be in a sound financial position, and with a substantial balance in its favour.

North-East Coast Section.—Steps were taken to further the organisation of this Section. Chemists in this district are invited to communicate with Dr. J. H. Paterson, The Green, Walsend-on-Tyne.

Guarantee Fund.—It was decided to raise a Guarantee Fund for propaganda work, including the payment of an Assistant Secretary, and the matter was left in the hands of the President.

Subscriptions.—It was resolved that as the financial year will shortly close, subscriptions from applicants from the present date should be counted as subscriptions for the coming year.

Other Business.—Progress was reported in the matters of Trade Union Registration, Income-tax Rebate, formation of an Admiralty Chemists' Group, and the re-establishment of the Edinburgh Section. The attention of the Council was also directed to the action of the military authorities in transferring men from the Chemists' Brigade to other units for the purpose of subordinate and routine work, and it was decided to follow the matter up.

The next meeting of the Council will be held at Derby on September 27 at 1.30 p.m.

SALARIES OF CHEMISTS IN GOVERNMENT SERVICE.

The history of the agitation on the part of chemists in Government munitions factories during the past few years should be impressed on the minds of all chemists. The chemist trained the operatives, coached the foremen, raised and maintained efficiencies, improved processes and plants, and responded to every call made on his brains and service with extraordinarily successful results.

Although the Government began to discover the value of the "chemist" as a chemist, the fact that he was a living man who required a living wage, adequate to the position he occupied, made no impression. The Ministry of Munitions refused to accept the obvious principle that "for purposes of efficient factory control and the maintenance of discipline an official should be paid more than individuals for whose work he is responsible and whom he controls." A considerable percentage of operatives and tradesmen employed were paid more than the chemists.

The memorial, stating the position and signed by 352 chemists in nine Government factories, which was sent to the Ministry, does not appear to have been acknowledged, but

the chemists were informed, through the Superintendent of Gretna Factory, that "the salaries of chemists cannot be compared with the earnings of tradesmen"; and that "the Ministry object to meetings being held by any section of the staff of factories under their control to pass resolutions asking for revision of salaries and appointing deputations to wait on the Superintendent in respect thereof." Truly an extraordinary statement on the part of a Government actively engaged in forming Whitley Councils, etc., and publicly advocating collective bargaining. On November 16, 1918, these chemists addressed the Minister of Munitions himself, the Right Hon. Winston S. Churchill, and an expression of regret has recently been made in the House of Commons for his neglect to reply to this letter.

The British Association of Chemists have secured the interest of the Labour Party in this subject, and a number of questions have been put in the House of Commons by Mr. Sith and Mr. Robert Young. A study of these questions and answers is interesting. It will be noticed how questions involving important principles are dealt with by politicians, and how a display of power compels the Government to recognise principles of "right" instead of "expediency."

It is satisfactory to know that the Government now throw overboard the statement made through the Superintendent of Gretna Factory, and say that it "must not be taken to express the considered view of the Ministry," but nevertheless they do not state what that "considered view" really is.

We do, however, now learn that a Committee of the Treasury has been formed to consider the question of the salaries to be offered to scientific and technical officers of the Government, but there is no suggestion that the arrears due to Government neglect of the matter will be paid.

Again, Mr. Hope, on behalf of the Government, puts forward an untenable proposition when he states that "even after making full allowance for the increased cost of living, the scale of salaries paid by the Department can be compared favourably with the salaries paid by private firms under pre-war conditions." This is an unfortunate statement for a Government official to make. Is not Mr. Hope aware that the salaries paid to chemists under pre-war conditions were generally disgraceful, and constituted a pointed indication of the backwardness of chemical industry in this country? He should know that it is necessary to attract the best brains to the service of chemistry if the industrial efficiency of the Empire is to be maintained, and that this cannot be done by paying the chemist the wages of a labourer. He ought to know, also, that the Government should set an example in such matters, and not excuse itself by following the practice of private firms who are swayed only by commercial considerations.

The matter cannot be allowed to rest with the evasive and illusive replies so far given on behalf of the Government. What is the "considered" opinion of the Government? When is it going to give effect to its "considerations"? Are these "considerations" going to act retrospectively?

THE BRITISH ASSOCIATION OF CHEMISTS AND THE WIDNES ELECTION.

In view of the importance of the chemical interests in the Widnes district the Council of the B.A.C. thought it proper to ascertain, for the guidance of its local members, the attitude of the two candidates on matters of vital interest to the chemical profession.

The Hon. Local Secretary of the Liverpool Section therefore placed before Mr. H. M. B. Fisher and Mr. Arthur Henderson the following questions:—

Are you prepared to secure by Parliamentary action or any other constitutional method:—

- (1) For chemists in Government employ—
 - (a) The right to negotiate as a collective body.
 - (b) Salaries commensurate with their services to the State.
 - (c) Corresponding increases in salary in the event of any future increases in the operative rate of pay.
- (2) The redress of the wide discrepancy now existing between the totally inadequate salaries paid to the majority of industrial and academic chemists and the wages received by skilled artisans.
- (3) That no public contract shall be given to firms employing chemists at less than the minimum scale of salaries fixed in a constitutional manner by the Association.

- (4) The amendment of the Patent Laws in such a manner as to prevent the unfair exploitation of the true inventor by his employer or the capitalist.
- (5) That all agreements to transfer patents without fair payment to the inventor shall be null and void.
- (6) As a practicable solution to the two latter propositions, and in order to protect the public from the aggressive monopolisation of patents by firms who do not intend to work them, the creation of a Licensing Department of the Board of Trade, which shall be conducted on the lines, say, adopted in dealing with enemy patents during the late war—namely, by granting licences to more than one manufacturer to work one and the same process, and adequate royalties to the inventor in every case.
- (7) As a development of the progressive democratisation of industry now initiated by the establishment of Industrial Councils, that chemists shall have an equitable share in the joint control of industry by capital and labour.
- (8) That the name "Chemist" be legally re-defined.
- (9) That steps be taken to establish a Statutory Register of all those who are qualified to practise chemistry in the British Empire.
- (10) That legislation be obtained to safeguard the public by securing that certain prescribed chemical operations shall be under the control of a chemist.

The following replies have been obtained:—

Mr. Fisher: "I approve of 1, 2, 4, 7, 8, 9, and 10. On 3, 5, and 6 want more information before committing myself."

Mr. Henderson: "I beg to state that as the proposals are so much in harmony with the general policy of the Labour Party, I have no hesitation in giving my assent to them all."

The questionnaire and the above replies were communicated to the local Press.

PROTECTION FOR JAPANESE CHEMICAL INDUSTRIES.

THE following resolutions calling for protection have been passed by a Committee of the Japan Chemical Industries Association, and communicated to the Japanese Government:—

1. An import duty of yen 5 per 100 kin to be imposed on potassium chlorate, provided no duty is imposed on potassium chloride.
2. Import duty on caustic soda to be 25 per cent. Price of salt to be reduced to 40 sen. Exports of bleaching powder to be subsidised at the rate of yen 1 per 100lb.
3. The post-war cost of the manufacture of soda ash may be estimated as yen 115.77 (? per ton), and it is requested that the Government take steps to protect the industry, as prospects are not entirely hopeless.
4. The present import duty of 5 per cent. on "intermediate" chemical manufactures—i.e., those which are neither dyestuffs nor drugs—should be revised.
- A duty of 25 per cent. *ad valorem* to be imposed on raw materials, such as benzene and methyl alcohol; on salvarsan and compounds of arsenic, yen 4 per gramme.
5. That the Government-protected factories should not take up the manufacture of products successfully manufactured by private concerns.
6. The Government should establish regulations for granting subsidies to exporters of chemicals, and arrange for rebates of insurance and freight charges.
7. If import duties on zinc and lead be increased at any time in the future, a rebate should be given when these materials are to be used for the manufacture of paint or cosmetics.

MERCURY PRODUCTION IN THE UNITED STATES.—According to statistics compiled by F. L. Ransome, of the United States Geological Survey, the mercury production of the United States during the first quarter of 1919 very distinctly showed the lessened demand for mercury with the end of the war, both in the production figures and in the prices. The total production amounted to 5,960 flasks, against 8,674 flasks in the same period of 1918. The prices had steadily been sinking, from 103.75 dollars in January to 90 dollars and 72.80 dollars in February and March, but were still higher than in pre-war times, though not high considering the general rise of prices.

LEGAL INTELLIGENCE.

Chemical Merchant's Heavy Losses.

At the London Bankruptcy Court last week, the first meeting of creditors was held under the failure *re* Joseph Algernon Hare Duke, residing at the "Dell," Croft Road, Sutton, and Henry Slater, residing at "Ingles," Burdon Lane, Cheam, Surrey, and carrying on business as Perry, Mills and Co., 61 and 62, Gracechurch Street, E.C., chemical merchants.

Mr. F. T. Garton, Official Receiver, stated that prior to 1908 the debtor Duke was a half commission man on the Stock Exchange and from 1908 to 1912 he was managing director of Oil Refineries Ltd., at a salary of £700 per annum. In 1912 he commenced business in partnership with a Mr. Perry, under the style of Perry, Mills and Co., at 29, Gracechurch Street, E.C. They had no capital and none was required, because their business consisted chiefly of agencies. They secured a number of agencies for German firms and worked up a very successful business, but upon the outbreak of war a considerable part of their business disappeared. In 1913 his brother joined the firm, but withdrew on the outbreak of war in 1914, when he rejoined the Army. Mr. Perry and debtor continued the business until September, 1917, when the former withdrew from the firm and a dissolution of the partnership was gazetted. In August, 1918, he opened an office at 67, Hanging Ditch, Manchester. It was originally intended that that office should be used as a buying office, but it gradually developed into a branch business. In September, 1918, Mr. Slater became a partner in the firm, and he put about £700 into the business. The firm had chiefly dealt in chemicals which were exported to the Continent. They had several large contracts with Italian firms, but on the signing of the Armistice those firms refused to take further deliveries on the ground that the Armistice terminated all existing contracts. That placed the firm in a very awkward position, because they had purchased very large quantities of chemicals for export, and their bankers had made advances on the warrants. Since then the markets had gone against them, with the result that the prices had fallen considerably below what they had paid for the goods. They were however making claims against four Italian firms for damages for breach of contract, amounting to something like £14,800. The debtors estimated their liabilities at about £11,000, and the assets at about £2,000, but they could not value their assets exactly because they did not know how much would be received under their claims for breaches of contract. The debtor Duke had a half share in a farm at Headley, near Epsom, but it was only a leasehold property. The failure of the firm was attributed to the Italian firms refusing to accept delivery of the chemicals under the contracts entered into before the Armistice.

In reply to a creditor, the Official Receiver said he had not received any notice of an execution being levied on the debtors' goods. Eventually it was decided to appoint Mr. Claude Leigh Sixsmith, chartered accountant, of 6, Broad Street Place, E.C., as trustee of the estate to act in conjunction with a committee of inspection, consisting of Mr. Clarence Hadfield, of the Nippon Shoko Co. Ltd., Mr. R. A. Giles, of the Brimsdown Lead Co., and Mr. W. R. Livesey, of Messrs. Riley and Sons, Ltd.

A question arose as to how much the stocks of chemicals were likely to realise, and Mr. Hadfield suggested that the prices had gone down to about 60% or 70% of the prices ruling before the Armistice.

Mr. Hawkins, who appeared on behalf of a creditor, said he did not think the stocks held by the banks would realise sufficient to pay their advances.

In reply to a creditor, Mr. Duke said they had received certain unjust claims by Australian creditors against them, but he did not know if they were going to be put forward.

Mr. Hawkins, who appeared for the Brimsdown Lead Co., suggested that the trustee's bond should be fixed at £2,000, with an undertaking to increase it, should he receive more assets at any time. The Official Receiver accordingly fixed the bond at that amount and the remuneration of the trustee was left in the hands of the committee of inspection.

A Debtor's Huge Surplus.

At the London Bankruptcy Court on Tuesday, before Mr. Registrar Francke, the public examination was appointed to be held of Francis Joseph De Giers, 3, Cross Lane, E.C., and Aspen House, Sudbury, Middlesex. The statement of affairs filed by the debtor disclosed gross liabilities amounting to

£18,440. 18s. 8d., and assets estimated to produce £111,464. 18s. 9d., thus showing an estimated surplus of £93,024. 0s. 1d. Upon the case being called on for hearing, the Official Receiver stated that the debtor had only filed his statement of accounts on August 27 last, and he had not been able to issue his usual report and summary of accounts to the creditors, therefore he asked that the case might be adjourned until October 29.

Mr. Tindale Davis, who appeared on behalf of the debtor, offered no objection, and the case was adjourned accordingly.

The receiving order was made on July 8 last, and the debtor, an American citizen, came over to this country, in 1912, when he became connected with a syndicate for the purpose of trying to sell oil properties in London. He remained in England until July, 1914, when he returned to America to complete certain business, but soon after his arrival there, war broke out, and the deals fell through. Early in 1915 he was asked to take up the European agency for the New England Supply Co., of Providence, Rhode Island, U.S.A., his remuneration being a certain allowance for expenses, and 5% commission on all business done in Europe. He took offices at 6a, Finsbury Square, E.C., for the company. Under his arrangement with the firm, he was not to receive any commission until peace had been ratified, although, roughly, his commission amounted to £100,000. In May, 1918, he promoted the Anglo-Spanish Trading Company, Ltd., with registered offices at 3, Cross Lane, E.C., for the purpose of carrying out certain olive oil contracts, and to carry on a general produce business. He was appointed managing director, and was allotted £2,000, in shares. The company was still carrying on business, and the shares should be of some value. He had promoted other companies, all of whom owed him money in regard to advances made to them. He did not admit being insolvent, but his present financial difficulties had arisen through his inability to collect commission due to him from America, and to his liability in regard to loans made to various companies in order to keep them going.

ZINC OXIDE MANUFACTURE.

WRITING in *The Times* of Saturday last, Mr. Alexander J. McConnell, in the course of a letter dated August 29, said: The Board of Trade prohibit the importation of zinc oxide excepting under special licence, and they stated in writing yesterday that such licences are granted only to regular importers based on their direct importation during the year 1913. A leading British manufacturer desires to use a high grade of zinc oxide which is not at present being manufactured in this country, but which to him is an essential raw material in the production of an article in which he can do an extensive export business. He is unable to obtain supplies, and must go on using an inferior material unless he puts himself into the hands of a merchant who happened to be importing zinc oxide in the year 1913. It seems incredible that sample lots of the highest known grade of zinc oxide are lying at an English port unable to be touched by one of our manufacturers even for experimental purposes. But such is the case.

On Tuesday Mr. J. K. Campbell replied to the above letter in the following terms: In *The Times* of August 30 Mr. Alexander J. McConnell states that a British manufacturer desires to use a zinc oxide which is not being manufactured in this country, and that he is unable to obtain supplies. I would like to point out that the highest grade of zinc oxide is being manufactured on a large scale by an old-established English firm. The purity and colour of this product is equal to the highest grade of imported zinc oxide. Many qualities of zinc oxide inferior to the one above referred to are being used by druggists with satisfaction to-day. It would be a pleasure for me to put "the British manufacturer" in touch with a British manufacturer of pure zinc oxide, and I am sure he would not wish to buy in a foreign market in future.

ANILINE DYE IMPORTS AT HONG KONG.—H.M. Commercial Secretary at Peking states that during the January-March quarter of this year aniline dyes were imported into Hong Kong to the value of £18,774., as against less than £7,000 for 1918, but some merchants question the accuracy of the latter figure. American firms are devoting much attention to this business, and by the distribution of samples and practical demonstrations of the method of using their products, are steadily improving their position in the market.

FERTILISER NEWS.

(SPECIALLY CONTRIBUTED.)

Nitrate of Soda.—There is practically nothing doing, the article being of no immediate interest as a fertiliser, while chemical manufacturers buy only from hand to mouth the small quantities required, prices ranging from £22. to £24. per ton, according to ports. No full cargoes have arrived in the United Kingdom, the imports being confined to parcels by "liners" from Chili. A few steamers have been fixed at very high rates for the Continent, presumably in connection with the sales made by the Chilean Government for account of producers outside the Association, but the latter, through asking higher prices, is still out of the market on the West Coast; its programme for the disposal of nitrate on this side next season will no doubt soon be revealed, and it will be interesting to see the prices fixed in competition with the synthetic nitrogenous products now officially acknowledged to be in the field against natural nitrate of soda. As shown by the report of Dr. Edward C. Worden (United States Government expert), quoted in our issue of August 23, the German Badische Aniline Company is in one factory alone about to turn out under the Haber process over 800,000 tons per annum of sulphate of ammonia; this, without counting the works already in operation and other forms of nitrogen, will not only supply all this country's agricultural requirements of the kind, but will leave large quantities available for export. The Nitrogen Products Committee—the issue of whose report, dated May last, still awaits a definite instruction from the Ministry of Munitions—consider the Haber process "feasible," and the Board of Agriculture has just decreed an important increase in the prices of sulphate of ammonia to the British farmer. Well may the latter, worried to death by official interference, ask to be preserved from his friends!

North African Phosphates.—The phosphate position in North Africa is fairly illustrated by the experiences of the Gafsa Phosphate Company, which is one of the leading companies in North Africa. Unfortunately, difficulties in respect to labour and scarcity of freight interfered seriously with phosphate business generally during the war, necessitating a reduced production and exportation. This latter, which constitutes the governing factor in the activity of the company named, being now under improved conditions, the production, it is expected, will develop rapidly. At the end of 1918, when the Allied Governments made their control of freights less rigorous, this company was able greatly to increase its shipments, which made by the end of the year 720,193 tons, or 50 per cent. better than the preceding year. As has already been noted, the French Government are making great efforts to put additional tonnage at the disposal of the North African phosphate companies, all of which have suffered from disabilities identical with those that affected the Gafsa, and will correspondingly benefit with it from the improved conditions now obtaining.

Basic Slag and Superphosphate.—Basic slag is in good seasonable demand, but it is feared the recent coal strike will have somewhat interfered with the production. Prices are without change, as also are the superphosphate quotations. Higher prices for slag are spoken of, and some increase in values would not be out of the way, it is argued, and would not appreciably interfere with consumption.

Norwegian Nitrates for Poland.—Norway and Poland are getting into direct business relations, particularly, it appears, in respect to the products of the nitrate works. A delegation from the Norwegian nitrate producers has gone to Poland in order to organise an exchange of goods, which, in regard to Poland as an exporter, would consist mainly of coal, oils, etc. It is hoped to establish an agreement of some importance and duration for shipments to be made and received reciprocally through Dantzic and Christiania.

Sulphate of Ammonia.—The expected price increases for 24½ per cent. ammonia delivered to buyer's nearest station or wharf in Great Britain, prompt cash payment, have now been announced. They are £20. 10s. for October, £20. 15s. for November, £21. for December, £21. 7s. 6d. for January, £21. 15s. for February, and £22. for March, April, and May next year. The average export figure appears to be about £25. per ton, net cash, in double bags, f.o.b., British port, but not a great deal of business is passing in that direction. Generally, it seems that more sulphate of ammonia is wanted here than can be secured for the time being. Probably the coal strike has had a great deal to do with this decrease in supply, and some time must elapse before that setback has

been recovered from. Fears are expressed that America is going to eat very substantially into overseas markets for sulphate of ammonia formerly supplied by Great Britain. It cannot be said, however, that up till now there have been very strong signs of this taking place, and the latest export demand movements in America are only marked moderate.

Atmospheric Nitrogen.—Although some despondent views have been expressed about the large Government factory on the Tees, which was started last year for the fixation of atmospheric nitrogen, it appears that the scheme is not to be the loss that some writers have been presuming. The matter is not yet decided, but important negotiations are now said to be in progress whereby the whole undertaking will be handed over to an exceedingly busy and wealthy combination of manufacturers of explosives and chemicals. This arrangement would relieve the Government of all liability for the undertaking. It will be stipulated that the Government shall have the right of first call upon the output of air nitrates in the event of any national emergency. A great deal of very useful research work has been done by the Nitrogen Products Committee. This is a British Government organisation which was brought into being while Mr. Lloyd George was Minister of Munitions. It is composed of scientific experts, and includes among its members many eminent men. Its object was originally to investigate and report on various matters primarily relating to the fixation and utilisation of atmospheric nitrogen with a view to facilitating the manufacture of nitric acid and its derivatives for munition purposes.

SOUTH WALES NOTES.

(SPECIALLY CONTRIBUTED.)

The tinplate trade is much better and there are now 112 additional mills operating compared with a year ago. At the present moment there is a lack of skilled rollermen, doublers, and furnacemen, and outputs are thereby handicapped. Relative to the outstanding question of the 12½ per cent. demand of the operatives, the arbitrators have failed to agree and the matter will now have to be placed before Mr. Marley Samson, K.C., the independent chairman appointed.

The patent fuel industry remains very active and export orders are coming in faster than the trade can conveniently deal with. The expansion of foreign markets is rapidly taking place.

An important cargo of 2,695 tons of phosphate from Sfax reached Newport on Monday.

The exports of chemicals from South Wales ports are just now of a very meagre character, and the home requirements with the exception of fertilisers are not so pressing as they were a week or two since. The coke ovens are working well and sulphate of ammonia production is quite as great as, or even greater than, before the war. Fortunately, the demand for coke is considerable, and good shipments have been sent during the week to the Argentine, St. Malo, and Dieppe.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

(SPECIALLY CONTRIBUTED.)

The decrease in coal production caused by the shorter hours is estimated to be 15 per cent., and is causing serious inconvenience to coke makers. Although the by-product ovens are not working at more than two-thirds of their capacity, it is, nevertheless, impracticable at the present time to secure an adequate supply. As long as the hematite pig-iron trade preserves its present strength, coke makers are assured of the absorption of their make. What does give rise to anxiety, however, is a prospect of a slackening of demand for ordinary iron. There is a ready market for low-phosphorus brand of iron, but it is undoubted that several furnaces on ordinary iron will have to be damped down unless the demand for Bessemer rails quickens. On the whole, the signs are not discouraging. Continental users cannot get their wants properly coped with by American steel-makers, and it is believed that, in spite of the high prices, they will be compelled to come to England with their business. If this should prove to be a correct view of the situation, it is obvious that coke-makers will be faced with a busy winter. East Coast coke supplies to the Furness district this week are 15,100 tons, and to West Cumberland 9,000 tons. The demand for Lenzole, whether from Ireland or from local users, is brisk; sulphate of ammonia is required by home users; and there is a good market for pitch.

REPORTS OF COMPANIES.

Ammonia Soda Company, Ltd.

At the meeting of the Ammonia Soda Company, Limited, held at Lostock Gralam, near Northwich, on August 28, Mr. John H. Wilcox presided. At the ordinary proceedings the report was adopted, and a 6 per cent. dividend on the preference shares was declared.

An extraordinary general meeting was held afterwards at which a resolution was proposed that the company go into voluntary liquidation.

Mr. Henry Ellison, of Bradford, proposed, and another shareholder seconded an amendment that an independent expert be appointed to examine the company's plant and report to the shareholders, the name of Mr. Stanley Smith, of Chancery Lane, London, being suggested as this expert. This amendment was lost, and the substantive resolution carried.

Before such resolutions Mr. Ellison asked several questions, to which the chairman replied, admitting that Brunner Monds held by far the major part of the capital of this company, that Brunners had written to the latter requesting them to go into liquidation, that prior to the present notice no other shareholders had been consulted, that the current directors were all former or present officials of Brunner Monds, and that the brine wells had been dismantled with the view of preventing possible contamination of the brine supply of the two concerns by calcium chloride liquor.

The Chairman said this had been done upon the advice of Mr. Stanley Smith, who made the proviso that Brunner Monds should supply the Ammonia Soda Company with an unlimited supply of brine from other sources.

Hereupon Mr. Smith asked whether this proviso would stand good in the event of any other concern than Brunners taking over the Ammonia Company.

The Chairman could not answer for that, but upon being asked whether the directors of the Ammonia Soda Company had been advised by former or present officials that with certain alterations and extensions of plant the business of that company might be made highly profitable, he replied that originally the directors had been so advised, but subsequently they took what they considered better advice. Answering the question whether before deciding upon liquidation the directors would consult the minority shareholders and reconsider the position, the Chairman replied that the shareholders were being consulted by the present proposal to liquidate the concern.

Asked whether the business of the company was not a highly profitable business, and whether there was any reason why by good management the business of the Ammonia Soda Company could not be made highly profitable, the Chairman replied that in the opinion of the directors it was not highly profitable. The question whether Brunners did not stand to benefit substantially by the liquidation of the Ammonia Soda Company was ruled out of order.

English Oilfields, Ltd.

An extraordinary general meeting was held in London on Monday to increase the capital of the company to £1,500,000. Sir James Heath, Bart. (chairman of the company) presided.

The Chairman stated that the directors proposed in the first instance to make an issue of 400,000 of the new shares and to offer them at the price of 25s. per share in the proportion, or as near as possible so as to avoid fractions, of four new shares for every three held by each shareholder.

Dr. W. Forbes-Leslie, in seconding the resolution, said: This company was issued July, 1918. It acquired the interests of the English and Foreign Oil Finance, Ltd., its land interests, and the technical information of the district in which these properties were situated. The land area it secured was important. It covered about 20 square miles of land, especially selected as a result of very extensive geological investigations carried out for several years previous to the issue of your company. No more land within the selected limits of the field is now obtainable; we have covered it. We have found that mining in the shale series is economical and cheap, roofs and floors being available and the structure of the seams giving natural facilities for mining. Samples from the mine faces on the whole have demonstrated that in thickness of seams measured up from drill records we have been about 25 to 30 per cent. less than shown in the mine, that in volatile contents as given from laboratory tests on cores we have been over 50 per cent. less than freshly mined samples

of the same beds demonstrate. This is so much to the good. Another point of the most vital importance has been further demonstrated in mining. The oil obtained from the middle shales is an oil of remarkable quality, practically free from sulphur, and yielding many valuable by-products, and especially rich in motor spirit and wax. This discovery, first made in mining operations and finally worked out in the laboratory and in commercial tests, transformed at once the whole business into one of first-class importance. I originally estimated commercial production at 30 gallons per ton, but in consequence of the yield from mined middle shales being so much richer than drill records formerly demonstrated I have good reasons for considerably raising my estimate, and now estimate that a yield commercially of from 45 to 55 gallons of oil per ton treated may be expected. The yield of sulphate of ammonia may be anything to or over 60lbs. per ton of shale and the wax about 60lbs. per ton. There are two corollaries still to be dealt with under by-products. The first comprehends the discovery and present development of a very valuable deposit of clay. It is fortunate for the Company that this clay exists, for we shall require very great quantities of bricks for the large works we are about to erect—works dealing with 1,000 tons of shale per day as a beginning and possibly ultimately dealing with 4,000 tons per day. The second corollary comprehends cement manufacture as an integral part of the Company's business. It is possible you will be turning out 600 tons of cement per day when your 1,000 ton shale plant is in full working order. The property you hold is capable of supplying 18 works dealing with 4,000 tons each per day for 120 years.

The resolution was carried unanimously.

San Miguel Copper Mines, Ltd.

At an extraordinary general meeting on Friday of last week, it was resolved to wind-up the company voluntarily, with Mr. E. Johnston (the secretary), as liquidator. Mr. C. A. Massauti, who presided, explained the difficulties under which the company had been carrying on its operations owing to the scarcity of freight, the great increase in working costs, and the fact that the ore mined had been steadily deteriorating in value. The consulting engineer and the manager at the mine were of opinion that the results of the investigation work in the lower levels did not warrant further outlay. The liquidator could continue to treat the heaps already there at small cost, and thus extract most of the remaining copper on remunerative terms. The machinery, rolling-stock, etc., at the mine should be easily realisable owing to the general shortage, so that, if carefully handled, the liquidation, undertaken at this stage, should produce a relatively good return to the shareholders.

Rubber Curing Patents Syndicate, Ltd.

The accounts for 1918 show a net profit, including £3,425. brought forward, of £9,626, against £4,747. The directors have carefully considered the question of the payment of a dividend, but they are unable to recommend the payment of one for the reason that patents stand in the books at £30,000., and although six years have elapsed since the syndicate was formed, no depreciation of this asset has in the past been possible. The directors recommend that £7,500. be used in the reduction of the item of patents, and the balance of £2,126 be carried forward.

DIVIDENDS.

ANGLO-CONTINENTAL GUANO WORKS COMPANY, LTD.—Interim dividend on ordinary shares at the rate of 12½ per cent. per annum (1½d. per share).

LAWES' CHEMICAL MANURE COMPANY, LTD.—Dividend for year ended June 30 of 10s. per share on ordinary and bonus of 2s. 6d. free of tax.

OUR BOOK SHELF.

MINING AND MANUFACTURE OF FERTILISING MATERIALS.—By Strauss L. Lloyd, E.M. London: Crosby Lockwood and Son; 9s. net.

A highly informative work dealing in very concise form with the raw materials, manufacturing processes, and applications of all fertilisers—phosphatic, nitrogeous, and potassic. Considerable reference is made throughout to mechanical detail, examination of commercial fertilisers, and examination of soils.

NEW COMPANIES.

Dunraven Cement and Lime Company, Ltd.—Private company. Capital £25,000., £1. shares. Office: 57, James Street, Cardiff.

Franklin Chemical Company, Ltd.—Private company. Capital £20,000., £1. shares. Manufacturers, importers, and exporters of and dealers in chemicals, etc. Solicitors: Linklater and Co., 2, Bond Court, Walbrook, E.C.

Ineson Gibbs Oil and Chemical Company, Ltd.—Private company. Capital £3,000., £1. shares. Registered office: Marshall Works, Milner Road, Selly Park, Birmingham.

J. R. Morris, Ltd.—Private company. Capital £1,000., £1. shares. Objects: To take over the business carried on at Star Works, London Street, Smethwick, as "J. R. Morris," and to carry on the business of paint and colour manufacturers and merchants, workers in ferrous and non-ferrous metals, ores, compounds and alloys, etc.

Kalchester Manufacturing Company, Ltd.—Private company. Capital £5,000., £1. shares. Manufacturing chemists, druggists, drysalts, oil and colourmen, manufacturers of and dealers in toilet requisites, etc. Registered office: 1, Williamson, Reddish, Lancs.

Masterson Roumanian Oil Syndicate, Ltd.—Private company. Capital £20,000., £1. shares. Office: 29, Great St. Helens, E.C.

Coal By-Products (Parent) Syndicate, Ltd.—Private company. Capital £5,000., £1. shares. Solicitors: Kenneth Brown and Co., Lennox House, Norfolk Street, W.C.

Kingdown (Hewas Water) Tin Mines, Ltd.—Capital £60,000., 2s. shares. Registered office: Broad Street House, E.C.

British Magnesite Calcining Company, Ltd.—Private company. Capital £100,000., £1. shares. Registered office: 14, Great George Street, S.W. 1.

Consolidated Mines of Cornwall, Ltd.—Private company. Capital £66,000., £1. shares (33,000 7 per cent. cumulative preference). Registered office: 8, Hart Street, Mark Lane, E.C.

Hovey and Lowther, Ltd.—Private company. Capital £10,000., £1. shares. Object: To take over the business of manufacturers of phosphoric acid powder, used as a substitute for cream of tartar, carried on by J. F. Lowther at the Wheelock Cream Powder Mills, Sandbach, Cheshire. Registered office: Wheelock Mills, Wheelock, near Sandbach, Cheshire.

M. H. Wilson and Sons, Ltd.—Private company. Capital £40,000., £1. shares. Object: To take over the business of chemical manure manufacturers and coal merchants carried on as "H. M. Wilson, late Wm. Wilson," at 28, Old Market and Bedford Street, Wisbech. Solicitor: A. G. Hardy, 27, Chancery Lane, W.C.

Malco, Ltd.—Private company. Capital £5,000., £1. shares. Manufacturers and merchants of cutting oils or compounds, starch substitutes, glue, size, gelatine and similar substances, etc. Registered office: 63, Norfolk Street, Sheffield.

Morgan Ebonite Company, Ltd.—Private company. Capital £30,000., £1. shares. Manufacturers of rubber, rubber substitutes and all recovered rubbers and chloride of sulphur, vulcanite, ebonite, and all chemicals used in the manufacture of indiarubber, vulcanite, and ebonite goods, etc. Registered office: Empire Works, Oldham Road, Failsworth, near Manchester.

North Cornwall Quarries Syndicate, Ltd.—Private company. Capital £20,000., in 18,000 preference shares of £1. and 40,000 deferred shares of 1s. each. Registered office: 4, Vernon Place, W.C. 1.

Products and Equipment, Ltd.—Private company. Capital £3,000., £1. shares. Manufacturers, importers, and exporters of and wholesale and retail dealers in engineering apparatus, building materials, oil, soap, grease, lubricants, agricultural produce, fertilisers, cattle feeding-stuffs, brewers' materials, and by-products. Solicitors: Holder and Wood, 6, Martin's Lane, Cannon Street, E.C.

Stockport United Chemical Company, Ltd.—Private company. Capital £25,000., £1. shares (5,000 preference). Registered office: Old Road Works, Stockport, Cheshire.

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 4, Queen Anne's Gate Buildings, London, S.W. 1, whence, unless otherwise stated, further information may be obtained:—

Canada.

A correspondent in Prince Edward Island desires to obtain the address of United Kingdom exporters of superphosphate, basic slag, Paris green, arsenate of lead (powder and paste), arsenate of lime, and also potash for agricultural purposes. (Inquiry at office of High Commissioner for Canada, 19, Victoria Street, London, S.W. 1.)

Ceylon.

A firm in Ceylon wish to get into touch with (a) rubber manufacturers, with a view to representing them in Ceylon and supplying all their requirements; (b) consumers of copra and citronella oil; (c) buyers of plumbago, the firm being also large mine owners. (Reference No. 514.)

Turkey.

A firm in Constantinople, already holding important United Kingdom agencies, wish to get into touch, with a view to obtaining additional agencies, with United Kingdom manufacturers or exporters of household and toilet soap and chemicals. (Reference No. 540.)

A firm of merchants in Constantinople desire to represent United Kingdom manufacturers of paint, glass, etc., either on a commission basis or to buy for their own account. (Reference No. 541.)

Argentine Republic.

H.M. Consul-General at Buenos Aires reports that a commission agent in that city is desirous of representing United Kingdom firms for the sale of aniline dyes. (Reference No. 544.)

GAZETTE NEWS.

LIMITED COMPANIES.—Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions, Orders, and Official and Other Notices.

Acetylene Equipment Company, Ltd. (formerly Acetylene Illuminating Company, Ltd.).—Resolved July 23, confirmed August 16: That the company be wound up. J. G. Harris, Palmerston House, Old Broad Street, E.C., chartered accountant, liquidator, who is authorised to carry into effect an agreement with the Dissolved Acetylene Company, Ltd., for the sale of the company's goodwill, undertaking, and assets at the price of £35,000., subject to such terms and conditions otherwise as he may deem advisable.

Adams (Arthur) and Co., Ltd.—Petition presented, August 19, by Bradley and Burch, Ltd., 5, Whittington Avenue, E.C. Iron, tinplate, and metal merchants. Hearing, Royal Courts of Justice, Strand, October 14. Pettiver and Parkes, 21, College Hill, E.C., solicitors.

Broughton Rubber Company, Ltd.—Claims to F. S. Burman, 29, Princess Street, Manchester, chartered accountant, liquidator, by September 30.

Manbre Saccharine Company, Ltd.—Resolved July 30, confirmed August 19: That the draft agreement submitted to the meeting and for the purpose of identification subscribed by the chairman be and the same is hereby approved, and that the company be wound up. H. P. Tongue, Fulham Palace Road, Hammersmith, secretary of the company, liquidator, who is authorised to consent to the registration of a new company. Meeting of creditors, Receiver's Office, Fulham Palace Road, Hammersmith, September 8, at 2. (Note.—The notice of the meeting is given to comply with the provisions of the Companies Acts on the voluntary winding-up of the company.)

Oowana Soap Company, Ltd., London, E.C.—J. D. Pattullo, 65, London Wall, E.C., appointed liquidator July 4.

DISSOLUTIONS OF PARTNERSHIP.

(Note.—When two dates are given in the following announcements, the first is the date of the dissolution. The date in parentheses is that of the official advertisement.)

Mundav, J. C., and Co. (Geo. Frdk. Wm. Hussey, Frank Hewitt Warr, and Chas. Ambrose Harman), 46, 47, and 48, Orchard Lane, Southampton, oil, colour, lead, glass, and paper merchants. August 1. Debts by G. F. W. Hussey and C. A. Harman, who continue. (August 19.)

to a scrubber, where the gases are washed with heavy shale oil. The heavy shale oil is afterwards distilled, and the distillate is added to the spirit obtained in the condenser. In distilling shale, a vertical retort, fed with shale at the top and with steam at the top or lower down, is employed. About $\frac{1}{2}$ lb. of water is used for 1 lb. of shale. The shale oil is distilled at the top of the retort at about 400°C . and flows downwards with the steam, and is cracked and hydrogenated by passage over the spent shale at the bottom of the retort, which is maintained at about 600°C .

Treating Ammoniacal Liquors. D. M. Holmes, Stockton-on-Tees. British Patent, 128,401.

Ammonia is recovered from the ammoniacal liquor from plants for purifying gases from producers or the like by first concentrating the liquor, distilling with lime until a considerable proportion—for example, 75-80 per cent.—of the ammonia is recovered, and then running the liquor remaining in the still into a producer to recover the rest of the ammonia. If the producer is provided with a water lute, a solution of calcium chloride collects therein, and may be treated with nitre-cake or sodium sulphate to produce calcium sulphate and sodium chloride.

Acetone and Alcohols. A. P. H. Desborough, Royal Naval Cordite Factory, Holton Heath; J. Reilly, Parkstone; A. C. Thaysen, Parkstone; and F. R. Henley, Organford Manor, near Wareham, all in Dorset. British Patent, 128,403, of 1918.

In bacterial fermentation processes to produce acetone, together with butyl alcohol, ethyl alcohol, or other products, the yield of acetone is increased by adding, to the fermenting mass acetic acid or a soluble acetate, which becomes converted by the bacteria or their enzymes. *Granulobacter butylicum* may be used to give principally acetone and butyl alcohol. In an example, a bacterial culture is added to a cooked rice mash, and acetic acid is added at intervals during the fermentation.

Utilising Nitre-cake. J. S. Morgan, Freshfield, Lancashire. British Patent, 128,302, of 1917.

Nitre-cake is heated in a closed chamber to produce neutral sulphate, and this, while still hot, is further heated in the closed chamber with a material, such as slag, which will drive out the combined acid. The opening statement refers to the decomposition of sodium sulphate by silica or alumina. The particular process described consists in placing the nitre-cake on the surface of molten basic slag, which drives off the free acid, and then breaking the crust and stirring the residue into the body of the molten slag. This removes the combined acid and leaves the slag in a form more suitable for setts and for manure.

Acetic Anhydride and Acetyl Chloride. T. H. Durrans, Oxford; and A. Boake, Roberts and Co., Stratford, London. British Patent, 128,282, of 1917.

Acetic anhydride is prepared by mixing anhydrous acetates of the alkali or alkaline-earth metals with phosphorus and treating the mixture with chlorine, the materials being used in the proportions of 6 to 8 molecular parts of alkali acetate (or 3 to 4 of alkaline-earth acetate) to 1 atomic part of phosphorus and 3 to 5 atomic parts of chlorine; the acetic anhydride is isolated by distillation under reduced pressure or by extraction with a solvent such as carbon tetrachloride. Acetyl chloride is obtained similarly, but by using the reagents in the proportions of 3 to 4 molecular parts of alkali acetate (or $\frac{1}{2}$ to 2 molecular parts of alkaline-earth acetate) to 1 atomic part of phosphorus and 3 to 5 atomic parts of chlorine, the acetyl chloride is isolated by distillation or by extraction with a solvent such as acetylene tetrachloride.

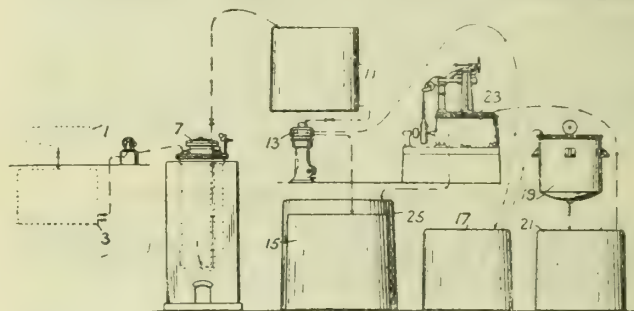
Chlorhydrins. K. T. and H. E. Kerfoot, Bardsley, Lancashire; and J. C. Irvine and W. N. Haworth, University, St. Andrews, Fife. British Patent, 128,635.

Chlorhydrins are prepared by supplying small amounts of hypochlorous acid and ethylene or its homologues, etc., to a liquid medium, and repeating the operations until the resulting solution of chlorhydrin is sufficiently concentrated to be worked up. The process may be carried out by first passing chlorine into a copper salt solution to give a weak solution of hypochlorous acid, cutting off the chlorine supply when absorption ceases and driving off the excess chlorine from the reaction vessel by a stream of air, and thus passing ethylene into the solution; the operations are repeated until the solu-

tion contains, say, 40 grammes of chlorhydrin per litre. Stronger solutions may be obtained by periodically neutralising the hydrochloric acid formed—e.g., by means of basic copper carbonate—and continuing the operations. The chlorhydrin is then separated by fractional distillation or by extraction with ether, etc. During fractional distillation of the aqueous solutions, calcium carbonate may be added to neutralise hydrochloric acid. The product is finally purified by fractional distillation, washing with petroleum spirit, and drying. Ethylene dichloride is formed as a by-product in the process. The process may be carried out on the large scale in packed towers through which the liquid circulates and comes into contact alternately with chlorine and ethylene, or in a tower divided by a series of shelves into zones containing alternately chlorine and ethylene, through which the liquid flows.

Treatment of Wool-scouring Liquors. W. P. Thompson, Liverpool. (A communication from F. E. Underwood and B. F. Illston, New York.) British Patent, 128,730, of 1918.

Wool-scouring and like liquors are treated to recover fats and sodium and potassium salts by heating under pressure with an alkaline-earth salt such as magnesium sulphate. The liquor from a scouring-bowl 1 is passed to a settling-tank 3, and thence to an autoclave 7, in which it is heated with magnesium sulphate to about 350°F . under a pressure of about 125 lb. per sq. in. The mixture is passed to a settling-tank



11, from which the supernatant liquor is run through a centrifugal 13 to a storage tank 15. The liquor is evaporated to recover sodium, potassium, and nitrogen compounds. The sediment from tank 11 is passed to a storage tank 17, and thence to a steam-jacketed kettle 19, in which it is treated with sulphuric acid. The treated liquor is cooled in tank 21. Fatty matters are separated by filtration or by a centrifugal 23. The clear liquor containing magnesium sulphate is passed to a storage tank 25, and is evaporated to obtain the salt for use again.

Plastic Compositions. G. L. Scott, London. British Patent, 128,477, of 1918.

Lime is used in admixture with phenol-formaldehyde resins to form plastic compositions. Filling components of the mixtures are fuller's earth, steatite, China-clays, clays, wood flour meal and pulp, waste cotton material, jute, and other fibres. Indiarubber, gutta-percha, or the like may be incorporated with the resin before addition of the calcium oxide and filling material. The mixture is moulded, dried at about 75 to 80°F ., and heated to 350 to 400°F . In an example, from 5 to 10 per cent. of rubber dissolved in naphtha is added to an alcoholic solution of a synthetic resin, and then, after stirring, 5 to 20 per cent. of the powdered calcium oxide, the fillers, if used, being afterwards stirred in gradually.

Alkali Cyanides. W. J. Mellersh-Jackson, London. (A communication from the Air Reduction Company, New York.) British Patent, 128,507, of 1919.

The extraction of cyanide from a furnace product obtained by nitrogenising a mixture of alkali carbonate and carbon, with or without a catalyst—for instance, a mixture of sodium carbonate, coke, and iron or iron oxide—is effected by a composite solvent consisting of a mixture of water with an organic solvent miscible therewith, such as methyl or ethyl alcohol or acetone. Any alkali oxide or hydroxide in the furnace product may be removed by treatment of the wetted product with carbonic acid or by passing carbonic acid through the solution before or after it is separated from the residue. The residue, with suitable additions to make up its composition, may be used again.

Acetone, Alcohols, Etc. A. P. H. Desborough, Holton Heath; J. Reilly, Parkstone; A. C. Thaysen, Parkstone; and F. R. Henley, Organford Manor, near Wareham, Dorset. British Patent, 128,714, of 1918.

In bacterial fermentation processes for the production of acetone, alcohols, etc., one or more volatile fatty acids (acetic, propionic, etc.) or their salts are added to the mash, whereby the total production of volatile products is increased or modified. According to an example, propionic acid is added at intervals to a maize mash undergoing fermentation by the "*n*-butyl alcohol-acetone" producing organism; the products obtained consist of acetone, butyl, and propyl alcohols, and a little ethyl alcohol.

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Aminobenzoic Ester Derivatives. Soc Chimique des Usines du Rhone Anciennement Gilliard, P. Monnet, et Cartier, Paris. British Patents, 128,552, 128,553, and 128,554. Convention date, June 20, 1918.

Mono- and di- β -oxyethylaminobenzoic esters of the formulæ $\text{HO.CH}_2\text{CH}_2\text{NHC}_6\text{H}_4\text{COOR}$ and $(\text{HO.CH}_2\text{CH}_2)_2\text{N.C}_6\text{H}_4\text{COOR}$ (R = alkyl), are prepared by heating aminobenzoic esters with one or two molecular parts of ethylene oxide at $50\text{--}110^\circ\text{C}$; the reaction may be accelerated by adding small amounts of water or alcohol. Examples are given of the preparation of ethyl esters.

β -halogenethylaminobenzoic esters of the formula $\text{X.CH}_2\text{CH}_2\text{NHC}_6\text{H}_4\text{COOR}$ (X = halogen, R = alkyl) are prepared by treating the corresponding β -oxyethylaminobenzoic esters with halogenating agents, such as phosphorus or sulphur halides or thionyl chloride or bromide. Examples are given of the preparation of β -chloroethyl-*p*-aminobenzoic ethyl ester.

β -alkylaminoethylaminobenzoic esters of the formula $\text{R}^1\text{N.CH}_2\text{CH}_2\text{NHC}_6\text{H}_4\text{COOR}$ (R^1 = hydrogen or alkyl, R = alkyl) are prepared by heating the corresponding β -halogenethylaminobenzoic esters with alkylamines under pressure. An example is given of the preparation of diethylaminoethyl-*p*-aminobenzoic ethyl ester.

Electrolytic Chlorine. P. L. Hulin, Grenoble, France. British Patent, 126,992. Convention date, July 17, 1915.

Chlorine is separated from gaseous mixtures by absorption in a solution of a lower chloride such as ferrous chloride, or cuprous chloride, or a mixture of such chlorides, and by electrolysis the product, acidified by hydrochloric acid, to regenerate pure chlorine and the lower chloride for re-use. The chlorine obtained may be liquefied. The original gaseous mixture may be that obtained by the Deacon process, or by the electrolysis of fused chlorides of alkali and alkaline-earth metals. In the latter case it may be scrubbed with water to remove fumes, mainly chlorides, and then passed up one or more earthenware towers down which flows the absorbent solution. Each electrolytic cell, which may be of earthenware, is provided with a very porous partition, such as a sheet of asbestos, through which the solution passes from anode to cathode, overflowing from the cathode compartment. An electric pressure of about 2.5 volts per cell is employed. The initial absorbent solution may contain 30 per cent. of ferrous chloride, but after complete conversion to ferric chloride, only a part, say a third, of this salt is reduced by electrolysis, in order to avoid the production of iron and hydrogen.

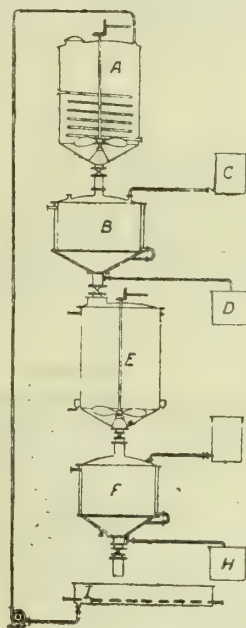
Catalytic Production of Ammonia. Nitrogen Corporation, Providence, Rhode Island, U.S.A. British Patent, 128,939. Convention date, June 25, 1918.

Ammonia is produced from its elements at comparatively low temperatures and under pressure by a nitrogenous catalyst, which may contain carbon, and which is employed under sufficient pressure to prevent the dissociation or decomposition of the catalyst during the process, but not under a pressure greatly exceeding this. The catalysts mentioned are the cyanamides of calcium, barium, strontium, copper, and silver, the nitrides of copper and silver, and paracyanogen. The catalysts should be prepared under a lower temperature and pressure than those used in the catalytic synthesis, and should be in a porous condition. Calcium cyanamide in suitable form is obtained by dissolving the commercial body in water, removing sulphur by silver nitrate, passing carbonic

acid through the filtered solution to produce free cyanamide, dissolving the crystallised free cyanamide in liquid ammonia, and adding metallic calcium; or hydrocyanic acid gas may be passed through a solution of calcium in liquid ammonia, forming calcium cyanide, which on heating in the catalytic apparatus in the nitrogen-hydrogen mixture blackens, and is apparently converted into calcium cyanide. Barium and strontium cyanamide are prepared by heating the pure cyanide in nitrogen or ammonia at about $350\text{--}400^\circ\text{C}$. Copper and silver cyanamides are prepared by reacting with cupric or silver chloride on a pure solution of calcium cyanamide, the precipitated product being carefully dried in small portions; or by preparing ammonium cyanamide by adding ammonium carbonate or oxalate to a solution of calcium cyanamide, filtering, and adding copper or silver chloride. Copper and silver cyanamides are converted into the nitrides, which are also catalysts, by heating to about 500°C . in nitrogen and hydrogen when hydrocyanic acid is evolved. Copper or silver cyanamide prepared as described above may be treated with a solution of calcium in liquid ammonia, and the ammonia expelled, the product being then heated to about $250\text{--}300^\circ\text{C}$, when a mixture of copper or silver and calcium cyanamides with free copper or silver is produced. Dry silver cyanide is heated to $200\text{--}300^\circ\text{C}$ to form a mixture of silver and paracyanogen. Paracyanogen may be used when otherwise prepared. Paracyanogen may be dissolved in sulphuric acid and introduced into pumice or other support, after which the support is treated with water to precipitate the paracyanogen and wash away the acid.

Ammonium and Sodium Sulphates. Soc. Industrielle de Produits Chimiques, Paris. British Patent, 128,895. Convention date, June 22, 1918.

The process described in the parent specification for treating the double salt $(\text{NH}_4)_2\text{SO}_4.\text{Na}_2\text{SO}_4.4\text{H}_2\text{O}$ prepared by the action of ammonia on sodium bisulphate by heating it with water to about 110°C . to separate anhydrous sodium sulphate, and, after filtering, cooling the mother liquor to separate ammonium sulphate, is carried out in the apparatus illustrated. A charge of the double salt, water, and a small quantity of ammonium sulphate is introduced into the vessel A, and is heated by a steam coil and agitated. When a temperature of $110\text{--}111^\circ$ is reached, the contents are passed into a filter B heated by a steam jacket. The mother liquor is passed into a vessel E, and is cooled to 62°C . Ammonium sulphate together with a small quantity of sodium sulphate crystallises and is separated in a filter F. The mother liquor is concentrated in an apparatus I, and is returned to the vessel A together with a quantity of the double salt and a small quantity of sodium sulphate sufficient to obtain a charge of the original composition. The sodium sulphate in the filter B is washed with a nearly boiling and saturated solution of sodium sulphate from a reservoir C. The wash-water passes either into the vessel E or into a reservoir D. The ammonium sulphate in filter F is washed with a solution of ammonia sulphate saturated at 60°C . The wash-water passes either into apparatus I or to a reservoir H.



Recovering Phenols. M. E. L. Ponchon, Ban-Saint-Martin, Lorraine. British Patent, 126,965. Convention date, May 10, 1918.

Phenol and its homologues, such as cresols, are recovered from gases, in which they occur in a gaseous or atomised state, by washing the gases with mineral, vegetable, or animal oils. The resulting solution is treated with a current of hot air, gas, or steam of $100\text{--}150^\circ\text{C}$, and the vapours of phenol, etc., so obtained are condensed and decanted if necessary. The process is applicable to the recovery of phenols that have been taken up in the separation of ether, alcohol, acetone, etc., from gases by washing with phenols.

FARADAY SOCIETY.—The offices of the Faraday Society have been removed from 82, Victoria Street, S.W., to 10, Essex Street, Strand, W.C.2. Mr. F. S. Spiers, B.Sc., remains secretary of the society.

PETROLEUM TECHNOLOGY.—A Department of Petroleum Technology, under Professor P. G. H. Boswell, has been instituted at the Liverpool University, the studies beginning with the next session.

MARKET REPORTS.

TAR AND AMMONIA PRODUCTS.

WEDNESDAY.

Benzole: London 90%, 1s. 10d. to 2s.; North, 1s. 8d. to 1s. 9d.; 50%, 1s. 10d.; North, 1s. 8d. to 1s. 9d. naked. Carbollic acid, crude, 60%, East and West Coast, nominally 1s. 7d. to 1s. 8d.; crystals, 39-40%, 9d. to 9½d., f.o.b. Crude tar, London, 45s. to 50s.; Midlands, 44s. to 46s.; North, 45s. per ton, ex works. Pitch 72s. 6d. to 75s.; East Coast, 67s. 6d. to 72s. 6d. f.o.b.; West Coast, 55s. to 57s. 6d., f.a.s. Solvent naphtha, naked, London, 90-100%, 2s. 5d.; North, 2s. 3d. to 2s. 4d.; 90-100%, naked, London, 2s. 5d.; North, 2s. 2d. to 2s. 3d. Crude naphtha naked, 30%, 9d.; North, 8d. to 8½d. Refined naphthaline, £16. to £18.; salts, £6. to £7. Toluol, naked, London, 2s. 6d.; North, 2s. 5d. Creosote, naked, London, 6½d.; North, 5½d. to 6d.; heavy oil, 6½d. Anthracene, 40-45%, 7d. per unit. Cresylic acid, 95%, 2s. 5d. to 2s. 6d.; 97-99%, 2s. 7d. to 2s. 8d., ex works, London, and f.o.b., other ports. Sulphate of ammonia; home trade, £19. 10s. per ton; basis 24½%. Nitrate of soda, £21. to £22.

FERTILISER MATERIALS.

LIVERPOOL, THURSDAY.

Nitrate of soda continues firm, the quotations on spot for 95-96% quality being £20. 2s. 6d. per ton, net cash, f.o.r., prompt delivery. East Indian bone meal is easier, and the nearest value is now £14. 5s. per ton, net cash, ex ship, Liverpool, for September-November shipment. On spot, holders require £15. per ton, net cash, for 41% and 45% quality. Mineral phosphates are without alteration, and values at present are only nominal. Dried blood is rather irregular, the nearest value being about 30s. per unit of ammonia per ton.

LONDON METAL MARKET.

THURSDAY.

Copper: Standard brands, £101. 10s. to £101. 15s. cash; £102. 10s. to £102. 15s., three months; electrolytic, £110. to £120. Tin: Standard, £278. 10s. to £279.; cash, £272. 10s. to £273., three months; Straits, £279. 10s.; English, £276. to £277. Lead: Soft foreign, £24. 15s.; English, £26. Spelter, £41.; hard, £30. to £32. Antimony, English regulus, 90%, £42. Aluminium, £150.; Nickel, £205. delivered, packages extra. Quicksilver, £23. 10s. to £24. Bismuth, 12s. 6d. Platinum, 442s. per oz. Wolfram, 30s. per unit.

SWANSEA MARKET REPORT.

THURSDAY.

Tinplate prices very firm at 36s. per box for standard sizes f.o.b. Copper maintains good inquiry at £100. 15s. per ton for prompt delivery and £101. 10s., three months. Tin firm at £275. 10s. cash and £268. 15s., three months. Lead steady with small business at £24. 17s. 6d. per ton for Spanish and £26. for English. Spelter firmer at £39. 15s. per ton prompt and an additional £1. for over November. Zinc sheets showed activity at £65. per ton f.o.b., at New York, with English at £64. 10s. Silver, 59d. per ounce. Quicksilver, £23. 10s. per bottle. Nickel, £205. per ton, including delivery London or equal. Aluminium, £150. Antimony remains nominal with English regulus 90% at £42. Sulphate of copper dull at £43. per ton. Sulphate of ammonia steady with delivery present month at £19. 10s. per ton. Nitrate of soda quiet and steady at 21s. 9d. per cwt. in bags. Seed oils quiet with scarcity of offers. Palm oil very firm with good inquiry. Lagos £92. 5s.; softs £92.; Benin £86. 10s.; and hards £84. per ton. Turpentine firm at £6. 11s. per cwt. Rape oil quiet at £5. 12s. per cwt. in casks. Arsenic very quiet with firm quotations round £50. per ton for white powdered in bags. f.o.b. Oxalic acid quiet at 1s. 2½d. per bottle. Pitch dear and scarce at 55s. per ton, ex ship.

MANCHESTER CHEMICAL MARKET.

THURSDAY.

Business continues brisk in nearly all branches of the trade, and values generally are well maintained. Small resale lots of 70% caustic soda are still available at £17., and refined bicarbonate of soda, bags, at £7. 10s. per ton, 58%. Alkali

is quiet at £6. 15s., ex store. Bleaching powder quiet at £15., softwoods, on rails; and £14. hardwoods, f.o.b. Chlorate of soda easy at 6½d. per lb. Potash 1s. per lb. Roasted saltcake, in bulk, firm at 60s. per ton, carriage paid. Borax is scarce, and high prices are asked for spot parcels. Recovered rock sulphur unchanged at £17., on rails. Sulphate of copper is still neglected for export, and price is only nominal at £43. per ton, f.o.b. Nitrite of soda is firm on the spot at £60., basis 100%, but parcels are offered much cheaper to arrive. Commercial hyposulphite of soda steady at £16. 10s. per ton. Phosphate of soda a shade dearer at £27. per ton. White powdered arsenic continues scarce, and spot lots of Cornish are realising £60. per ton. Yellow prussiate of potash is unaltered at 1s. 9d. per lb. Soda higher on the week at 7½d. per lb. Lead salts continue in steady request. White acetate at £81., brown £70., and nitrate £56. per ton. Acetate of soda only moving slowly at £52. per ton. Acetic acid unchanged. English brown acetate of lime firmly held for £11. per ton. Grey easy at £17. per ton. Demand for miscible and solvent wood naphtha is dull. Trade in green copperas is still on the quiet side, and stocks are increasing. Oxalic acid unaltered at 1s. 2½d. per lb.

LIVERPOOL CHEMICAL MARKET.

THURSDAY.

Inquiries for the heavier chemicals have come in rather freely, and have seemed to indicate the existence of a more settled feeling in the principal fields of consumption in the Northern counties. A very fair demand has again been experienced on export account. More inquiries have come to hand from European countries, and have helped to give a brighter aspect to the market. Bleaching powder has been more in request. Quotations are still £14. 10s. to £15. per ton free on rail or conveyance, in buyers' packages, and £17. per ton for export. Chloride of calcium has been in fair inquiry, and is £8. to £11. per ton, in casks, f.o.r. Caustic soda has been well inquired for, and is £24. per ton for 76%; £22. per ton, for 70 to 72%; and £19. per ton for 60 to 62%. Nitrate of soda has been in moderate demand, and is £20. 10s. to £21. 10s. per ton. Saltcake has sold more freely, and is £6. 10s. per ton in casks, f.o.b. Soda crystals have been in good request and are £5. per ton in 2cwt. bags f.o.r. at works. Bicarbonate of soda has been steadily inquired for and is £7. 5s. to £10. per ton, according to terms of delivery. Borax has again been in rather active demand, and scarce for early deliveries. It is £42. per ton for ordinary, and £44. per ton for powdered, in bags. Ammonia alkali has had a brisk inquiry and is £6. to £6. 5s. per ton, f.o.r. at works. Hypo-sulphite has been in fair request, and is £17. per ton for ordinary and £22. per ton for pea crystals. Sulphite of sodium has been but little called for and is £10. per ton for ordinary and £16. to £18. per ton for pea crystals in lewt. kegs. Bichromate of soda has been rather more in request and is 9d. per lb. Phosphate of soda has been in moderate demand, and is £25. per ton. Sulphide of sodium has been in somewhat better request, and is £20. per ton in casks and £22. per ton, in drums. Chlorate of potash has been quieter, and is 1s. 1d. to 1s. 3d. per lb. Permanganate of potash has sold more readily and is 3s. 3d. to 3s. 6d. per lb. Sulphate of potash has been little in request and is £40. per ton. Carbonate of potash has been in moderately active inquiry, and is £90. to £95. per ton for 80 to 85%. Caustic potash has sold with some freedom, and is £110. to £120. per ton. Nitrate of potash has been in very fair request, and is £55. to £60. per ton for refined and £40. per ton for ordinary. Canadian potashes have again been very quiet. Montreal, first quality are £210. to £220. per ton, and second quality, £190. to £210. per ton. Bichromate of potash has had a fair inquiry and is 1s. 6d. to 1s. 7d. per lb. Yellow prussiate of potash has been quiet and is 1s. 9d. to 1s. 10d. per lb. Sulphate of ammonia has been more inquired for and is £80. per ton for lump, £75. per ton for seconds, and £5. per ton extra for ground. Sulphate of ammonia has had a quietly steady sale and is £19. 10s. per ton, less traders' discount of 10s. per ton, free to nearest wharf or station;

to September 30. Prices for later dates have been fixed as follows:—October: £20. 10s. per ton; November, £20. 15s.; December, £21.; January, 1920, £21. 7s. 6d.; February, £21. 15s.; March and April, £22. per ton. Carbonate of ammonia has been rather more in request, and is 6½d. per lb. Muriate has been very quiet and is £50. to £60. per ton, according to quality. Magnesia has again been in very fair demand. Carbonate is £3. per cwt., and sulphate, £10. to £16. per ton, according to grade. Alum has been in good request, and is still in very limited supply for early deliveries. For the home trade, £18. 10s. per ton is still being asked, and, for export £18. 10s. to £19. 10s. per ton. Aluminoferric has been neglected, and is £8. 10s. to £12. per ton, according to quality. Sulphate of alumina has been rather more inquired for, and is £12. to £17. per ton, according to grade. Sulphur has been in fairly active demand. English kinds are: flowers, £32. per ton; roll, £28. per ton, and rock, £22. per ton, in bags, f.o.r. Sicilian grades are: flowers, £28. per ton; roll, £22. 10s. per ton; and rock, £17. 15s. per ton. Cream of tartar has been in very fair request and is £11. 10s. to £11. 15s. per cwt. Tartaric acid has been quieter, and is 3s. 1d. to 3s. 3d. per lb. Boracic acid has been in good request and is £72. per ton for crystals and £74. per ton for powdered. Oxalic acid has been in quietly steady request and is 1s. 3d. per lb. Citric acid has met with a fair inquiry and is 4s. 4d. per lb. White acetate of lead has been very quiet and is £85. to £90. per ton. Arsenic has been but little in request and the price is higher. It may be given as £55. per ton for white powdered. Sulphate of copper has again been very quiet and is £44. per ton, for agricultural purposes in the United Kingdom, and £43. per ton, less 5%, in casks, f.o.b. at Liverpool.

TYNE CHEMICAL REPORT.**TUESDAY.**

Trade continues very steady, with an increasing demand for caustic soda and bleaching powder for home markets. Prices show very little fluctuation. The inquiry for export is also showing signs of improvement. The following prices are per ton, net: Bleaching powder, softs and hards, £15.; caustic soda, 74-77%, £23. 5s.; do., 70%, £22.; do., 60%, £20.; recovered sulphur, 2cwt. bags, £24.; hyposulphite of soda, 5-7cwt. casks, £19.; 1cwt. kegs, £25.; sulphite of soda, 5-7cwt. casks, £12.; do., 1cwt. kegs, £20.; silicate of soda, 75° Tw., £9. 12s. 6d.; do., 100° Tw., £10.; do., 140° Tw., £10. 10s.; soda crystals, 2cwt. bags, £5.; sulphate of soda (saltcake), in bulk, £3. 10s.; pure white sulphate of alumina, 14-15%, £19. 10s.; blanc fixe, £22.; sulphide of sodium, crystals, £18.; do., refined concentrated solid, 60-62%, £25.; hydrate of barium, crystals, £56.

COALS.—Market continues very strong, and collieries are well booked up for September. The home demand and official requisition leave very limited quantities for oversea trade.

To-day's quotations: Best Northumbrian steam, 95s. to 100s. per ton; second qualities, 80s. to 90s.; Northumberland small coals, 75s. to 80s.; seconds, 70s.; best Durham steam coals, 90s. to 100s.; seconds, 80s. to 85s.; Durham gas coals, 80s. to 85s.; seconds, 65s. to 75s.; Durham bunkers, 70s. to 80s.; foundry coke, 85s. to 90s.; gas coke, 85s. to 90s.

WEST OF SCOTLAND CHEMICALS.**GLASGOW, Wednesday.**

During the past week there has been fairly good inquiry for all the different kinds of chemicals, and it is reported that a number of pretty big deals have been carried out. There are no changes worth recording in the general market conditions, and as far as prices are concerned, these are maintained at a steady level and without quotable variations on the previous range. Altogether the feeling of the market may be described as firm and steady, and with business on the upward grade. Current quotations: Arsenic, £55. per ton, net, Glasgow; bicarbonate of soda, £8. 15s. and £10. per ton for 6-8 casks and 1cwt. kegs, Liverpool; boracic acid crystals, English refined, £72. for 2cwt. bags, and borax crystals, £39. for 2cwt. bags, carriage paid; caustic soda, white, 70-72%, £24. per ton, net, Glasgow; chlorate of potash, 1s. 1d. per lb. net, Glasgow; chlorate of soda, £3. 4s. per cwt. net, Glasgow; citric acid, 4s. 4d. per lb. 5% Glasgow; cream of tartar 98% £11. 5s. per cwt. net, Glasgow; paraffin wax, U.K. deliveries 125°, 6½d. to 6¼d.; 121-3°, 5½d. to 5¼d.; 118-20°, 5¼d.; 110-12°, 4d. to 4¼d.; and 98-102°, 4d. to 4¼d.; salammonic, £80. and £75. per ton, net, any port, for first and second lump respectively; salammonic crystals, £85. per ton, net, Glasgow; salepetre, £3. 4s. net, Glasgow; tartaric acid, 3s. 1d. per lb., 5% Glasgow.

Among the sea oils, quantities of all the different varieties have once again been available, although in some cases not sufficiently so to supply the demand. Whale oils have been more in the forefront, with the pale, brown, and black all on offer, but yellow has still been an absentee. Pale has been selling at 102s., brown at 76s., while black has gone down in value from 78s. to its present quotation of 74s. Newfoundland cod has also again come on offer at 79s., while a noticeable change in market conditions has been that both pale seal and Menhaden have again been purchasable, the former at 96s. and the latter at 86s. Quality generally is satisfactory, and demand all round is fairly steady.

In the Scottish coal trade outputs are still poor, and demands for all purposes very strong, with the result that the collieries are far behind with their orders, and all classes of material are extremely scarce. For local requirements there is no easing-off in the demands, and consequently the greater portion of the outputs is being taken up to fulfil these requirements. In the export branch of the trade, only very limited quantities are being exported.

IMPORTS OF CHEMICAL PRODUCTS**AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.****BRISTOL.***Publication of Official Returns Suspended.***GLASGOW.***Week ending August 30.***ACETIC ACID—**

Philadelphia, 27 brls.

BARYTES—

New York, 639 brls.; Philadelphia, 429 brls.

COPPER PRECIPITATE—

Lisbon and Huelva, 520 cks.

DEXTRINE—

Los Angeles, 1,340 bgs.

DYESTUFFS—

Chestnut Tanning Extract

New York, 200 brls.

FISH OIL—

New York, 500 brls.

GLUE—

New York, 200 cks.

IRON PYRITES—

Lisbon and Huelva, 3,400 t.

LEAD CARBONATE—

New York, 640 lbs.

LITHOPONE—

New York, 672 brls.

MINERAL WHITE—

Genoa and Leghorn, 900 bgs.

PARAFFIN WAX—

New York, 746 brls.

PITCH—

New York, 60 brls.

ROSIN—

Lisbon and Huelva, 118 brls.

New York, 1,000 brls.

SOAP—

New York, 150 cs.

SODA (CALCINED)—

Rouen, 57 drms.

TAR (WOOD)

Gothenburg, 85 brls.

ZINC OXIDE—

New York, 320 brls.

GOOLE.*Week ending August 30.***NIL.****GRANGEMOUTH.***Week ending August 30.***MAGNESITE—**

Christiania, 508 bgs.

GRIMSBY.*Week ending August 30.***NIL.****HULL.***Week ending August 30.***ACID—**

New York, 350 brls.

BENZINE—

Rotterdam, 280,000 galls.

CARBON BLACK—

New York, 200 cs.

CHEMICALS (otherwise undscribed)

New York, 75 brls.

CREAM OF TARTAR—

Rotterdam, 20 brls.

METHYL ALCOHOL—

New York, 10 drms.

PITCH—

Gothenburg, 10 cks.

ROSIN—

New York, 500 brls.; Rotterdam, 30 cks.

SODIUM NITRATE—

Dunkirk, 45 cks.

TALLOW—

Melbourne, 292 cks.

TAR—

Gothenburg, 10 brls.; Ljusne, 100 brls.

TAR OIL—

Gothenburg, 6 cks.

TURPENTINE—

Gothenburg, 35 cks.; Rotterdam, 218,818 galls.

WAX—

Gothenburg, 4 cs.

ZINC ASH—

Stockholm, 602 cks.

LEITH.*Week ending August 30.***NIL.****LIVERPOOL.***Week ending August 30.***BEES WAX—**

Montreal, 28 cs.

CARBON BLACK
Boston, 20 cs.

CARNAUBA WAX
Maranhão, 31 bgs.; Parnahyba, 181 bgs.

DYESTUFFS

Argols
Messina, 237 bgs.
Bark Extract
Baltimore, 210 brls.
Chestnut Tanning Extract
New York, 427 brls.
Cutch
Rangoon, 1,450 bxs.
Logwood Extract
Kingston, 1,258 cks.
Myrabolans
Calcutta, 980 bgs., 8,561 pkts.
Sumac
Palermo, 1,770 bgs.
Tanning Extract
Norfolk, Va., 12,380 brls.
Tartars
Messina, 20 cks.

FISH OIL—

Baltimore, 500 brls.

GLUE

Bordeaux, 8 brls.

IRON PYRITES

Seville, 1,238 t.

LITHOPONE

New York, 1,000 brls.

ONIDE (FINE)

New York, 500 brls.

PARAFFIN WAX

Rangoon, 6,400 bgs.

PETROLEUM WAX

Baltimore, 1,897 brls.

PITCH

New Orleans, 5,147 pes.

POTASSIUM MURIATE

Rotterdam, 2,500 bgs.

ROSIN

Bordeaux, 1,070 cks.; Galveston, 7,219 brls.; New Orleans, 1,031 brls.

SALTPETRE—

Calcutta, 1,000 bgs.

SILICO MANGANESE

Bordeaux, 116 cks.

SOAP—

Catania, 99 cs.

SULPHUR

Giardini, 750 bgs.

SULPHUR OIL

Palermo, 200 brls.

TALLOW

Buenos Ayres, 2,726 cks., 303 tes.; Montreal, 60 tes.; South Georgia, 162 tes.

TAR (PINE)

New Orleans, 300 brls.

TARTARIC ACID

Palermo, 40 cks.

WAX

New York, 105 brls.

ZINC OXIDE
Rotterdam, 13 cs.

LONDON.

Week ending August 30.

ACETIC ACID
U.S.A., 53 pkgs.

ARGON GAS
U.S.A., £806.

BARYTES
Spain, 200 bgs., 90 brls.; U.S.A., 925 cks.

BEES WAX
British India, 81 brls., 50 bgs., 20 cs.; B.W.I., 2 cs.; China, 126 cs.; Port E. Africa, 46 brls.; U.S.A., 2 bxs.

BORIC ACID
U.S.A., £2,171.

CAMPHOR
Japan, 330 cs.

CARBON BLACK
U.S.A., 44 cs.

CARBON TETRACHLORIDE—
U.S.A., £91.

CHLOROPHYLLE—
France, £686.

CITRATE OF LIME
British Guiana, 43 pkgs.; Italy, 18 pkgs.

CITRIC ACID
British Guiana, 51 pkgs.; Italy, 116 pkgs.

COBALT OXIDE
Canada, 24 brls.

CREAM OF TARTAR—
Italy, 83 pkgs.

DYESTUFFS

Aniline Dye
Switzerland, 109 pkgs.

Annatto

France, 3 pkgs.

Cochineal

Canary Islands, 11 pkgs.

Indigo

India, 52 chts.

Mimosa Extract

Natal, 90 t.

Myrabolans

India, 210 pkgs.

Sumac

Italy, 1,300 pkgs.

Tanner's Bark

Belgium, 22 t.; Natal, 83 t.

Tartars

France, 52 cks.

Turmeric

India, 121 pkgs.

FISH OIL—
Azores, 48 brls.; Cape, 1,191 drms.; Japan, 430 cs.

FORMALDEHYDE
U.S.A., £2,500.

GALLIC ACID
Canada, £146.

GELATINE
France, £771.

GLUE
Belgium, £2,910; France, £910.; U.S.A., £583.

GLYCERINE
Brazil, £30.

LACTIC ACID—
Canada, £284.

LITHIUM CARBONATE—
Canada, £177.

LITHOPONE
Holland, 120 cks.

MANGANESE PEROXIDE
Italy, £130.

NAPHTHALENE
India, 2,380 pkgs.

PARAFFIN SCALE
U.S.A., 100 t., 8 c.

PARAFFIN WAX
British India, 265 t.; U.S.A., 552 t. 19 c.

PIHTHALIC ANHYDRIDE—
U.S.A., £256.

PITCH
Norway, 509 brls.

PLUMBAGO
Canada, 112 brls.

PYROGALLIC ACID—
Canada, £28.

QUININE
Holland, 7,680 ozs.

ROSIN
France, 100 cks.

SOAP—
Italy, £1,057.; U.S.A., £11,529.

SODIUM BICHRIMATE
U.S.A., 10 t. 3 c.

SODIUM PHOSPHATE—
Belgium, 20 t.

SULPHON METHANE
Canada, £616.

SULPHONAL TRIONAL
Canada, £616.

SULPHUR
U.S.A., £65.

TALLOW—
Argentine Rep., 118 t. 9 c.; N.S.W., 503 t. 10 c.; N.Z., 549 t. 14 c.; Queensland, 127 t. 6 c.; Victoria, 58 t. 14 c.

TARTAR CRYSTALS—
Italy, £1,185.

TARTARIC ACID—
Italy, 240 pkgs.

THIOBROMINE
Holland, £80.

TURPENTINE
Belgium, 723 brls.; U.S.A., 3,000 brls.

ULTRAMARINE
France, 50 cs.

WAX
U.S.A., 50 kgs.

WHITE LEAD
Canada, 32 cks.

ZINC OXIDE
France, 40 brls.; Holland, 625 cks.; U.S.A., 6,832 brls.

ZINC PIGMENT—
U.S.A., 320 brls.

MANCHESTER.

Week ending August 30.

CARBIDE (otherwise undescribed)—
Quebec, 10,350 drms.

DENTRINE
New York, 1,746 bgs.

DYESTUFFS

Dye-wood Extract

New York, 29 brls.

FERRO SILICON—
Quebec, 1,551 brls.

LITHOPONE
Rotterdam, 600 cks.

OXALIC ACID
Rotterdam, 15 cks.

PARAFFIN SCALE—
New York, 3,049 brls.

PHOSPHATE OF LIME—
Philadelphia, 136 brls.

PHOSPHORUS
Quebec, 500 cs.

ROSIN—
Galveston, 1,500 brls.

SOAP—
Philadelphia, 205 bxs.

SODIUM ACETATE—
New York, 45 kgs.

TARTAR EMETIC—
Rouen, 6 cks.

ZINC OXIDE
Rotterdam, 10 cks.

MIDDLESBROUGH.

Week ending August 30.

NIL.

NEWCASTLE-ON-TYNE

Week ending August 30.

TAR
Gothenburg, 665 brls.

N. & S. SHIELDS.

Week ending August 30.

NIL.

STOCKTON-ON-TEES.

Week ending August 30.

NIL.

SWANSEA.

Week ending August 23.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

GLASGOW.

Week ending August 30.

CHEMICALS (otherwise undescribed)
Antwerp, 79 t. 13 c.; Bombay, 1 t. 19 c.; Busch, 1 t.; Genoa, 7 t. 12 c.; Rouen, 10 t.

CHLOROFORM
Bombay, £120.

CHROME ORE
Antwerp, 2 t. 19 c.

COAL PRODUCTS (otherwise undes.)
Abo, £101.; Bombay, £59.; Calcutta, £66.; Helsingfors, £737.

DYESTUFFS (otherwise undescribed)
Antwerp, 158 t. 2 c.; Genoa, 5 t.

GELATINE

New York, 1 t. 10 c.

LEAD NITRATE—
Rouen, 5 t. 3 c.

PARAFFIN WAX
Genoa, 51 t. 3 c.; Rouen, 26 t. 8 c.

SOAP
Antwerp, 100 bxs.; Busch, 2,271 cs.; Rouen, 5 bxs.

SODA ASH
Genoa, 75 t.

SODIUM BICARBONATE—
Helsingfors, 3 t. 1 c.

GOOLE.

Week ending August 30.

NIL.

GRANGEMOUTH.

Week ending August 30.

AMMONIUM CARBONATE—
Christiania, 30 kgs.

BASIC SLAG—
Christiania, 10 t.; Skien, 250 t.

DYESTUFFS

Tanning Extract

Christiania, 25 cks.

Naphthalene

Christiania, 9 drms.

PARAFFIN WAX—

Nantes, 9 t. 16 c.

PHOSPHATE

Christiania, 1 kg.

SODA ASH

Rotterdam, 12 t.

SODIUM BICHRIMATE

Nantes, 30 t. 6 c.

GRIMSBY.

Week ending August 23.

NIL.

HULL.

Week ending August 26.

ALA MINOFERRIC
Christiania, 438 lbs.

BLEACHING POWDER—
Bergen, 14 cks.

BORAX—
Newfairwater, 1 ck.

CARBIDE—
Newfairwater, 1 cs.

CARBONATE OF LIME—
Rotterdam, 12 cks.

CAUSTIC SODA—
Malmo, 222 drms.

CHEMICALS (*otherwise undescribed*)

Newfairwater, 18 cks.; Rotterdam, 6 drms., 12 cks.; Stockholm, 4 cs., 8 cks., 1 bx., 3 brls.; Seville, 7 bgs., 1 cs.; Stavanger, 36 crbys.; Trondhjem, 37 cs., 33 cks., 5 drms.

COAL PRODUCTS—

Disinfectants
Lisbon, 2,500 drms.
Naphthalene
Calais, 49 drms.

DYESTUFFS (*otherwise undescribed*)
Copenhagen, 24 cs.

GLUE—

Amsterdam, 1 cs.; Antwerp, 20 bgs.; Bergen, 33 brls.; Copenhagen, 10 bgs.; Christiania, 60 bgs.; Gothenburg, 1 brl., 45 bxs.

MANGANESE ORE—

Antwerp, 255 t.

PITCH—

Antwerp, 164 t.

SOAP—

Antwerp, 170 cs., 278 bxs.; Copenhagen, 1 cs.; Christiania, 240 kgs.; Newfairwater, 1,233 cs.; Stockholm, 144 cs.

SODA—

Amsterdam, 497 bgs.; Calais, 335 bgs.; Stockholm, 2 drms.

TALLOW—

Amsterdam, 10 cs.

TAR—

Aalesund, 2 drms., 1 cs.; Stockholm, 5 brls.

TURPENTINE—

Antwerp, 60 brls.

LEITH.

Week ending August 30.

AMMONIUM SULPHATE

Kobe, 2,454 t. 13 c., £57,387.; Yokohama, 508 t. 3 c., £12,193.

BITUMEN—

Copenhagen, 3 qrs., 15s.

BORIC ACID—

Yokohama, 10 t. 4 c., £720.

COAL PRODUCTS—

Carbolic Acid
Copenhagen, 4 t. 7 c., £110.

POTASSIUM BICARBONATE—

Copenhagen, 16 c., £125.

SODIUM BICARBONATE—

Copenhagen, 5 t. 13 c., £80.

LIVERPOOL.

Week ending August 28.

ACETIC ACID—

Calcutta, 1 c., £10.

ALUM

Bordeaux, 7 t. 8 c., £129.; Calcutta, 25 t. 2 c., £361.; Fammersford, 5 t., £590.; Helsingfors, 20 t. 1 c., £350.; Natal, 5 c., £6.; Soerabaya, 5 t. 18 c., £102.

ALUM (CHROME)—

Tamersfors, 22 cks.

ALUMINO-FERRIC—

Helsingfors, 50 t., £500.; Karachi, 49 t. 17 c., £400.

AMMONIA—

Bonny, 1 qr., £4.; Elmina, 1 c., £4.

AMMONIUM CARBONATE

Bombay, 1 t. 10 c., £125.; Bordeaux, 3 t., £202.; Colombo, 1 c., £2.; Lagos, 2 c., £11.

AMMONIUM MURIATE

Amsterdam, 2 t. 2 c., £106.; Antwerp, 4 t. 16 c., £212.; Hamilton (Ont.), 5 t. 3 c., £188.; Rotterdam, 18 c., £50.

ANILINE SALTS—

Alexandria, 5 t., £680.; Constantinople, 12 c., £80.; Smyrna, 3 t., £410.

ANTIMONY SULPHIDE—

Bordeaux, 9 t. 3 c., £1,171.

BARIUM SULPHIDE—

Bordeaux, 4 c., £4.

BLEACHING POWDER—

Antwerp, 2 t. 2 c., £38.; Calcutta, 23 t. 10 c., £395.; Lisbon, 6 t. 12 c., £88.; Napier, 1 c., £1.; Rouen, 20 t., £237.

BORAX—

Antwerp, 31 t. 4 c., £1,317.; Christchurch, 1 t., £40.; Dunedin, 1 t., £40.; Dunkirk, 5 t., £250.; St. Johns, 2 t., £224.; St. Croix, 1 c., £2.; Wellington, 15 c., £31.

BORIC ACID

Christchurch, 2 t. 4 c., £162.; Dunedin, 5 c., £19.; Lagos, 2 c., £17.; Sydney, 3 c., £13.

CALCIUM CHLORIDE

Bordeaux, 25 t. 1 c., £172.; Calcutta, 16 t., £110.; Cape Town, 10 t. 1 c., £75.

CARBONIL

Pt. Elizabeth, 9 t. 19 c., £100.

CAUSTIC SODA

Auckland, 10 drms.; Brisbane, 15 pgs.; Constantinople, 40 drms.; Dunedin, 10 cks.; Durban, 13 drms.; Fremantle, 135 pgs.; Greyouth, 10 cks.; Helsingfors, 72 drms.; Lytleton, 18 pgs.; Melbourne, 469 pgs.; Monrovia, 10 drms.; Napier, 36 cks.; Passages, 6 pgs.; Piraeus, 540 drms.; Pt. Stanley, 80 pgs.; Puerto Cabello, 50 pgs.; Rio de Janeiro, 100 drms.; Shanghai, 874 drms.; Sydney, 177 drms.; Wellington, 130 drms.

CHEMICALS (*otherwise undescribed*)

Lagos, 3 c., £51.; Piraeus, 6 c., £340.; Rouen, 5 t. 11 c., £151.

CHINA CLAY—

Calcutta, 224 cks.

CHLORIDE OF LIME

Hong Kong, 13 c., £26.

CHLOROFORM

Bonny, 20 lb., £4.

COAL PRODUCTS—

Carbolic Acid
Beira, 2 c., £10.; Kobe, 47 t. 9 c., £2,111.

Cresote Oil

Lisbon, 89 t., £680.

Dyes

Barcelona, 7 c., £141.; Boston, 8 t. 4 c., £4,312.; Bombay, 4 t. 1 c., £1,835.; Havre, 9 c., £235.

Naphthalene

Aden, 25 t. 3 c., £187.; Demerara, 3 c., £5.; Daressalaam, 5 t., £112.

Tar

Accra, 14 t. 9 c., £209.; Adjuah, 8 c., £3.; Appam, 2 t. 10 c., £11.; Bathurst, 10 c., £8.; Calabar, 8 c., £3.; Cape Coast, 18 c., £11.; Elmina, 1 t., £5.; Koforidua, 1 t. 5 c., £7.; Koko, 8 c., £3.; Lisbon, 21 t., £140.; Nsawan, 1 t. 5 c., £14.; Sassandra, 1 t. 2 c., £8.; Secondee, 1 t. 2 c., £11.; Warri, 2 c., £2.; Winnebuh, 1 t. 6 c., £16.

CREAM OF TARTAR

Montreal, 8 t. 13 c., £895.

CREOLINE

Puerto Barrios, 8 c., £27.

CRYOLITE

Sydney, 19 c., £25.

DISINFECTANTS (*otherwise undes.*)

Accra, 2 c., £8.; Bonny, 1 c., £2.; Calabar, 1 c., £2.; Calcutta, 6 t. 2 c., £252.; Cape Coast, 3 c., £7.; Cape Town, 4 t. 16 c., £76.; Chinde, 4 c., £23.; Chittagong, 10 c., £23.; Delagoa Bay, 2 t. 5 c., £94.; Durban, 4 t. 9 c., £187.; Elmina, 3 c., £13.; Lagos, 10 c., £13.; Mombasa, 2 t. 6 c., £138.; St. Johns, 2 c., £15.; St. Louis, 5 c., £9.; Tarkwa, 1 c., £1.

DYESTUFFS

Aniline Dye
Adelaide, 60 lbs., £115.; Constantinople, 1 c., £26.; Monte Video, 7 lbs., £8.; Piraeus, 8 t. 13 c., £1,004.; Smyrna, 1 t. 6 c., £366.; Saigon, 1 t. 16 c., £280.; Samarang, 1 t. 10 c., £192.; Tamerfors, 6 c., £110.

FERRO MANGANESE

Bilbao, 10 t.; Helsingfors, 20 t.

FULLER'S EARTH

New Orleans, 284 t.

GLUE

Kobe, 100 pgs.; Norekoping, 20 pgs.; Valencia, 20 pgs.; Vigo, 200 pgs.

GLUE, SIZE, AND GELATINE—

Bilbao, 10 pgs.; Bombay, 42 pgs.; Bordeaux, 4 pgs.; Boston, 25 pgs.; Constantinople, 20 pgs.; Lisbon, 20 pgs.; Montreal, 20 pgs.; Nantes, 11 pgs.; New York, 1 pgs.; Punta Arenas, 6 pgs.; Shanghai, 360 pgs.; Sierra Leone, 2 pgs.

GLYCERINE—

Cape Town, 10 c., £60.; Yokohama, 270 pgs.

IRON AND AMMONIUM CITRATE

Bordeaux, 1 c., £25.

IRON AND AMMONIUM OXALATE

Bordeaux, 65 lbs., £10.

LEAD ACETATE

Durban, 6 c., £20.

MAGNESIA (CALCINED)

Lisbon, 5 t., £128.

MAGNESIUM CHLORIDE

Bombay, 36 t. 14 c., £486.; Lisbon, 5 t. 3 c., £93.

MAGNESIUM SULPHATE

Axim, 3 c., £7.

METANILIC ACID

Piraeus, 9 c., £179.

MURIATIC ACID

Antwerp, 2 t., £10.; Zanzibar, 5 c., £12.

NICKEL SALTS

Gothenburg, 2 t. 19 c., £161.

NITRIC ACID

Calcutta, 7 c., £36.; Zanzibar, 3 c., £11.

PHOSPHORUS (AMORPHOUS)

Kobe, 10 t. 7 c., £2,875.

PITCH

Accra, 16 c., £5.

POTASSIUM BICARBONATE

Antwerp, 1 t. 1 c., £190.; Buenos Ayres, 10 c., £81.; Marseilles, 14 c., £115.

POTASSIUM CARBONATE

Bombay, 1 c., £7.

POTASSIUM PRUSSATE

Piraeus, 1 c., £12.

ROSIN

Abo, 30 brls.; Rangoon, 10 cks.

SALAMMONIAC

Antwerp, 9 c., £34.; Bombay, 5 t. 2 c., £362.; Constantinople, 3 t., £230.; Lisbon, 10 c., £37.; New York, 5 t. 1 c., £198.

SALT

Bakama, 20 t.; Gothenburg, 200 t.; Pt. Harcourt, 20 t.

SAUCE

Sao Paulo, 500 dble. bgs.

SALT-PETRE—

Accra, 3 c., £15.

SHEEP DIP

Algoa Bay, 6 t. 19 c., £381.; Cape Town, 5 t. 1 c., £265.; Christchurch, 2 t. 16 c., £105.; Delagoa Bay, 30 t. 18 c., £1,594.; Durban, 6 t. 4 c., £122.; East London, 11 t. 7 c., £658.; Kingston, 1 c., £2.; Natal, 9 t. 8 c., £350.; Wellington, 9 t. 5 c., £350.

SOAP

Accra, 4 cs.; Antofagasta, 175 cs.; Antwerp, 3,822 bxs.; Batavia, 1,340 bxs.; Bangkok, 800 pgs.; Barbados, 3,900 pgs.; Bilbao, 50 bxs.; Bombay, 3,977 bxs.; Benghazi, 155 pgs.; Calcutta, 1,443 bxs.; Copenhagen, 1,073 bxs.; Colombo, 87 cs.; Curacao, 1,000 cs.; Colon, 1,000 cs.; Dakar, 680 cs.; Dominica, 28 cs.; Fiume, 1,220 cs.; Freetown, 2 cs.; Galatz, 376 cs.; Genoa, 2,575 cs., 4,881 bxs.; Georgetown, 6 cs.; Gibraltar, 635 bxs., 295 cs.; Gothenburg, 552 cs.; Grenada, 100 cs.;

Guadeloupe, 1,500 cs.; Havana, 3,729 cs.; Havre, 621 cs.; Iquitos, 328 bxs.; Jeddah, 100 cs.; Kingston, 500 pgs., 640 bxs.; Karachi, 44 cs.; Lagos, 10 bxs.; Larnaca, 130 bxs.; Las Palmas, 106 pgs.; Malta, 117 cs.; Martinique, 509 cs., 300 bxs., 250 pgs.; Maracaibo, 1 cs.; Messina, 25 bxs., 44 pgs.; Manaus, 2,854 bxs.; Naples, 180 pgs.; Oporto, 13 pgs.; Oran, 1,770 pgs.; Panama, 425 pgs.; Paphos, 75 pgs.; Paranaguá, 3 pgs.; Piraeus, 51 bxs.; Port Said, 50 pgs.; Port Stanley, 50 bxs.; Puerto Barrios, 462 pgs.; Quituh, 30 pgs.; Rosario, 450 pgs.; St. Kitts, 6 cs.; St. Louis, 75 cs.; St. Lucia, 50 cs.; Samarang, 1,275 bxs.; Santa Cruz, 196 pgs.; Salonica, 60 pgs.; Santander, 2 bxs.; Segli, 90 bxs.; Siboga, 1 cs.; Sekondi, 323 bxs.; Sierra Leone, 14 bxs.; Smyrna, 260 bxs.; Sourabaya, 363 bxs.; Upsala, 120 pgs.; Valencia, 22 pgs.; Venice, 593 pgs.; Winnebuh, 16 bxs.

SODA ASH

Abo, 823 pgs.; Antwerp, 300 pgs.; Calcutta, 3,695 pgs.; Durban, 335 pgs.; Fremantle, 25 pgs.; Helsingfors, 301 pgs.; Hong Kong, 9,917 pgs.; Shanghai, 3,276 pgs.; Sierra Leone, 2 pgs.; Yokohama, 3,403 pgs.

SODA CRYSTALS

Fremantle, 10 pgs.; Pt. Stanley, 20 pgs.; Rosario, 500 pgs.; Salonica, 20 pgs.; Sierra Leone, 1 pgs.; Trieste, 100 pgs.

SODIUM BICARBONATE

Antwerp, 250 pgs.; Helsingfors, 314 pgs.; Hong Kong, 252 pgs.; Palermo, 80 pgs.; Pt. Sudan, 50 pgs.; Pelotas, 100 pgs.; Pt. Stanley, 4 pgs.; Pt. Swettenham, 40 pgs.; Rockhampton, 260 pgs.; San Juan, 1 pgs.; Tuticora, 1,000 pgs.; Wellington, 174 pgs.

SODIUM SILICATE

Bombay, 15 pgs.; Cape Town, 22 pgs.; Calcutta, 65 pgs.; Shanghai, 258 pgs.; Wellington, 26 pgs.

SULPHURIC ACID—

Calcutta, 10 c., £29.; Pt. Sudan, 3 c., £10.; Zanzibar, 4 c., £8.

SUPERPHOSPHATE—

Demerara, 116 t.

STEARINE

La Libertad, 10 pgs.

TALLOW

Helsingfors, 148 t.; Madras, 6 pgs.; Sekondi, 2 cks.

TARTARIC ACID—

Montreal, 3 t., £990.

WAX—

Antwerp, 96 bgs.; Bordeaux, 3 cts.; Kingston, 4 pgs.

WOOD ACID—

Colombo, 19 c., £6.

WOOD PRESERVATIVE

Chinde, 1 t. 5 c., £35.; Delagoa Bay, 1 t., £29.

WOOD TAR

Colombo, 1 t., £8.

ZINC CHLORIDE

Batavia, 5 t., £267.

ZINC SULPHATE

Hong Kong, 5 c., £7.

LONDON.

Week ending August 27.

ACETANILID—

Brisbane (F.), 1 cs. (pt.), £7.; Durban (F.), 3 cs. (pt.), £5.

ACETATE OF LIME

Rotterdam, 90 bgs., £171.

ACETIC ACID—

Jesseltown, 6 cks., £88.; Paris (F.), 15 cks., £192.; Sydney, 10 cks., £39.

ACETO SALICYLIC ACID

Amsterdam (F.), 2 kgs., £55;
Brisbane 1 cs. (pt.), £30;
Barcelona, 1 cs., £12.; Bombay,
1 cs. (pt.), £8.; Rotterdam,
3 cs. (pt.), £310.; Sydney (F.),
1 cs., £22.

ACETONE

Antwerp, 1 drm., £35.; Copen-
hagen (F.), 3 drms., £97.;
Rotterdam, 7 drms., £248.

AMMONIA

Barbados, 5 cs., £7.; Beira, 13
cs., £25.; Bilbao, 2 drms., £34.;
Bombay, 10 cs., £20.; Bordeaux,
23 drms., £234.; Buenos Ayres,
20 drms., £70.; Calcutta, 5 cs.,
£10.; Durban, 6 cs., £12.;
East London, 4 cs., £8.; Karachi,
4 cs., £8.; Lisbon, 21 cs., £52.;
Oporto, 50 drms., £40.; Paris,
76 drms., £652.; Port Elizabeth,
8 pkgs., £16.; St. Michaels,
1 cs., £5.; Sarawak, 1 cyl.,
£24.; Shanghai, 4 cs., £9.;
Titinidad, 4 cs., £8.

AMMONIA (ANHYDROUS)

Antwerp, 13 cys., £114.

AMMONIUM BROMIDE

Antwerp, 4 cs., £116.; Genoa
(F.), 3 cs., £43.

AMMONIUM CARBONATE

Calcutta, 9 c., £25.; Cape Town,
2 c., £9.; Constantinople, 2 c.,
£11.; Hioogo, 10 t., £607.; Rotter-
dam, 4 t., £304.; Tokio, 5 t.,
£303.

AMMONIUM CHLORIDE

Canton, 1 cs., £8.

AMMONIUM FLUORIDE

Lisbon, 1 cs., £13.

AMMONIUM MURIATE

Athens, 5 c., £22.; Beira, 1 c.,
£5.; Constantinople, 6 c., £35.;
Bombay, 1 t. 13 c., £108.;
Melbourne, 6 c., £25.; Perth,
1 t. 4 c., £52.

AMMONIUM NITRATE

Antwerp, 25 t. 1 c., £880.

AMMONIUM PHOSPHATE

Bordeaux, 2 t. 10 c., £85.

AMMONIUM SULPHATE

Dunkirk, 309 t. 1 c., £6,805.

AMYL ACETATE

Buenos Ayres, 1 cs., £7.; Rotter-
dam, 6 drms., £560.

ANTIMONY

Novorossisk, 1 t.

ANTIMONY REGULUS

Amsterdam, 10 t.; Antwerp,
5 t. 10 c.

ANTIMONY SALTS

Amsterdam (F.), 1 brl., £92.

ANTIMONY SULPHIDE

Antwerp, 6 cks., £255.; Dunkirk,
3 cks., £61.; Naples, 6 cks., £90.;
Valparaiso, 2 cks., £43.; Yoko-
hama, 14 cks., £459.

ARSENIC

Penang, 4 c., £9.; Piraeus, 12 c.,
£51.; Rangoon, 1 c., £8.;
Salonika, 4 c., £11.; Sao Paulo,
5 t. 17 c., £312.; Valencia, 2 t.,
£70.

BARIUM BINOXIDE

Melbourne, 40 drms., £600.

BEES WAX

Amsterdam, 6 t. 17 c.

BENZALDEHYDE

Barcelona, 1 cs., £22.

BENZOIC ACID

Calcutta, 2 cks. (pt.), £36.;
Melbourne, 1 ck. (pt.), £8.

BENZYL CHLORIDE

Rotterdam, 1 ck., £11.

BISMUTH CARBONATE

Buenos Ayres, 1 cs. (pt.), £11.;
Durban, 1 cs. (pt.), £32.

BISMUTH SALICYLATE

Bilbao, 1 cs. (pt.), £8.; Buenos
Ayres, 1 cs. (pt.), £20.; Calcutta,
1 cs. (pt.), £38.

BISMUTH SUBNITRATE

Monte Video, 1 cs. (pt.), £10.

BORAX

Amsterdam, 4 t. 19 c., £190.;
Delagoa Bay, 2 c., £9.; Madras,
2 t. 10 c., £98.; Ostend, 9 t. 17 c.,
£384.; Rangoon, 2 c., £6.;
Salonika, 10 c., £20.

BORIC ACID

Cape Town, 1 c., £5.; Cartagena
Col., 1 c., £7.; Constantinople,
3 c., £15.; Durban, 2 c., £11.;
Hasingen, 6 c., £33.; Paris, 5 t.,
£370.; Piraeus, 2 c., £11.;
Shanghai, 20 t., £1,480.

CABLE WAX

Antwerp, 3 t. 4 c.

CALCIUM CARBONATE

Cape Town, 9 t. 16 c., £244.;
Pt. Elizabeth, 4 t. 18 c., £121.

CALCIUM CHLORIDE

Alexandria, 2 cs., £11.

CALCIUM GLYCEROPHOSPHATE

Christiania, 1 cs. (pt.), £31.

CALCIUM HYPOPHOSPHITE

Genoa, 5 cs. (pt.), £45.

CALCIUM LACTATE

Lisbon, 1 cs. (pt.), £5.

CARBON BISULPHIDE

Antwerp, 10 cs., £40.; Sydney,
20 cks., £59.

CARBON TETRACHLORIDE

Antwerp, 2 drms., £15.

CARNAUBA WAX

Amsterdam, 1 t. 1 c.; Genoa,
1 t. 1 c.

CAUSTIC POTASH

Bombay, 1 cs. (pt.), £14.;
Rangoon, 1 cs., £14.

CERESINE WAX

Abo, 1 t.; Antwerp, 24 t. 5 c.;
Amsterdam, 4 c.; Bordeaux, 6 c.;
Paris, 5 c.; Rotterdam, 61 t.

CHEMICALS (otherwise undescribed)

Barcelona, 2 cs. (pt.), £32.;
Bilbao, 3 pkgs., £454.; Brussels,
1 cs. (pt.), £7.; Buenos Ayres,
1 cs. (pt.), £14.; Calcutta, 7 cs.,
£129.; Cape Town, 3 cs., £99.;
Canterbury, 1 cs., £8.; Dunedin,
13 pkgs., £88.; Durban, 19 pkgs.
(F.), £152.; Durban, 5 cs., £17.;
Genoa, 21 pkgs., £102.; Lagos,
2 cs. (pt.), £13.; Leghorn, 1 cs.,
£28.; Lisbon, 3 cs., £101.;
Madras, 2 cs., £20.; Melbourne,
9 cs., £137.; Montreal, 3 cs.,
£175.; New York, 1 cs. (pt.),
£52.; Oporto, 1 ck., £10.;
Shanghai, 5 pkgs., £9.; Toronto,
3 cks., £21.; Wellington, 1 cs.,
£20.

CHINA CLAY

Adelaide, 2 t.; Toronto, 5 t.

CHLORIDE OF LIME

Sydney, 5 t. 10 c., £112.

CITRIC ACID

Alexandria, 2 c., £52.; Amster-
dam (F.), 1 t. 10 c., £600.;
Durban (F.), 1 c., £15.; Gib-
raltar, 1 cs. (pt.), £10.; Mon-
treuil, 4 t. 12 c., £2,079.; Rotter-
dam, 1 t. 15 c., £390.; Rotterdam,
(F.), 1 t., £437.; Suez, 2 c., £49.;
Toronto, 1 t. 13 c., £678.

COAL PRODUCTS

Alizarine

Bombay, 20 cks., £6,364.

Aniline Dye

Alicante, 1 cs., £14.; Barcelona,
7 kgs., £209.; Bombay, 1 ck.,
£14.; Brussels, 3 kgs., £72.;
Calais, 2 kg., £10.; Colombo, 1
cs., £8.; Durban, 1 cs., £25.;
Genoa, 5 cks., £295.; Madras,
1 cs., £28.; Melbourne, 20 cks.,
£595.; Monte Video, 1 cs. (pt.),
£15.; Montreal, 2 kgs., £69.;
Rouen, 1 kg., £23.; Seville, 1
kg., £48.

Benzine Base

Havre, 4 cks., £790

Benzole

Antwerp, 24 drms., £570.

Carbolic Acid

Calcutta, 7 cks., £22.; Kobe,
67 drms., £500.; Sydney, 22
pkgs., £39.; Yokohama, 69
drms., £600.

Cresol

Kobe, 10 brls., £70.

Cresote

Rotterdam, 25 cks., £91.

Naphthalene

Cape Town, 2 cks., £6.; Durban,
12 pkgs., £40.; Melbourne, 80
cs., £217.; Pt. Swettenham, 20
cs., £50.

Paranitramine

Calcutta, 1 ck., £45.; Rouen,
10 ck., £1,750.

Pith

Adelaide, 4 cs., £19.; Antwerp
(F.), 8 brls., £23.; Antwerp, 180
t., £560.

Tar

Adelaide, 10 drms., £10.; Hel-
singfors, 200 cks., £270.; Pt.
Elizabeth, 250 drms., £32.

Tar (Dehydrated)

Helsingfors, 100 cks., £168.

Terebine

Brisbane, 1 cs., £8.

COBAL HYDROXIDE

Stockholm, 1 cs., £21.

COPPER ACETATE

Calais, 1 ck., £20.

COPPER SULPHATE

Amsterdam, 2 c., £5.; Athens,
4 t., £190.

CREAM OF TARTAR

Amsterdam (F.), 5 c., £65.;
Antwerp, 5 c., £58.; Beira (F.),
1 cs. (pt.), £5.; Brussels, 6 c.,
£69.; Constantinople, 2 c., £50.;
Durban (F.), 3 c., £41.; Malta
(F.), £56.; Rotterdam, 15 c.,
£237.; Rotterdam (F.), 1 t.,
£235.; Schiedam, 2 t. 2 c.,
£512.; Halifax, N.S. (F.), £100.;
St. Johns, N.B. (F.), 2 t. 2 c.,
£400.

DISINFECTANTS (otherwise undes.)

Antwerp, 5 t. 19 c., £745.;
Belevan, 5 c., £12.; Bombay,
5 t., £108.; Buenos Ayres, 8 c.,
£44.; Calcutta, 1 c., £8.; Durban,
1 c., £9.; East London, 2 c.,
£7.; Karachi, 1 c., £5.; Penang,
1 t. 8 c., £70.; Piraeus, 5 c., £18.;
St. Lucia, 2 c., £7.; Teluk
Anson, 1 c., £10.; Trinidad,
1 t. 6 c., £36.; Wellington, 4 c.,
£8.

ETHER

Lisbon, 8 cs., £23.; Piraeus, 5
cs., £26.

FATTY ACIDS

Antwerp, 26 t.; Dunkirk, 10 t.;
Havre, 37 t.

FULLER'S EARTH

Newport News, 40 t.; New
York, 190 t. 12 c.; Paris, 5 t.;
Philadelphia, 60 t.

GLUE

Madras, 2 t.; Paris, 10 c.

GLUE SIZE AND GELATINE

Amsterdam, 2 t.; Antwerp, 1 c.;
Auckland, 1 c.; Barcelona, 1 t.;
Bilbao, 10 t.; Boston, 4 t. 2 c.;
Bombay, 1 t. 16 c.; Brisbane,
6 c.; Colombo, 10 c.; Cape
Town, 8 c.; Constantinople, 2 c.;
Durban, 6 c.; Copenhagen, 4 t.
8 c.; Ghent, 1 t.; Hong Kong,
1 t.; Karachi, 12 c.; Kobe, 10
t.; Melbourne, 3 t.; Rio de
Janeiro, 1 t.; Rotterdam, 4 t.
10 c.; Sydney, 11 c.; Tokio,
3 t.; Wellington, 5 c.

GLYCERINE

Athens, 3 c., £31.; Boulogne,
2 t., £255.; Canton, 3 c., £22.;
Constantinople, 4 c., £33.; Dur-
ban, 1 c., £7.; Havre, 10 c.,
£78.; Kobe, 4 c., £58.; Maccio,
1 c., £11.; Paris, 5 t. 10 c., £595.;
Penang, 1 c., £9.; Rouen, 1 t.,
£130.; Shanghai, 10 c., £65.

HYDROCHLORIC ACID

Penang, 1 c., £5.; Teluk Anson,
1 c., £12.

HYDROFLUORIC ACID

Lisbon, 1 cs., £7.

HYDROGEN PEROXIDE

Beyrout, 1 cs., £5.; Tangiers, 2
cs., £14.

HYDROSULPHITE

Genoa, 1 ck., £19.

HYPOPHOSPHITE

Genoa, 11 cs., £270.; Paris, 4 cs.,
£170.

IODINE (RESUBLIMED)

Calcutta, 1 cs. (pt.), £23.;
Monte Video, 1 cs. (pt.), £5.;
Sydney, 1 cs., £9.

IRON & AMMONIUM CITRATE

Antwerp, 1 cs. (pt.), £14.;
Bilbao, 1 cs., £21.; Buenos
Ayres, 2 cs., £24.; Calcutta,
2 cks., £47.

IRON & AMMONIUM OXALATE

Bilbao, 1 cs., £16.

IRON PERCHLORIDE

Dunkirk, 11 cks., £56.; Sydney,
3 cks., £16.

IRON PYROPHOSPHATE AND AM-

MONIUM CITRATE

Rotterdam, 1 cs. (pt.), £10.

LEAD ACETATE

Antwerp, 1 kg., £9.

LEAD SULPHIDE

New York, 5 pkgs., £34.

MAGNESIUM CARBONATE

Jamaica, 1 cs., £5.; Lisbon,
ck., £5.; Rouen, 25 cks., £90. 1
Timaru, 2 cks., £12.

MAGNESIUM CITRATE

Antwerp, 1 cs. (pt.), £9.; Buenos
Ayres, 1 cs., £9.; Limon, 2 cs.,
£25.; Yokohama, 2 cs., £14.

MAGNESIUM OXIDE

Lisbon, 1 cs., £5.

MAGNESIUM PEROXIDE

Christiania, 1 cs. (pt.), £13.

MAGNESIUM SULPHATE

Auckland, 13 c., £255.; Calcutta,
4 c., £7.; Cairns, 17 c., £31.;
Cape Town, 8 c., £19.; Colon,
4 c., £9.; Cyprus, 7 c., £12.;
Delagoa Bay, 4 c., £7.; Durban,
10 c., £21.; East London, 4 c.,
£9.; Gibraltar, 4 c., £8.; Lyttel-
ton, 1 t. 2 c., £41.; Melbourne,
5 c., £10.; Mossel Bay, 4 c., £9.;
Panama, 4 c., £9.; Port Elizabeth
1 t. 12 c., £75.; Singapore, 10 c.,
£14.; Sydney, 11 c., £21.;
Wellington, 1 t., £38.

MANGANESE Binoxide

Antwerp, 3 cks., £31.

MANGANESE RESINATE

Brussels, 3 brls., £32.

MERCURY CHLORIDE

Bilbao, 1 cs. (pt.), £16.; New
York, 10 cs., £202.

MERCURY OXIDE

Lisbon, 1 cs. (pt.), £14.

MERCURY OXIDE & CYANIDE

Amsterdam, 1 cs., £51.

METHYL SALICYLATE

Antwerp, 2 drms., £44.; Bou-
logne, 5 cs., £58.; Genoa, 4
drms., £100.; Italy, 10 drms.,
£90.

MINERAL WHITE

Amsterdam, 25 t.

NICKEL SALTS

Amsterdam, 2 cs., £26.; Yoko-
hama, 20 cs., £55.

NICKEL SULPHATE

Paris, 48 cks., £525.

NITRIC ACID

Penang, 1 c., £6.; Teluk Anson,
1 c., £14.

OXALIC ACID

Genoa, 3 cks., £142.; Melbourne,
1 brl., £15.

PARAFFIN WAX

Antwerp, 2 t. 3 c.; Bordeaux,
4 t. 10 c.; Genoa, 10 t. 11 c.;
Gothenburg, 10 c.; Lisbon, 2 t.
10 c.; Paris, 18 c.

PHOSPHORIC ACID

Genoa, 14 crbys., £192.

PHOSPHORUS

Sydney, 10 cs., £130.

PHOSPHORUS (AMORPHOUS)

Bombay, 2 cs., £30.

PHOSPHORUS SESQUISULPHIDE

Alicante, 45 cs., £724.

PLUMBAGO

Buenos Ayres, 2 t. 19 c.; Durban,
3 t.; Helsingfors, 1 t. 10 c.;
Penang, 4 c.

POTASSIUM BROMIDE—
Calcutta, 2 cks., £55.; Dunkirk (F.), 4 cs., £63.; Melbourne (F.), 1 kg., £14.

POTASSIUM CARBONATE—
Dunkirk (F.), 2 t. 6 c., £355.; Lisbon, 1 cs., £5.; Rangoon, 1 ck., £21.

POTASSIUM CHLORIDE—
Barcelona, 1 c., £15.; Sydney, 10 t., £54.

POTASSIUM CITRATE—
Calcutta, 2 ck., £87.

POTASSIUM CYANIDE—
Karachi, 1 cs. (pt.), £11.; Oporto, 1 cs., £13.

POTASSIUM FERROCYANIDE—
Bilbao, 1 kg., £17.

POTASSIUM HYDROXIDE—
Rangoon, 2 cs., £46.

POTASSIUM HYPOPHOSPHITE—
Genoa, 5 cs. (pt.), £45.

POTASSIUM IODIDE—
Calcutta, 1 cs. (pt.), £77.; Rotterdam, 6 cs., £440.; Swatow, 1 cs. (pt.), £6.; Tientsin, 5 cs. (pt.), £9.

POTASSIUM PERMANGANATE—
Durban (F.), 3 cs. (pt.), £6.

POTASSIUM PRUSSATE—
Melbourne, 3 kgs., £32.

POTASSIUM SULPHATE—
Sydney, 1 cs., £14.

POTASSIUM SULPHIDE—
Lisbon, 1 cs. (pt.), £5.

POTASSIUM SULPHITE—
Cape Town, 1 kg., £5.; Montreal, 14 pkgs., £47.

POTASSIUM SULPHOGUAIACOLATE—
Malaga (F.), 1 cs. (pt.), £23.

QUININE—
Calcutta, 5,500 ozs.; Cape Town, 190 ozs.; Palermo, 10,000.

ROSIN—
Genoa, £32.

SALICYLIC ACID—
Calcutta, 3 cs., £14.; Genoa, 40 kgs., £150.; Oporto, 1 cs., £6.; Singapore, 1 cte., £9.

SALT—
Antwerp, 1 t.; Bombay, 5 t.

SALTPETRE—
Bilbao, 1 t. 8 c., £76.; Desterro, 10 c., £30.; Ghent, 11 c., £26.; Labrador, 2 c., £8.; Rio de Janeiro, 2 t. 1 c., £123.; Sao Paulo, 1 t. 5 c., £73.; Toronto, 1 t., £50.

SHEEP DIP—
Buenos Ayres, 33 t. 15 c., £1,800.; Hastings, N.Z., 5 c., £8.; Pt. Elizabeth, 3 t. 16 c., £171.

SILVER NITRATE—
Durban, 3 cs. (pt.), £11.

SIZE—
Tammerfors, 1 t. 2 c.

SOAP—
Adelaide, 2 c.; Alexandria, 1 t. 2 c.; Amsterdam, 1 t. 3 c.; Antwerp, 764 t. 15 c.; Auckland, 17 c.; Barcelona, 5 c.; Bergen, 1 c.; Bilbao, 10 c.; Bombay, 1 t. 17 c.; Boulogne, 105 t. 13 c.; Buenos Ayres, 8 c.; Calais, 6 c.; Cape Town, 1 t.; Calcutta, 1 t. 14 c.; Christchurch, 2 c.; Cologne, 97 t. 19 c.; Colombo, 2 t. 17 c.; Cochín, 3 c.; Constantinople, 2 c.; Cuba, 1 t. 6 c.; Delagoa Bay, 1 c.; Dunkirk, 11 t. 1 c.; Durban, 9 c.; Fiume, 1 t. 13 c.; Fiji Isles, 1 c.; Genoa, 2 t. 2 c.; Gothenburg, 2 t. 12 c.; Halmstad, 1 t.; Haarlem, 2 c.; Italy, 2 t. 7 c.; Karachi, 8 c.; Lyttleton, 2 c.; Leghorn, 14 c.; Madras, 1 t. 5 c.; Melbourne, 3 c.; Naples, 14 c.; New York, 7 c.; Oporto, 1 c.; Peru, 1 c.; Pt. Elizabeth, 3 c.; Piraeus, 10 t.; Rangoon, 1 c.; Rotterdam, 15 t. 13 c.; St. Johns, N.F., 23 t. 11 c.; Sao Paulo, 1 c.; Shanghai, 4 c.; Sydney, 2 c.; Seville, 1 c.; Trinidad, 3 c.; Tuticorin, 3 c.; Vienna, 1 t.; Yokohama, 4 c.

SODA ASH—
Genoa, 13 t., £104.

SODA CRYSTALS—
Colombo, 18 c., £7.

SODIUM ARSENITE—
East London, 10 drms., £24.; Penang, 1 kg., £22.

SODIUM BENZOATE—
Constantinople, 2 brls., £52.; Genoa, 3 kgs., £130.; Malaga, 1 cs. (pt.), £19.

SODIUM BICARBONATE—
Bangkok, 4 c., £5.; Cape Town, 4 c., £7.; Delagoa Bay, 4 c., £7.; Durban, 8 c., £17.; Limon, 10 c., £6.; Lisbon, 7 c., £9.; Mossel Bay, 16 c., £30.; Perth, 4 c., £5.; Singapore, 1 t. 2 c., £15.

SODIUM BISULPHITE—
Klang, 5 t., £170.; Penang, 1 t. 10 c., £52.

SODIUM BROMIDE—
Melbourne, 2 cs. (pt.), £8.; Sydney, 1 cs., £9.

SODIUM CARBONATE—
Kobe, 10 c., £22.

SODIUM GLYCEROPHOSPHATE—
Bordeaux, 3 c., £140.

SODIUM HYPOPHOSPHITE—
Genoa, 5 cs. (pt.), £41.

SODIUM HYPOSULPHATE—
Amsterdam (F.), 4 t. 10 c., £60.; Constantinople, 2 t., £85.

SODIUM HYPOSULPHITE—
Cape Town, 6 c., £7.; Oporto, 4 c., £6.

SODIUM IODIDE—
Calcutta, 1 ck. (pt.), £8.; Melbourne, 1 cs. (pt.), £6.

SODIUM METABISULPHITE—
Paris, 1 ck., £22.

SODIUM NITRATE—
Madras, 3 kgs., £18.

SODIUM PRUSSATE—
Genoa, 2 t. 19 c., £201.; New York, 20 t., £1,260.

SODIUM PYROPHOSPHATE—
Leghorn, 1 t., £75.

SODIUM SALICYLATE—
Amsterdam (F.), 1 cs., £10.; Melbourne, 1 cs., £13.; New York, 1 cs. (pt.), £17.

SODIUM SILICATE—
Cologne, 4 t. 5 c., £70.; Gothenburg, 4 t. 15 c., £70.

SODIUM SULPHIDE—
Havre, 19 t. 11 c., £325.; Leghorn, 1 t., £24.; Sydney, 1 t., £14.

SODIUM SULPHITE—
Durban, 1 t., £16.; Kobe, 10 c., £25.; Melbourne, 2 t., £74.; Pt. Swettenham, 5 t., £125.

SODIUM TARTRATE—
Buenos Ayres, 3 cks.; Calcutta, 1 cks., £8.; Lisbon, 1 kg., £8.; Montreal, 10 c., 3 cks., £175.; Rotterdam, 5 cks., £20.; Sydney, 1 t., £142.

SULPHUR—
Brussels, 1 t., £31.; Maceio, 6 pkgs., £14.

SULPHUR (FLOWERS)—
Cape Town, 17 t. 17 c., £475.; Paris, 1 t., £35.

SULPHURIC ACID—
Calcutta, 1 t. 10 c., £63.; Channel Islands, 1 c., £8.; Penang, 1 c., £6.

SUPERPHOSPHATE—
Channel Islands, 50 t., £325.

TALLOW—
Genoa, 145 t.

TANNIC ACID—
Amsterdam (F.), 2 cs., £43.; Boulogne, 4 cks., £100.

TAR (STOCKHOLM)—
Bombay, 14 t.; Rio de Janeiro, £14.

TARTARIC ACID—
Beira (F.), £8.; Bombay, 5 c., £98.; Cape Town, 1 c., £24.; Dominica, 1 cs. (pt.), £9.; Durban, 3 c., £71.; Karachi, 1 c., £10.;

Madras, 10 c., £168.; Melbourne, 3 t., £863.; Montreal, 3 t., £930.; New York, 3 t. 10 c., £1,075.; Pt. Elizabeth, 2 c., £51.; Rotterdam, 1 t. 10 c., £465.; Rotterdam (F.), 1 t., £220.; Sydney, 19 c., £273.; Toronto, 14 c., £223.

VEGETABLE WAX—
Piraeus, 1 c.

WAX—
Oporto, 1 t.; Singapore, 3 c.

WHITE LEAD—
Adelaide, £306.; Amsterdam, £198.; Antwerp, £2,146.; Beira, £25.; Bombay, £300.; Calcutta, £245.; Cape Town, £28.; Calicut, £3.; Dunkirk, £425.; Helsingfors, £500.; Lourenco Marques, £51.; Melbourne, £128.; Monte Video, £77.; Oporto, £377.; Paris, £500.; Rangoon, £321.; Singapore, £270.; Trinidad, £110.

ZINC SULPHATE—
Melbourne, 1 ck., £6.

MANCHESTER.

Week ending August 27.

ALUMINA SULPHATE—
Antwerp, 31 cks.; Quebec, 100 bgs.

BLEACHING POWDER—
Bombay, 60 drms.

CHEMICALS (otherwise undescribed)—
Dunkirk, 685 bgs.; Ghent, 1 ck.

COAL PRODUCTS (otherwise undescribed)—
Bombay, £130.; Rotterdam, £33.; Rouen, £16.

GLYCERINE—
Rotterdam, 20 cks.; Tunis, 10 cs.

HYDROSULPHITE (otherwise undescribed)—
Rotterdam, 10 kgs.

MANGANESE SULPHATE—
Rotterdam, 1 ck.

SALT—
Ghent, 2,000 pkgs.; Montreal, 4,800 cks.; Quebec, 8,000 sks.

SIZE—
Antwerp, 6 cks.

SOAP—
Antwerp, 862 crts., 6 cs.; Galatz, 20 cs.; Rotterdam, 26 cs.

SODIUM BICARBONATE—
Antwerp, 187 kgs.; Rotterdam, 909 bgs.

SODIUM HYDROSULPHITE—
Rotterdam, 1 drm.

SULPHUR (BLACK)—
Rotterdam, 4 cks.

TANNIC ACID—
Rotterdam, 4 brls.

MIDDLESBROUGH.

Week ending August 30.

BARIUM NITRATE—
Antwerp, 1 t., £45.

CAUSTIC SODA—
Calcutta, 167 t. 5 c., £3,091.

CHEMICALS (otherwise undescribed)—
Calcutta, 60 t. 2 c., £871.

COAL PRODUCTS—
Benzole—
Rotterdam, 22,104 galls., £2,214.
Creosote Oil—
Beira, 900 galls., £81.
Disinfectants—
Calcutta, 24 t. 15 c., £668.; Madras, 5 t. 19 c., £195.
Naphthalene—
Calcutta, 1 t. 12 c., £75.
Pitch—
Antwerp, 714 t. 17 c., £2,144.

SALT—
Antwerp, 70 t., £692.

SODIUM SILICATE—
Calcutta, 10 t., £125.

NEWCASTLE-ON-TYNE
Week ending August 30.

ALUM—
Rotterdam, 16 t.

AMMONIUM CARBONATE—
Gothenburg, 1 t.

AMMONIUM SULPHATE—
Rotterdam, 2 t.

ANTIMONY—
Bergen, 10 c.; Copenhagen, 20 t. 10 c.; Rotterdam, 3 t.

BARIUM BINOXIDE—
Rotterdam, 5 t. 1 c.

BEE'S WAX—
Archangel, 49 t. 18 c.

BITUMASTIC SOLUTION—
Bergen, 10 t.

BLEACHING POWDER—
Copenhagen, 26 t. 10 c.; Gothenburg, 2 t.; Rotterdam, 47 t.

BORAX—
Rotterdam, 1 t.

CAUSTIC SODA—
Archangel, 25 t.; Copenhagen, 31 t. 7 c.; Gothenburg, 41 t.; Helsingfors, 203 t.

CHEMICALS (otherwise undescribed)—
Archangel, 10 galls.; Copenhagen, 17 c.

COPPER CARBONATE—
Bergen, 6 c.

COPPER SUBOXIDE—
Bergen, 2 t. 16 c.

FERRO MANGANESE—
Gothenburg, 10 t.

GELATINE—
Bergen, 8 c.; Copenhagen, 8 c.

GLUE—
Bergen, 1 c.

MAGNESIA—
Copenhagen, 9 c.

RED LEAD—
Bergen, 3 t. 12 c.; Copenhagen, 13 t. 11 c.; Gothenburg, 3 t. 5 c.; Malta, 5 t.; Piraeus, 4 t.; Rotterdam, 8 t. 7 c.

ROSIN OIL—
Copenhagen, 4 brls.

SOAP—
Archangel, 12 t. 10 c.

SODA ASH—
Rotterdam, 50 t.

SODA CRYSTALS—
Helsingfors, 5 t.; Rotterdam, 110 t.

SODIUM SILICATE—
Malta, 20 t.

SODIUM SULPHIDE—
Gothenburg, 5 t. 3 c.

SODIUM SULPHITE—
Rotterdam, 10 t.

SULPHUR—
Gothenburg, 10 t.

SULPHUR (ROCK)—
Helsingfors, 10 c.; Rotterdam, 25 t.

TAR OIL—
Gothenburg, 5 c.

WHITE LEAD—
Archangel, 4 t. 10 c.; Bergen, 19 c.; Copenhagen, 5 t. 2 c.

N. & S. SHIELDS.

Week ending August 30.

CAUSTIC SODA—
Malmo, 21 t. 9 c.; Norrköping, 4 t. 18 c.

RED LEAD—
Christiania, £45.; Malmo, 2 t.; Stockholm, 1 t.

SOAP—
Christiania, £38.; Malmo, 1 t. 12 c.

WHITE LEAD—
Malmo, 1 t.; Norrköping, 1 t.

STOCKTON-ON-TEES.

Week ending August 30.

NIL.

SWANSEA.

Week ending August 23.

NIL.

PRICES CURRENT.

THURSDAY, Sept. 4, 1919.

PREPARED BY MESSRS. HIGGINBOTTOM AND CO., 21, SPRING GARDENS, MANCHESTER.

The values stated are F.O.R. at makers' works, or at usual ports of shipment in U.K., unless otherwise specified
The prices in different localities may vary.

Acids:—			£ s. d.	
*Acetic 40% and 60%	... per cwt.	30/- & 45/-		
* " Glacial	... per ton	85 0 0		
Arsenic, S.G. 2,000°	... per ton	70 0 0		
Boric Crystals	... "	72 0 0		
*Fluoric	... per lb.	0 0 7		
*Muriatic (Tower Salts), 28° Tw.	... per carboy	0 6 6		
*Nitric, 80° Tw.	... per ton	32 0 0		
Oxalic	... per lb.	0 1 2½		
Phosphoric, 1,750°	... "	0 1 9		
*Sulphuric (fuming, 70%)	... per ton	—		
* " (Pyrites, 168°)	... "	7 18 9		
* " (" 140°)	... "	4 10 0		
* " (free from arsenic, 144°)	... "	5 7 4		
Tannic (commercial)	... per lb.	0 2 6		
Tartaric (crystals)	... "	0 3 1		
*Acetone	... per ton	80 0 0		
*Alum, loose lump (delivered)	... "	17 0 0		
Alumina Sulphate (pure)	... "	17 0 0		
Aluminoferrous (in slabs)	... "	8 10 0		
Aluminium (Ingot Metal, 98/99%)	... per ton	150 0 0		
*Ammonia, Anhydrous	... per lb.	0 1 10		
* " 880	... per ton	33 0 0		
* " 920	... "	20 0 0		
" Carbonate	... per lb.	0 0 6½		
" Muriate (grey)	... per ton	47 0 0		
" (salammoniac) 1st & 2nd, per cwt.	80/- & 75/-			
" Nitrate	... per ton	60 0 0		
" Phosphate	... "	110 0 0		
" Sulphate (grey), London, net	... "	—		
" " Itall	... "	—		
" " Manchester	... "	—		
*Aniline Oil (pure)	... per lb.	0 1 2		
Aniline Salt	... "	0 1 2		
Antimony	... per ton	45 0 0		
" (tartar emetic), 13/14%	... per lb.	0 3 4		
" (golden sulphide)	... "	0 1 3		
Arsenic, white powdered	... per ton	60 0 0		
Barium Chloride (in casks)	... "	23 10 0		
" Carbonate (native), 92/94%	... "	11 0 0		
" Sulphate (native levigated)	... "	47 to 14		
Baryta Chlorate	... per lb.	0 1 3		
*Bisulphide of Carbon	... per ton	55 0 0		
Bleaching Powder, 35%	... "	15 0 0		
* " Liquor, 7%	... "	6 0 0		
Casein (commercial)	... "	90 0 0		
Chromium Acetate (crystals)	... per lb.	0 1 6		
Calcium Chloride	... per ton	8 0 0		
China Clay (at Runcorn), in bulk	... "	70/- to 90/-		
Coal-tar Products and Dyes:—				
Alizarine (artificial), 20%	... per lb.	0 2 0		
Magenta	... "	18/- to 35/-		
Anthracene, 40/50% A, f.o.b., L'don, per unit,	... "	0 0 7		
Benzol, 90's (naked)	... per gal.	0 1 11		
" 50/90's	... "	0 1 10		
Carbolic Acid (crude, 60°)	... "	0 1 7½		
" (crystallised, 40°)	... per lb.	0 0 9½		
" Acid (pale liquid, 97/98%)	... per gal.	0 2 9		
*Creosote (ordinary), naked	... "	0 0 6½		
*Crude Naphtha, 30% at 120°C.	... "	0 0 9		
*Grease Oils, 18° Tw. (naked)	... per ton	6 10 0		
Pitch, f.o.b., Liverpool or Garston	... "	2 16 6		
*Solvent Naphtha, 90% at 160°	... per gal.	0 2 5		
Copper	... per ton	101 10 0		
" Sulphate	... "	43 0 0		
Dross Salts	... "	39 0 0		
*Glycerine (crude), 80%	... "	72 0 0		
* " (industrial, S.G. 1,260)	... "	110 0 0		
*Iodine	... per oz.	0 1 0		
*Iron Nitrate, 80° Tw.	... per ton	12 0 0		
" Sulphate (copperas), delivered	... "	4 10 0		
" Sulphide	... "	7 15 0		
Lead (Foreign Pig)	... "	25 0 0		
" Litharge Flake	... "	45 0 0		
" Acetate (white)	... "	83 0 0		
" (brown)	... "	70 0 0		
Lead, Carbonate (White lead), pure	... per ton	50 0 0		
" Nitrate	... "	56 0 0		
Lime, Acetate (brown)	... "	11 0 0		
" (grey), 80%	... "	17 0 0		
Magnesium Chloride	... "	15 10 0		
" Carbonate (light)	... per cwt.	2 5 0		
" Calcined Magnesite	... per ton	21 10 0		
" Sulphate (Epsom Salts) (coml.)	... "	11 0 0		
" (Chargists)	... "	16 0 0		
Manganese, Sulphate	... "	80 0 0		
" Borate	... "	100 0 0		
*Methylated Spirit, 64° (industrial)	... per gal.	0 5 7		
*Naphtha (Wood), Solvent	... "	0 10 0		
" " Miscible, 60° p.	... "	0 10 0		
Oils:—				
*Cottonseed	... per ton	135 0 0		
*Linsed	... "	135 0 0		
Stearine, 115-120° M.P.	... "	105 0 0		
Potassium, Bichromate	... per lb.	0 1 6		
" Carbonate, 80/82%	... per to	95 0 0		
" Chlorate	... per lb.	0 1 0		
" Hydrate (Caustic Potash) 90%	per ton	160 0 0		
" " 75/80%	"	140 0 0		
" Potash Hydrate Liquid, 38° B	"	70 0 0		
" Nitrate (refined)	... "	60 0 0		
" Permanganate (commercial)	per lb.	0 3 3		
" Prussiate (yellow)	... "	0 1 9		
" (red)	... "	0 5 6		
" Sulphate, 90% (ex ship)	... per ton	30 0 0		
" Muriate, 80%	... "	25 0 0		
Silver (metal)	... per oz.	0 5 1		
Sodium (metal)	... per lb.	0 1 3		
" Acetate	... per ton	52 0 0		
" Arseniate, 45%	... "	60 0 0		
" Borate (Borax), Crystals	... "	39 0 0		
" Bicarbonate (1 cwt. kegs)	... "	9 10 0		
" Bichromate	... per lb.	0 0 11		
" Carb. (Caustic Soda-ash), 48%	per ton	12 10 0		
" (Alkali), 58% (bags)	... f.o.r.	6 0 0		
" (Soda Crystals), (bags)	... wks.	4 2 6		
" Chlorate	... per lb.	0 0 6½		
" Cyanide (100% basis) for export	... "	0 0 10		
" Hydrate (76% C. Soda) (f.o.r.)	... per ton	24 0 0		
" (74% C. Soda)	... "	23 5 0		
" (70% C. Soda)	... "	22 0 0		
" (60% C. Soda)	... "	21 0 0		
" (pure liquid, 90° Tw.)	... "	10 2 6		
" 77/78% Powdered (99%) Hydrate	... "	24 10 0		
" Hyposulphite (commercial)	... "	16 10 0		
" Manganate, 25%	... "	65 0 0		
" Nitrate, 96%, retd., f.o.r., L'pool	... "	21 0 0		
" Nitrite, 100%	... "	60 0 0		
" Phosphate	... "	27 0 0		
" Prussiate	... per lb.	0 0 7½		
" Silicate (glass) Alkaline	... per ton	12 5 0		
" (liquid, 100° Tw.)	... "	9 10 0		
" Sulphate (Saltcake), delivered	... "	3 0 0		
" (Glauber's Salt)	... "	3 10 0		
" Sulphide (conc.), 60/65% casks	... "	19 0 0		
" Sulphite	... "	9 0 0		
Sulphocyanide, Ammonium, 95%	... per lb.	0 2 0		
" Barium, 95%	... "	0 1 4		
" Potassium	... "	0 2 4		
" Calcium, 70%	... per lb.	0 4 4		
Sulphur, (Flowers)	... Sicilian per ton	23 0 0		
" (Roll Brimstone)	... "	21 0 0		
" Brimstone (best thirds)	... "	—		
" (ex ship)	... "	14 10 0		
Tallow	... "	100 0 0		
Tin Crystals	... per lb.	0 1 10		
" English Ingots	... per ton	276 0 0		
Titanium, Potass. Oxalate	... per lb.	0 1 6		
Uranous Chloride	... per cwt.	4 10 0		
" (Spelter)	... per ton	41 0 0		
" Powder, 88/92%	... "	70 0 0		
" Chloride (solution, 102° Tw.)	... "	33 10 0		
" Sulphate, Crystal	... "	22 0 0		

* Packages extra or returnable, other case prices usually include packages

THE CHEMICAL TRADE JOURNAL

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EDITORIAL NOTICES.

Communications for the Editor, if intended for insertion in the current week's issue, should reach the office not later than Wednesday morning.

Readers are invited to forward items of intelligence, company reports and balance-sheets, or cuttings from local newspapers of interest to the trades concerned.

CURRENT TOPICS.

THE BRITISH ASSOCIATION.

AFTER an interval of three years the meetings of the British Association have been resumed, and a gap which their discontinuance caused in the scientific life of the country has been filled. The contributions to the Association have always been marked by great interest and a very high standard of scientific attainment, and this year's addresses in no way fall behind. It is deeply to be deplored that so many of our great men who in the past have contributed so largely to British science have joined the great majority since the last meeting at Newcastle.

It is to be hoped that the admirable address by its distinguished President will be largely read and studied, as it will bring home the extraordinary scientific developments that have marked the years of war. It may seem regrettable that the pressure of war was needed to produce these great achievements, but in our opinion the fact to be emphasised is that the ability to do what was done was all the time latent among our scientific and technical men. Once this fact is realised by our governing classes there should be no limit to the future possibilities of this Empire. Words of warning, however, were delivered both by Professor Bedson in his presidential address to the Chemical Section, and by Sir W. Pope, that the lessons of the war have not yet been grasped, and that there is great danger of our falling back into that state of unpreparedness that was nearly our undoing.

Sir W. Pope also pointed out the fundamental difference between our own war factories and those of Germany. The latter were built, in great part, during peace, but with the possibility of their use in war ever before them, and were paid for as the result of successful pre-war trading. Our own factories, being purely a war product, cannot readily be turned to peaceful uses, and must be regarded more or less as a dead loss. Or, to use Sir W. Pope's words, we have paid for the German factories as well as for Gretna.

In conclusion, we should like to refer briefly to Sir Charles Parsons' affirmation that unless this country can find new sources of energy, it must decline from its present high estate. It was suggested that the heat

of the earth could in some way be utilised, and that a shaft twelve miles deep should be sunk to investigate the interior. There is undoubtedly an incalculable store of energy here, and there does not appear to be any inherent obstacle in the way of making such a supply available. That our coal supply will one day be exhausted is certain, and civilisation must come to an end if there is nothing to take its place.

TRADE RETURNS.

If it be possible to glean any scraps of comfort from the monthly Board of Trade returns, we think it is our duty to do so. Although it must necessarily be a very long time before we can regard the figures with any degree of complacency, yet in the returns just published there are symptoms which can be considered hopeful. One feature of good augury is that the rise in imports, generally speaking, is no longer so much a matter of values, but that we are getting greater value for our money than has been the case for so long a time. The August figures show an increase of 32½ per cent. in the tonnage entered with cargoes, the increase in values being 35 per cent. This is a good approximation, and it is to be hoped the trend will continue in the same direction. Then again, although the disparity between what comes in and has to be paid, and what goes out as a partial offset, is still enormous, the gap has been somewhat lessened. The actual figures are:—Total imports, £148,832,393., total exports £90,084,522., giving an adverse balance of over £58,000,000. The corresponding figures for 1918 showed an adverse balance of nearly £65,000,000., but the value of the exports for August, 1919, was nearly twice that for the corresponding month in 1918.

Dealing with the chemical trade in particular, we find much greater relative changes than are indicated by the total returns. For instance, the value of the imports has fallen from £4,224,882. in August, 1918, to £1,773,344. last month, or a decrease of no less than £2,451,538., or nearly 60 per cent. The fall has chiefly occurred in the unenumerated list (including acetate of lime, acetone, muriate of ammonia, and sulphuric acid), and consequently may be regarded as due to the cessation of the war. No carbide of calcium was imported, and brimstone, glycerine, and saltpetre all showed large reductions. Turning now to the exports of chemicals, there is to be observed a gain of £361,084. in the values, being the difference between £2,458,265. in August last and £2,097,181. in the corresponding month of 1918. Bleaching powder has increased from £2,020. to £16,515., dyestuffs from £132,730. to £165,463., glycerine from £15,951. to £27,578., and manures from £165,903. to £470,597. Soda compounds show a slight decline from £377,039. to £332,068., but sulphuric acid has increased from £2,498. to £9,164.

It might be well to refer in this connection to the June statistics of Japanese trade, which show few signs of that capturing of markets of which we have heard so much of late. The only export in which there was a rise of any moment was raw silk. Imports continued to grow, the value of the manufactured goods being nearly twice as great as in June last year. In the first six months of the year an excess of imports of £22,000,000. took the place of an excess of £5,700,000. in the corresponding half-year of 1918.

CHLORIDE v. SULPHATE OF POTASH.

WHY CHLORIDE IS PREFERABLE.

(FROM A CORRESPONDENT.)

Sulphate of potash is sold in two qualities containing respectively 48.6% K_2O = 90.6% of sulphate, and 51.8% K_2O = 97.2% of sulphate, it is interesting to compare the following figures, which show the composition of these two salts and of chloride of potash containing 50% and 60% K_2O .

	Chloride of Potash.		Sulphate of Potash.	
	Containing 50% K_2O	60% K_2O	48.6% K_2O	51.8% K_2O
Chloride of Potash (KCl)	81.3	97.3	1.6	0.3
Sulphate of Potash (K_2SO_4)	—	—	90.6	97.2
Sulphate of Magnesium ($MgSO_4$)	0.3	0.2	2.7	0.7
Chloride of Magnesium ($MgCl_2$)	—	—	1.0	0.4
Chloride of Sodium ($NaCl$)	16.3	2.0	1.2	0.2
Sulphate of Calcium ($CaSO_4$)	—	—	0.4	0.3
Water (H_2O)	1.8	0.3	2.2	0.7
Non-soluble	0.3	0.2	0.3	0.2
	100.0	100.0	100.0	100.0

Chloride of potash thus contains a little more pure potash than sulphate, which has a certain advantage from the point of view of freight over long distances. Moreover, chloride of potash does not contain any salts of magnesium ($MgCl_2$ and $MgSO_4$), which easily absorb moisture, and have a bad effect on vegetation; it is also easier to transport, and has better keeping qualities.

The salt ($NaCl$) contained in chloride in a moderate proportion (2-16%) is likewise a great advantage for all soils yielding considerable quantities of potash in non-soluble combinations. Indeed, this salt is active enough to dissolve the potash contained in such soils and to enable the plants to assimilate it. This is a well-known fact, and has of late again been confirmed by Mr. D. K. Tressler (Bureau of Fisheries, United States Department of Commerce) in his essay published in *Soil Science* (VI., iii., 237-257, Baltimore, 1918). The introduction of chloride of sodium into the soil may, therefore, be considered an indirect kind of potash manuring. It may be added that sodium can to a certain extent replace potash in some plants, and that rather considerable quantities of sodium are indispensable for beet and sugar beet, for which reason these plants are sometimes manured with salt when this mineral has not already been applied together with the usual artificial manures. It is seen that chloride of potash contains only beneficial matter; the sulphate of calcium can even increase the solubility of potash in certain lands.

Sulphates of potash, apart from the disadvantages already stated, have the added great defect that, owing to disaggregation and the absorption of potash by the plants, they leave considerable quantities of sulphuric acid in the soil. This sulphuric acid may be very harmful, especially in soils that are poor in lime or badly aerated, and still more so on land suffering from both these defects. Chloride of potash is cheaper per unit than sulphate of potash, which is one more point in favour of the former.

As to the use of potash for the manuring of cotton plants, the potash syndicate itself states in a published pamphlet that the United States prefer natural salts for such manuring, which proves that neither chlorine nor sodium, both of which are found in natural salts, have a harmful effect on the cotton plants. Coffee trees, may without hesitation be manured with chloride of potash, which for this particular purpose is in every way equal to sulphate of potash.

For the manuring of tobacco and sugar cane, chloride of potash is only inferior to sulphate when it is applied very late—viz., shortly before planting. When chloride is applied a few months, or at the latest seven to eight weeks before planting time, it is in every way equal to sulphate. (All potash manures, sulphate included, should be applied before the sowings, so that the full benefit of the cultivation preceding the sowings may be secured, for the potash will then penetrate uniformly into the soil.) As to fruit trees, such as lemon, orange banana trees, etc., chloride of potash is fully equal to sulphate of potash if it is applied some time before the plants push through the soil in the spring.

A significant testimonial in favour of chloride has been given by the potash syndicate, which says in a pamphlet published last year: "The farmers abroad are restricted to the use of chloride of potash, which can be applied to most plants, and can be carried at low freights over long distances, on account of its high percentage (50-60% of pure potash.)"

THE BRITISH ASSOCIATION.

THE meetings of the various sections of the British Association, after being suspended since 1916, were resumed this year at Bournemouth, the meetings continuing from Tuesday, September 9, until Saturday, September 13. In past years the main Presidential address to the Association has been delivered before the business of the various sections began, but this year the Presidential address of Sir Charles Parsons, F.R.S., was delivered in the evening of September 9, whilst the sections began work in the morning.

CHEMICAL SECTION: PRESIDENTIAL ADDRESS.

In his Presidential address to Section B (Chemistry), Professor P. Phillips Bedson said:—

In again taking up the work of this Section, after an interval of three years, a discontinuity without parallel in the annals of the Association, it is natural that our thoughts should turn to the past, and in so doing we are reminded of the gaps in the ranks of those who were accustomed to contribute to the work of our Section. In 1916 we met under a shadow caused by the death of Sir W. Ramsay, whose genius has added in so many ways to our science. And to-day we have to record the loss of one who in his long life contributed in a variety of ways to the advancement of chemistry, and to whom we owe an addition to the number of elementary substances in the discovery of thallium, one of the early fruits of the use of the spectroscope. The chemistry of the rare earths has been especially illumined by the researches of Sir William Crookes. With physicists we would join in a tribute to the memory of Lord Rayleigh, amongst whose experimental researches is one of special interest to chemists—namely, the revelation of the existence of argon, of which discovery Sir J. J. Thomson has recently written that it was not made “by a happy accident, or by the application of new and more powerful methods than those at the disposal of his predecessors, but by that of the oldest of chemical methods—the use of the balance.”

In this connection it is but right that, despite the feelings engendered by the war, I should refer to the passing of two great chemists—Baeyer and Fischer. The former died some two years ago, and the latter within the past few months. Each of them has advanced by his experimental researches the progress of organic chemistry, and has brought illumination into many of the obscure departments of this branch of science. The field of investigation latterly cultivated by Fischer, has revived an interest in the “vital” side of organic chemistry as distinguished from the study of the chemistry of the carbon compounds. Moreover, there are many British chemists, amongst them some of the most distinguished, who, as students received guidance and inspiration from the teaching of Baeyer or of Fischer, and with them we gratefully acknowledge our indebtedness.

Jubilee of the Periodic Law.

Fifty years ago Mendeléeff communicated to the Russian Chemical Society a memoir which has exercised a profound influence on chemical philosophy, and continues to serve as a guide in the interpretation of research and speculations on the nature of the elements. Without entering on the somewhat vexed question as to whom should be assigned the credit of the discovery of the Periodic Law, I trust I shall not be considered unmindful of the claims of Newlands, by adopting the traditional history, and, as is usual, associate this discovery with the name of Mendeléeff, and consequently we may look on this year as the Jubilee of the Periodic Law. Although there is already abundant special literature dealing with this subject, and the periodic system has been assimilated into the teaching of the science and is dealt with in the text-books of chemistry, in some of which it forms the basis of the system employed in the exposition of the facts and theories of inorganic chemistry, still it appeared to me that I might utilise this as an opportunity of passing in brief review some of the features of the rise and development of the “Periodic Law.”

The memoir, made known to the non-Russian reader by the abstract in German, shows the principle of periodicity—viz., the recurrence of similar properties at regular intervals with increase in the magnitude of atomic weights, the possibility

of utilising the atomic weights as a basis of the classification of the elements, the necessity for the revision of the values thus assigned to the atomic weights of certain elements, and finally that the scheme demanded for its completeness the existence of many new elements.

The later writings of Mendeléeff contain the mode of tabulating the elements in the form usually adopted in chemical text-books, portraying the principle of periodicity and showing the grouping of the elements into natural families. But undoubtedly the clearest demonstration of the association between the atomic weights and the physical properties of the elements is that exhibited by the curve of atomic weights and atomic volumes, which is an outcome of the independent studies of these relationships by Lothar Meyer, and, as is well known, shows the members of the natural families of elements occupying corresponding positions on the curve. This curve, with its undulations, corresponding to the series of the elements, has contributed to impress on the mind of the student the relationship between the properties of the elements and their atomic weights, and may have exercised an influence in drawing attention to the relationships which the attempts of the earlier workers in this field were not successful in doing.

Mendeléeff's Table of the Elements was just beginning to figure in the teaching of chemistry in my undergraduate days, and, together with the speculations underlying it, aroused considerable interest and proved an incentive and inspiration for experimental inquiry. Foremost in this country amongst those who by their writings have contributed to spread a knowledge of Mendeléeff's speculations was my fellow-student, Carnelley. His experimental investigations added materially to our knowledge and definition of the physical properties of elements and compounds, which further emphasised the periodicity in the relation of the atomic weights to the properties of the elements, and have provided data from which curves, resembling in contour the atomic volume curve, have been set up.

A valuable guide in fixing the atomic weights of the elements has been the specific heat which, as the discovery of Dulong and Petit showed a hundred years ago, varies in the case of solid elementary bodies inversely with their atomic weights; or, as is more usually expressed, the solid elements have the same atomic heat. The investigation of the exceptions to this empirical rule brought out the fact that the specific heat is influenced by temperature, and the study of the influence of low temperatures led Sir James Dewar to the discovery that at about 50° Absolute the atomic heats of the elements are a periodic function of the atomic weights. Further, the graphic representation of this relation gives a curve very similar in its course to that of the atomic volume curve. So that the specific heat is another of the physical properties to fit into the periodic scheme.

The necessity for a revision of the atomic weights of certain elements, as pointed out by Mendeléeff, has induced several workers to direct their energies to the solution of the problems indicated, so that in our present-day tables many of the anomalies of position and sequence which existed in the earlier schemes have disappeared. Tellurium has still resisted all attempts to bring it into order, with an atomic weight less than that of iodine, which its association with sulphur and selenium demands. The interesting attempts to decompose tellurium have so far remained unfruitful.

But undoubtedly the most fascinating feature of the periodic system in that “it allows the discovery of many new elements to be foreseen.” This and the manner in which Mendeléeff, in full conviction of the truth of the “Periodic Law,” boldly assigned properties to those elements required to fill the blank spaces in the table of the elements, and the verification within twenty years in three instances of these prophetic specifications have contributed to the recognition and firm establishment of the “Periodic Law” as an article of belief in chemical philosophy, and to make it the main-spring and inspiration of the greater part of modern inorganic research.

Discovery of Argon.

The discovery of argon, the announcement of which formed a notable feature in the proceedings of the Association at the Oxford meeting in 1894, and the recognition in it of an element with an atomic weight of 40, raised doubts in the minds of some as to the validity of the scheme of the elements

based upon the Periodic Law. It was indeed a time of testing the faith. The suggestion that argon would prove to be a modified form of nitrogen was brushed aside by the incontrovertible establishment of it as an element, endowed only with specific physical properties and distinguished from all known elements. But argon was not destined to enjoy a splendid isolation for long. The researches of Sir W. Ramsay soon brought helium to earth, and he and his colleagues provided a number of companions for argon. So, in a very short period, was recognised the existence of a group of gaseous elements forming a natural family, whose molecules are monatomic, the members of which are distinguishable by their spectra and atomic weights, but are all in agreement in their unreadiness to take part in any chemical change. This inertness or nonvalence provided a simple means of reconciliation with the periodic scheme of the elements, as all that was required was simply to add to the eight groups of the table of elements a zero group containing helium, neon, argon, krypton, and xenon, and with niton, the emanation from radium, as a recent addition. If we are to accept Mendeléeff's suggestion, the zero group should contain a member lighter than hydrogen, in Series I., and in a zero series a still lighter representative of the elements of the zero group, which he has postulated as the 'ether' of the physicist.

Thus the discovery of argon has formed a starting point in the development and a justification of the natural system of the elements, but it still remains, to make the tabulation complete, that provision should be made for the accommodation of the rare earths. The paper published by Werner in 1905, under the title "A Contribution to the Development of the Periodic System," shows how this can be satisfactorily accomplished.

The elements of the argon group form a valuable extension to the periodic system, and the knowledge acquired in the investigation of these substances has proved serviceable in the solution of problems in the realms of science and of industry. The knowledge of the properties and behaviour of helium was destined soon to play a part in the solution of the riddle of the radio-active elements, whilst it is specially noteworthy that argon, the "idle one," should have been pressed into industrial service.

This fact suggests the thought that idleness has its uses, and at the present time how satisfactory would it be were we able to find useful application for a quality which appears to be plentifully and widely distributed in this country.

The history of helium is still more astonishing, for not until thirty years after its existence had been surmised from spectroscopic observations of the sun was this element found to have a terrestrial existence, and now, as one of the achievements of science during the war, we may look on its production in bulk as a commercial proposition. Moreover, we are told "that the advances made in the production of helium warrant the opinion that had the war continued after November 11, 1918, supplies of helium at the rate of 2,000,000 cubic feet per month would have been produced within the Empire and the United States, and helium-filled aircraft would have been in service."

Some of the speculations that the periodic system of the elements has given rise to have been the subjects of communications to this Section.

At the Aberdeen meeting Carnelley, whom I have already mentioned as an ardent worker in this field, gave an account of a scheme based on the conception that the elements are composite, having relations similar to those exhibited by the paraffin hydrocarbons and the isologous series of radicals derived from them. He regarded the elements, other than hydrogen, as made up of two simple elements, A and B. A he identified with carbon, with the atomic weight of 12, and B was assumed to have a negative atomic weight of 2.

In the following year, at Birmingham, Sir W. Crookes devoted his address to this Section to an exposition of his ideas of the 'Genesis of the Elements,' a subject to which he on many subsequent occasions returned, and amplified in the light of recent discovery. The process of evolution of the elements from a primal "protyle" is depicted as taking place in cycle after cycle, in each cycle the 'unknown formative causes' scattering along its journey clusters of particles corresponding to the atoms of the 'elements,' forming in this way a series such as that beginning with hydrogen and ending with chlorine; a repetition of the movement under somewhat altered conditions giving rise to a series of similarly related elements, and thus homology, which is shown by the members of the natural families, is provided for.

The investigations of Sir J. J. Thomson on the discharge of electricity through gases have established the divisibility of the atoms, and in his "Corpuscular Theory of Matter," he has given us conceptions of how atoms may be constituted to provide a series so related that they reflect, it not reproduce, many of the chemical characters of the elements and their periodic relation to atomic weights.

With the discovery of radium and its remarkable properties we have been brought in contact with an element undreamt of in our philosophy. The interpretation of the results of the investigation of this element has called for drastic changes in our conception of an element. The pursuit of the researches of the radio-active elements, guided by the theory of the spontaneously disintegrating atom propounded by Rutherford and Soddy, has served to reveal facts which lend a special emphasis to many passages in the address of Sir W. Crookes to which I have already referred.

For instance, the passage in which he said: "Should it not sometimes strike us, chemists of the present day, that after all we are in a position unpleasantly akin to that of our fore-runners, the alchemists of the Middle Ages? The necromancers of a time long past did not, indeed, draw so sharp a line as do we between bodies simple and compound; yet their life-task was devoted to the formation of new combinations, and to the attempt to transmute bodies which we commonly consider as simple and ultimate—that is, the metals. In the department of synthesis they achieved very considerable successes; in the transmutation of metals their failure as a matter of history."

Or again, when he propounded the question, "Is there, then, in the first place, any direct evidence of the transmutation of any supposed 'element' of our existing list into another, or of its resolution into anything simpler?"—a question to which he, Sir William Crookes, was at that time forced to reply in the negative, whereas to-day many instances might be cited in support of an affirmative answer to this question. Radio-activity has supplied a method of analysis—radio-active analysis—surpassing in delicacy any of the previously known methods for the examination of material substance; the application of these methods has not only added to the list of elements, but also new classes of elements. First, elements indistinguishable and inseparable by chemical means, yet differing slightly, but definitely in their atomic weights. The existence of these "isotopes," as Soddy styles them (a name giving prominence to the fact that such elements occupy the same place in the table of the elements), demonstrates that absolute uniformity in the mass of every ultimate atom of the same chemical element is not an essential, but that "our atomic weights merely represent a mean value around which the actual atomic weights of the atoms vary within certain narrow limits."

Whether the possibility of separating isotopes, recently suggested by Dr. Lindemann and Dr. Chapman, will be found capable of experimental realisation, must be left to the future to decide; in fact, in this matter we must adopt the attitude, prevalent in other than scientific circles, of "wait and see."

The investigations in the field of radio-activity have further brought to light that identity in atomic weight may be associated with difference in chemical properties, revealing the existence of a further class of elements for which Dr. Stewart suggests the name "isobares." Further, Dr. Stewart considers that isobaric elements are to be found not alone amongst the radio-active, but some of the normal elements exhibit properties which may be explained on the assumption that they are isobarics. Thus the compounds formed from iron are regarded as indicating the existence of three irons, all having the same atomic weight. One of these, termed ferrium, is trivalent; one, ferrosium, is divalent; whilst the third, feron, is inert and takes no part in chemical changes. The three are under certain conditions mutually interconvertible. This last condition does not apply in the case of the radio-active isobares.

The elements are to be regarded as divisible into three classes: (1) Isotopic elements, each set of which have different atomic weights but identical chemical properties; (2) isobaric elements which have identical atomic weights but different chemical properties; (3) normal elements which differ from each other both in atomic weights and chemical properties.

The discovery of X-rays may be acclaimed as having added a new sense to aid us in our investigation of material objects, and to their innumerable services may be reckoned the results which have followed from the investigations of the X-ray spectra of the elements by the late Lieut. Moseley, whose

death in Gallipoli in 1915 is one of the many tragedies of the war specially deplored in the scientific world. From the analysis of the X-ray spectra, Moseley has shown that for each element a value can be deduced, which is styled the atomic number and which represents the space in the atomic table the element should occupy. The researches of Rutherford and Andrade on Lead and Radium B have proved that "isotopes" have the same atomic number. Whatever may be the ultimate explanation of the meaning of the atomic numbers, their experimental determination has already proved valuable in the solution of some of the anomalies of the Periodic Table. In addition to the case of isotopes, just referred to, the number of elements between hydrogen and uranium is fixed by finding 92 as the atomic number for uranium, and further, Moseley's work has revealed that the atomic numbers are in agreement with the order of the chemical sequence, rather than the order of the atomic weights, which is of special interest and value in the cases of tellurium and iodine, and of potassium and argon, the decision in each case proving a welcome support to the position in the table assigned to these elements on chemical considerations.

Again, Moseley's atomic numbers remind us of the arrangement of the elements adopted by Newlands in his communication to the Chemical Society of 1866, in which he set forth the "Law of Octaves," the precursor of the Periodic Law.

In concluding this brief sketch, cognisance should be taken of the speculations of physicists as to the structure of the atom. Already several models of the atom are in the field which leave the uncuttable Daltonian atom far out of view; still in a measure they help to an understanding of some of those regularities exhibited by the elements, and set forth in the natural system. Valency and its vagaries, which we are accustomed to describe by phrases such as "variable valency," "selective valency," and the like, still call for a full explanation.

Relation of Chemical Industries to the State.

I purpose now to direct attention to matters of another nature, which appear to me of interest to chemists, and to that extent have a bearing on the welfare of chemistry in this country.

Among the numerous revelations and surprises of the past five years has been the realisation on the part of the public and the Government of the importance of the chemical industries to the national well-being. The apathy and indifference of pre-war times were replaced by an apparently lively interest in things chemical, and there was what in the religious world would be styled a revival.

Politicians, and Press in all its varied forms, daily, weekly, monthly, and quarterly, took up the subject of our industrial insufficiencies and emphasised in various ways the importance of research in connection with our industries. Again, the coal-tar colour industry furnished, as it had done again and again, some thirty to forty years ago, the text from which research and its importance was preached. This time the reiteration had the effect that the "aniline phantasm, as I have seen it described, was recognised as a 'key industry,' important to the vitality of the manufacture of textiles; with the result that the Government, discarding its fiscal policy, was induced to subsidise the enterprise for the manufacture of dyes and other coal-tar products. The negotiations preceding the formation of the "British Dyes Co., Ltd.," have been remarkable as revealing that in the eyes of some, at any rate, special knowledge is a "dangerous thing," and, in fact, was deemed sufficient to exclude its possessors from a seat on the directorate. This is all the more remarkable as the history of similar enterprises in Germany shows the personnel of the directorates to be made up of university-trained men, in not a few instances of professors. So that in Germany academic distinction and theoretic learning are not considered as excluding the possession of commercial acumen and those other qualities needed in a successful man of business.

In the early stages of the war the demand for explosives was met by the expansion of already existing factories, the increase in staff of which called for many additional men with chemical training, a call which became unprecedented and insistent when the national factories were founded, so that men and women with a chemical training found an opportunity of putting the knowledge at the service of their country. And in not a few instances those who, for financial reasons, had at the close of their college career taken up a less congenial employment were able to return to the practice

of chemistry, for which in their student days they had specially fitted themselves.

In the foreword of the publication "Reports on Costs and Efficiencies for H.M. Factories," issued by the Ministry of Munitions, we are told "when it was decided to commence the erection of new and national factories, and an attempt was made to collect from existing factories the necessary technical data and assistance, did it become evident that, due to the extraordinary demands of the war, there was—practically throughout the entire country—a regrettable lack of available accurate technical data, and an even greater lack of trained technical men—more particularly chemical engineers."

To anyone acquainted with the conditions existing in this country in pre-war days, the lack of "trained technical men" is no matter of surprise. In fact, one cannot fail to be astonished at the phenomenal development of chemical manufacture which has taken place under the directing influence of Lord Moulton, in response to the call from Army and Navy. That men were found capable of taking a part in these varied undertakings, cannot, at any rate, be credited to the encouragement which the teaching of chemistry or the students of the science had received from those directing industries, which employ or should employ the services of chemists. It is no uncommon experience to find the chemist employed simply in the analytical testing of raw materials and manufactured products, and even in the working of processes under their control the potentiality of the chemist is not utilised to the full, as is evident from the following, which is a quotation from the Preface to the brochure, issued by the Ministry of Munitions, to which I have already referred: "Since the beginning the policy of the Department with regard to our national factories has been to aim at maximum efficiency in respect of cost and usage of materials."

"For this purpose the greatest efforts have been made to place before all those who are in any way responsible for control, full details concerning the working and costs of the factories. This was rather an innovation in the field of chemical manufacture, as until comparatively recently, either intentionally or through negligence, it was customary at many chemical plants to keep the chemists in complete ignorance not only of the cost at their plants but also even of the efficiencies."

"It is amazing that manufacturers can expect improvements in chemical processes when their chemists are kept in ignorance of such vital facts."

"It has happened very often that as soon as detailed figures were seen by chemists at a plant, important alterations and improvements have at once been suggested, the need for which would otherwise never have been noticed."

The condition of service indicated in the passage quoted, together with the low scale of remuneration which obtained hitherto in chemical industries, help to explain the scarcity of the kind of scientific labour referred to in the quotation I have made from the "Foreword."

But are we not told and invited to believe that all this is changed, that the records of the magnificent achievements of British chemists in the war have so educated the people and, may we say, the Government also, that the practitioners in chemistry will no longer find it essential that in describing their vocation they should be required to add, unless for special reasons, such prefixes as "analytical," "research," "scientific," or "engineering" to the word chemist, secure in the feeling that by describing themselves as "chemists" their standing, training, and profession will be correctly understood.

Still a feeling akin to despondency, if nothing worse, is pardonable, when realising the fundamental importance of chemistry to our industries, and the thousand and one ways chemical research has ministered to the amenities of our every-day life, there should exist not alone in the mind of the general public, but of the educated also, such a lack of information as has been revealed during the past few years. To wit, the myth woven into the history of the production of glycerine, the confusion in the minds of legislators between phosphates and phosgene. More serious, however, is the fact that the method of investigation employed by the chemist is so little appreciated or understood as to lead one to imagine that the discoveries and achievements are the results of a species of legerdemain. The production of new colours, a succession of happy thoughts, and that "by an accident the secret of synthetic indigo was unlocked." This last is a quotation from a review entitled, "The Value of Scientific Research," published some three years ago, and is typical of

much that passes muster in appraising the value of chemical research. That the unravelling of the constitution of indigo which occupied Baeyer and his pupils some thirteen years, the account of these investigations covers some 180 pages of Baeyer's collected works, should be summarised in this way appeared to me to call for a protest. My protest was made and I attempted to put the matter in the correct light, showing the synthesis of indigo to be, indeed, a brilliant example of the value of theory and of a practical illustration of the importance of the chemist's conception of the Architecture of Molecules, as exemplified by Kekulé's theory of the constitution of benzene. The protestation evoked a reply from a correspondent, signing himself D.Sc., Ph.D., who sought to justify the description of the revelation of the secret of synthetic indigo by reference to an accident which occurred in the investigation of the processes for the manufacture of phthalic acid and which certainly greatly facilitated the production of this substance, an intermediate in the manufacture of artificial indigo. So, if the initiated emphasise the unessential, why should we blame the layman and be surprised that well-ordered and planned design should appear to be but the workings of chance, for every such achievement is a witness to the conquest of well-founded theoretical speculation.

But I do not wish to conclude on a despondent note, nor is it right that I should do so, in view of the many activities operating for the promotion of scientific research, and of such evidence as that supplied by the magnificent endowment of the Chemical Department of the University of Cambridge, all of which are evidences of what we may reasonably hope to be a happy augury for the future of chemistry and chemists in this country.

CHEMISTRY AND THE WAR.

Sir William Pope, in an address on this subject, said that the sudden establishment of a state of war between two or more modern nations involves certain preliminaries. We might assume that the most peaceful of the Great Powers were in possession of carefully worked out and detailed plans for necessary action in the event of attack by other similar Powers; foremost in the elaboration of such plans was necessarily the data available as to the possibilities of success in any threatened war. We could not imagine the gauntlet thrown down between several world-Powers until the aggressor had made certain, so far as certainty was humanly possible, of ultimate victory. The equilibrium existing between all the relations—commercial, technical, and scientific—of modern life as between different nations was so complex and so delicate that its derangement by a condition of war must lead to results which could not be foreseen; the dangers of the unforeseen might be minimised by certainty of success. Confidence in success could only be attained after years of consultation with the whole of the instructed talent of an Empire had indicated precisely the most favourable moment for aggressive action. War was too serious an enterprise to be embarked upon merely because it might seem desirable from some internal or external political motive; it could only be undertaken when its successful conclusion seemed assured. In these circumstances we could not doubt that one of the most important contributories to the recent war was the striking contrast between the material resources of Germany and of the rest of Europe. In no domain was this contrast more evident than in that of the chemical industries; no branch of scientific technology was more immediately concerned with the arts of war than that which included all the great industries in which chemistry takes a leading part. What was the position of our chemical industries in 1914? Germany was at this time in possession of well-established organisations for the manufacture of coal-tar colours; she provided the great bulk of the artificial dyestuffs consumed throughout the world. Small installations existed in this country, France, and America, but the scale upon which operations were conducted outside Central Europe was insignificant. The outbreak of war was the signal for the conversion of all these great colour-making factories into manufacturing of high explosive. The British demand for high explosive rose to about 1,000 tons each of T.N.T. and picric acid and about 3,000 tons of ammonium nitrate per week. The complex facilities for the manufacture of these enormous quantities of material were practically non-existent at the beginning of the war in this country, but Germany was in a position to meet all her military demands by a mere rearrangement of her coal-tar colour works. So lacking were our means for utilising the great source of wealth represented by coal-tar

that during the first year of war 80 per cent. of our output of T.N.T. was derived from toluene contained in Borneo petroleum. The British demand for cordite, which had for long constituted the standard propellant for both large and small projectiles, rose to about 2,000 tons per week; the commencement of the war found us with neither works nor chemists for the manufacture of these quantities. A number of important points arose which must have engaged the attention of the German authorities. One of the chief essentials to a modern army or navy was quinine; 97 per cent. of the world's quinine production came from the Dutch colony of Java, and its import into Europe was practically under German control. A large number of other essential pharmaceutical products—such as salicylic acid, salvarsan, and local anaesthetics such as eucaine and novocaine—were made almost entirely in Germany. The war with Germany stopped our provision of all these essentials. Most of the fine photographic chemicals used in development and in the preparation of panchromatic plates were made almost exclusively in Germany; the initial lack of these constituted a heavy handicap to our air photographic service. Many of the essentials to the manufacture of special steels necessary to modern warfare—such as tungsten and the like—came to us from Germany. The control which Germany had secured over the manufacture of such products as coal-tar colours, pharmaceutical chemicals, and the like, enabled her to throw her enemies into confusion by a purely economic method at the outbreak of war; this initial advantage was gained, whilst entirely satisfactory arrangements were provided, by the stoppage of exports, for the manufacture of the necessary quantities of explosives, etc., at home. Another advantage was, however, derived from the advanced development of the German chemical industries.

The fundamental essential in the manufacture of explosives was nitric acid or its salts; the rifle and the large gun would become useless if we were no longer able to obtain these substances. The world's supply of nitric-acid salts had been hitherto obtained from the Chili saltpetre of South America; it is obvious that Germany could not go to war whilst dependent upon an overseas supply of this absolute necessity. It was known that previous to the war Germany was busily engaged upon the perfection of methods for manufacturing nitric acid and its salts from atmospheric nitrogen; this work came to a successful head in Germany not long before the outbreak of war, and she then became independent of overseas supplies of nitric acid. Was it to be doubted that this development of chemical industrial effort was not a factor in the declaration of war?

Whilst during five years of war this country succeeded in expanding its previously small installations for fine-chemical manufacture to such an extent that they became of sufficient magnitude to meet the immense demands for military explosives, one essential difference was observable between the German practice and that initiated to fulfil the corresponding war needs in this country. The German establishments were developed on a peace footing, and produced materials consumed by the whole world; they paid heavy dividends, and were a source of great national wealth in time of peace. At the same time, they were available for mobilisation for war production of explosives at short notice. The whole world, in fact, paid for the erection and extension of the vast explosives factories which made Germany so formidable in 1914; the British Empire paid for the German munition factories just as it paid for Gretna. Now that war was over, the German factories remained intact, and could revert immediately to their former task of providing our Empire with dyes, pharmaceutical and photographic chemicals, etc., as a dividend-paying proposition. The great German synthetic nitrogen products works, developed so as to render Germany independent of sea-borne nitrates for explosives manufacture, could now produce a considerable proportion of the nitrates and ammonium salts needed by Europe as agricultural manure. During the war the German synthetic nitrogen products factories had been greatly extended; these extensions constituted a valuable asset to the German commerce of the near future.

In this country it had not been possible to build up a chemical manufacture for war purposes which could be at once diverted to production for peace requirements. Explosives factories had had to be put up hurriedly for war production alone; the organisation could not be developed at short notice in such a way that the factories acquired any considerable after-war value. Thus the vast installation at Gretna was now practically on the scrap-heap. Whilst the German chemical industries emerged from the war in a stronger position than they held before, our own remain

much where they were. The causes which had placed the German chemical industry in the commanding position which it had so long occupied had been repeatedly discussed, and need not be considered on the present occasion; one point, however, might be insisted upon—Germany had never commanded any monopoly of scientific talent which had enabled her to secure supremacy in fine-chemical manufacture; in fact, a disproportionately large number of German technical products were discovered by scientific workers in Great Britain. A remarkable illustration of this fact occurred in connection with the materials which had been used in chemical warfare. Thus phosgene was discovered by John Davy in 1812, but only insignificant quantities had been made in this country; it was manufactured in considerable quantities in Germany for use in coal-tar colour preparation. The best and most economical methods of manufacture had been worked out on a peace basis in Germany; phosgene was an extremely poisonous substance, and was early used by the Germans in gas warfare. Large quantities of phosgene were used by us for the same purpose, but only after the delay caused by the necessity of time for working out the most convenient methods of manufacture and the construction of plant. Again, chloropicrin was discovered by James Stenhouse in 1848, and was highly poisonous; the Germans used it as a toxic material in gas warfare, being able to prepare it in quantity in the dye factories; and we, after the necessary delay for working out methods and installing plant, also used it in large quantities. The most powerful agent of all used in gas warfare, mustard gas, was discovered by Frederick Guthrie in 1860; the Germans were able to make it in their colour factories by an extremely complicated method, and used it against us in June, 1917. It took us about a year to work out and install a method of manufacture—much superior, it is true, to the German procedure—with which to arm the necessary retaliatory measures. All the above substances were British discoveries, but at the outbreak of war we had no facilities for their large-scale manufacture, whilst the flourishing coal-tar colour industry of Germany was able to provide them in quantity. Now that serious endeavours were being made to place fine-chemical manufacture on a proper basis in Great Britain it should be the duty of all interested to insist that the great schools of experimental science in the country should be financed on such a scale as to enable them to train efficiently the vast amount of young inventive talent which the war has shown to exist among us; only by so doing would it be possible to secure the large numbers of highly trained young scientific men who would be needed not merely for the purpose of gaining the knowledge required for the manufacture of articles of commerce already supplied by Germany, but for producing new inventions which would carry us in front of German effort. The record of Great Britain in chemical discovery was one of which she may well be proud, and many chemical industries now well established in Germany might be justly claimed as based entirely upon British discoveries. The coal-tar colour industry was initiated by the discoveries of Perkin, and was, indeed, established by him in this country before it was ultimately transferred almost wholly to Central Europe. Again, about a century and a half ago Henry Cavendish discovered that atmospheric nitrogen and oxygen could be caused to combine at the high temperature of the electric spark; this process, carried out on a minute scale in the laboratory by Cavendish, had been put into large-scale operation in Central Europe, and was used for the manufacture of huge quantities of nitric acid in Germany. Here, again, the development of a great scientific discovery made in this country had been left to Germany, and none of the practical fruits of the discovery have been gathered in Great Britain.

The whole history of the war consisted of a series of sequences in which some sudden military emergency had been met by rapid British scientific invention put into rapid practice by British technical effort. It can never be said, again, that this country is deficient in scientific skill or in technical ability.

It was, of course, obvious that the lessons which have been so forcibly brought home to us during the war must be applied by us in peace if the history of the past five years was not to be repeated. We needed the building up of all branches of chemical industry, and, to the promotion of that end, a great extension of the facilities for scientific education available in this country. In one respect at least the British Empire was in a highly favoured position; in one part or other it produced every raw material needed in its manufacture, although it had in the past left these sources of supply to be exploited by the foreigner.

In the near future one great danger threatened us. The large German colour works are again resuming their pacific manufacture of dyes and pharmaceutical products, and one of the foremost German dye manufacturers, Professor Carl Disberg, of Leverkusen, who helped his country valiantly in providing the materials for gas warfare, has just expressed the hope that he will be over in America again "very soon to see his old-time friends (*Journ. Indus. Engin. Chem.*, 1919, II., 509)."

We were on the eve of a great German propaganda movement for the purpose of rehabilitating the German chemist in the eyes of the world.

Discussion.

The PRESIDENT said that the science of chemistry has suffered more materially in the past than any other, by reason of lack of public and official recognition, but possibly after what had happened during the war, things would improve in the future. At times he thought they would, but at others he thought they would not. During the war it was impossible to fill the positions for which chemists were required, but now there were chemists wanting positions.

Professor H. E. Armstrong said he thought the paper ought really to have been read before the Economic Section. At times we were too prone to exaggerate the importance of chemistry in this connection relatively. Take the case of synthetic indigo. To him the marvel was, not that the Germans were successful as chemists in doing what they did, but that they were successful in exercising forethought 30 years in advance, and in seeing that there was a problem worth dealing with and spending any amount of money on from the chemical side. What we should ask ourselves was, why were the Germans such a long-headed nation, and we such a short-headed one?

At any time during the past 30 years we might have done what we had done during the war if there had been a sale for the products of the universities in the shape of chemists. Instead of that, too many students went to the bar simply because there was not a proper encouragement of them. He did not know whether there had been any advance in the attitude of manufacturers as a result of the war. He was inclined to think there had not been. The engineer and the chemist were not working harmoniously here, even now. They were in Germany. The engineer still thought too little of the chemist; he thought that he was the real man, and never gave the chemist a real chance. That state of affairs must be altered, and more particularly was it necessary to alter the outlook of the commercial man, or at least the education of the classes who were to be manufacturers and men of commerce. The question was whether they were likely to do that. There was some peculiar quality in the German which made him more receptive than ourselves. He had never been in the house of an English manufacturer, and met with the same culture that he had met with from similar men in Germany. People in this country would not take risks and look ahead, and be prepared not to have big returns at once. The Germans had worked out everything during the war, so that it would be of benefit to their manufacturers after the war, whereas we in this country were really worse off now than we were before the war.

SIR ROBERT ROBERTSON said that besides the training of chemists academically, there was an urgent need of technical training, and it was to be hoped that facilities would be given for that training. In his opinion, the training for an industrial chemist should be non-specialisation in the first instance, and a thorough grounding on the academic side, followed by a period in a factory, and then a return to some institution where he would receive guidance in technical training. In that institution he would be best left alone with simple appliances, and given the solution of a definite problem. In that way he would work out his own salvation, and if there was anything in him he would become a chemical technologist. That there would be a demand for this type of man in the future was undoubted, but at present, the outlook in regard to remuneration was deplorable.

SIR WILLIAM POPE in a brief reply, said he ought to mention that Sir Robert Robertson was previously responsible for working out the large scale manufacture of T.N.T., and that was a thing which every member of the nation could not be too grateful for.

CHEMICAL WARFARE.

In a paper before Section B (Chemistry), on Tuesday, September 9, Brigadier-General H. Hartley gave an exhaustive and interesting account of gas warfare and described the work of British chemists in this connection. Having explained that gas attacks were made in two ways, (a) in clouds, and (b) by projectiles, he mentioned that the first German gas attacks were made in 1915, when our troops were wholly or partially unprotected. In the first attack a great opportunity was missed by the Germans owing to the use of gas in low concentration and too small quantities, and even then the Germans failed to exploit the partial success gained in these attacks. We then formed a special brigade consisting of specially enlisted chemists, and from the formation of that brigade we liberated in France about 5,700 tons of gas, 25 per cent. being in the form of cylinder or cloud attacks, and the remainder in the form of projectiles. Development both on the part of the Allies and the Germans was then rapid. The German effort was directed to using little known organic compounds, hundreds of tons of complex organic derivatives, previously only prepared once or twice in a laboratory, being utilised. In 1916 chlormethylchloroformate (B.P. 105° C), with tonic properties similar to phosgene, was introduced and used against us. Later this was replaced by the trichloro compound (B.P. 128° C), which was used until the end of the war. As the well-known green cross shell filling, phosgene, was also introduced in trench mortar bombs. During the Arras battle of 1917, a variant appeared with asphyxiant properties, whilst in July, 1917, mustard gas made its appearance. Other varieties were introduced at various times. In the preparations for his attack in March, 1918, 90 per cent. of the enemy ammunition contained gas; it was never before used on such a scale, and from then until the end of the war both defensive and offensive operations were carried on by the aid of gas shells to a very considerable extent. A large number of extracts from a confidential report of General von Bulow, commanding the 1st German Army during the battle of Arras, dated 11-4-17, were read by Brigadier-General Hartley, which showed conclusively that our retaliatory measures in the use of gas had successful results. Other extracts from further German documents, were also read to the same effect. Then followed a discussion of the value of gas as a weapon in warfare, and a comparison of it with other weapons.

Coming to the work of British chemists, Brigadier-General Hartley said that researches were carried out in many laboratories, and a debt of gratitude was owing to professors and their assistants for the manner in which they worked on substances that were never pleasant, and often involved considerable risks. In April, 1915, we had only one plant producing liquid chlorine, with an output of 7 tons per week, but the energy of manufacturers enabled the first gas attacks to be made in September, 1915, and by December 31, 800 tons of gas had gone to France. Production increased steadily from that date, the output being: 1915—860 tons; 1916—5,150 tons; 1917—18,500 tons; 1918 (ten months) 15,500 tons. This, considering our unpreparedness, was a very satisfactory result. But comparison with the German output, thanks to their great resources, showed the importance of developing our organic chemical industry, otherwise we might find ourselves at the mercy of any power which had developed its resources in this respect and was prepared to take full advantage of them on the outbreak of a war. If any country dominated this industry as Germany did before the war, it was liable to become a standing menace to the peace of the world. More important even than offence was the means of defence against gas attacks, and it was difficult to over-estimate the value of the work of the anti-gas department under the leadership first of Sir William Horrocks, and later of Lieut.-Colonel Harrison. The latter gathered under him an enthusiastic group of young chemists and physicists, and the box respirator represented the joint results of their researches carried out under his inspiration, and controlled by his admirable practical judgement. He organised its manufacture on a huge scale, and it was a great testimony to his foresight and ability that, in spite of difficulties of production, supplies promised to France never failed. Altogether 55,000,000 respirators were produced by the Department, and of these, 19,000,000 were box respirators. Examples of the various types of gas mask, showing the stages in development, were exhibited.

Continuing, the author said that many chemists were employed in England and the theatres of war in advising on

technical matters connected with gas warfare, in organising gas defence, and in training and instructing the troops. That work had not been generally known or properly appreciated. The training of the men in the use of the respirators was as important as the design of it, because it gave them confidence in its use. The gas officer or chemical adviser in France had a very responsible post. In addition to his instructional and advisory duties he acted as intelligence officer so far as gas was concerned, investigating every attack to discover means of improving our defence, and collecting evidence of the result of our own gas operations. All new appliances were sent to him for a service test and criticism. Their work was of great value, as, being in constant touch with first-line conditions, they were in a position to criticise new appliances and to foresee future needs. Without their criticism and advice, progress would have been far slower and less certain. A field laboratory was formed in April, 1915, for investigating enemy material and solving urgent problems. The success of the laboratory owed much to the mechanical ingenuity and critical ability of Lieut.-Colonel W. Watson, the first director of the laboratory, and to the resourcefulness of his successor, Lieut.-Colonel B. Mount-Jones, who was mainly responsible for the chemical work from its formation. The instruction given at the gas schools was able to counteract to a great extent the disadvantage under which we suffered, owing to the general lack of scientific training among all ranks.

In conclusion, the author said that had the enemy foreseen the results of his treachery in introducing this new weapon in April, 1915, it would never have been employed. As it was, it provided another example of the German lack of foresight and their underestimation of their opponents, which might have delayed a decision, but only to make it the more complete and crushing in the end.

PRESIDENTIAL ADDRESS TO SECTION A
(Mathematical and Physical Science).

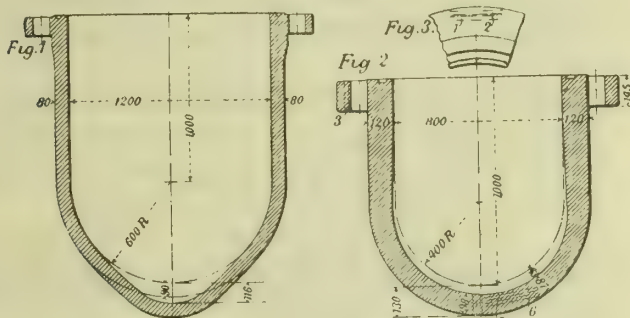
PROFESSOR A. GRAY in his address to this Section, dealt with some of the lessons which war has or ought to have taught our country and those who direct its policy. To a larger extent, of course, it was general in character and related mainly to engineering matters, but some of his points have an indirect bearing on the chemical and allied industries. In the first place he contended that had there been any truly scientific element in the personnel of the Government, attention would have been directed at a much earlier period to our hopeless state of unpreparedness for the storm which was gradually gathering up against us on the other side of the North Sea. This lack of scientific knowledge at the beginning of the war was responsible for a loss of life and treasure from which it will take us long years to recover, and which he could wish, seemed to weigh more heavily on the minds and consciences of politicians. The one single idea of our mobilisers was to send men to the trenches to kill Germans. The cause of the prevailing neglect of science, with all its pernicious results, was that almost all our political leaders had received the most favoured and fashionable form of public school education, and were without any scientific education. As things were at present, eminence in science was no qualification, it would even seem to be a positive disqualification, for any share in the conduct of the affairs of this great industrial country. Take the case of the dyes industries: the publicists and the good business men—the supermen of the present age—who wished to control and foster an industry which owed its very existence to an English chemist, refused to have on the committee which was to manage this important affair any man of scientific eminence, and no remonstrance had any effect. These great business men were, as a rule, not scientific at all. They were all very well for finance; in other respects their businesses were run by their works managers, and in general they were not remarkable for paying handsomely their scientific assistants.

While scientifically educated men, whether doing special work or acting as officers, had been held of far slighter account in the services than they ought to have been, for physicists as such there had been little or no recognition, except when they happened to be ranked as research chemists. These latter received their recognition in consequence of the existence of the Institute of Chemistry, and he was extremely glad that something was being done to found an Institute of Physicists. He was glad that something was being done at last for the organisation of scientific research. The movement had started well in several, if not all, respects, but there were one or two dangers to be avoided. There was, for instance, too

much centralisation aimed at. Everything was to be done from London; a body sitting there was to decide the subjects of research and to allocate the grants. There might be a good deal to be said for that in the case of funds obtained in London, but apparently already existing local incentives to research were to be transferred to London. The Carnegie Trust for the Universities of Scotland inaugurated a scheme of research work in connection with those Universities. The beneficiaries of the Trust, it was well known, must be students of Scottish nationality, but now, so far as chemistry and physics were concerned, it had been proposed, if not decided, to hand over to the organisation in London the making of awards, a process of centralisation which would probably not end with these subjects. He ventured to protest against that proceeding because the more incentives and endowments of research that existed, and were administered in the provinces, the better.

AUTOCLAVE FAILURES.

THE fiftieth annual report for 1918, issued by the Swiss Society of Steam Boiler Owners, Zurich, gives particulars of the failure in service of two autoclaves, or digesters. In one instance, a digester of semi-steel (*fonte d'acier*—steel casting?), which had been in service in a chemical works, was distorted, due to being overheated; as will be seen by Fig. 1, the spherical end dropped about the centre line and cracked, and the liquid content escaped into the fire-box. The digester was of Swiss manufacture; it was directly heated at a distance from the grate of 0.52m. (20 $\frac{1}{2}$ in.). The lower part internally had a thick deposit, due to the service required of the apparatus. The heavy deformation, 116mm. (over 4 $\frac{1}{2}$ in.) for a wall thickness of 90mm. (3 $\frac{1}{2}$ in.), must evidently have been the result of submitting the apparatus to a very high temperature. The apparatus was manufactured in 1915; the maximum registered pressure was 60 atmospheres; the explosion occurred at a pressure of 48 atmospheres and at a temperature of 265° C. The society condemned the digester, and had it replaced. In the case of the new one, they recommended placing the mixing device close to the bottom and increasing the distance between the grate and the digester.



In another chemical works, the bottom of a grey cast-iron digester, directly heated, also gave way (see Figs. 2 and 3). The crack produced by the explosion had, in the cold state, an opening of from 5mm. to 10mm. ($\frac{1}{8}$ in. to $\frac{3}{8}$ in.) in its central portion and a length of 0.5m. (19 $\frac{1}{2}$ in.). The liquid in the apparatus ran out in the fire-box. The digester was at a distance of 0.55m. (21 $\frac{1}{2}$ in.) from the grate. The apparatus, of foreign manufacture, was first used in the making of explosives, but this had been changed a few days before the accident, and fortunately so, for otherwise the consequences might have been disastrous. It was made in the year 1900; the maximum authorised pressure was 40 atmospheres, and the apparatus had been tested to a pressure of 120 atmospheres. The dimensions are given in Fig. 2.

It is not possible to say at what pressure this digester exploded. The temperature had certainly reached 240° C. The lower part was heavily worn internally, as shown in Fig. 2; the thickness was reduced from 130mm. (5 $\frac{1}{8}$ in.) to 87mm. (3 $\frac{3}{8}$ in.), a maximum wear of 43mm. (1 $\frac{3}{4}$ in.). Notwithstanding this fact, which was known to the society, the latter felt justified in allowing the apparatus to continue in service, since on the basis of a 40-atmosphere pressure the stresses in actual service were much below the normal ones. The explosion must have been due to other internal forces much above

the working pressure, this being confirmed by the circumstance that the crack remained open in the cold state and when the piece was under no pressure, there being, in other words, a permanent deformation.

Inspection showed that the bottom part of the apparatus was covered by a 20mm. ($\frac{3}{4}$ in.) layer of chalky deposit, which must have greatly hindered the uniform transmission of heat. The temperature of the walls must have risen up gradually, and it is well known that grey cast-iron when overheated loses all its resistiveness; growth, following repeated heating and cooling in the ordinary way, also comes in, quite apart from all consideration of overheating. This question of growth of cast irons we may add, has been frequently dealt with by the members of the Iron and Steel Institute, and we may recall a very interesting paper on the subject by Professor H. C. H. Carpenter, F.R.S., read before the Institute at the autumn meeting of 1909. Judging from the report, the society appears to be acquainted with Professor Carpenter's work in regard to this phenomenon.

Some experts, the report further states, may claim that the crack formed is the consequence of tensile stresses due to contraction and not to elongation of the metal. The report adds that it cannot say in what way the molecules become displaced, but that it can safely compare the occurrence with what takes place in the case of a grate bar, which curves out until it breaks at the part submitted to the highest tension; in the same way, the bottom of the apparatus lengthened out, or tended to lengthen out, downwards until fracture occurred.

Test specimens were taken, as shown in Figs. 2 and 3. Specimens having 200mm. (7 $\frac{7}{8}$ in.) between supports gave the following figures of resistance to bending in tons per square centimetre:—

No. 1	2.56
No. 2	2.86
No. 5	2.86
No. 6	3.14

Two specimens gave the following percentage analyses:—

	Bottom No. 5.	Flange No. 1.
Silicon	1.32	1.31
Manganese	0.42	0.42
Phosphorus	1.01	0.99
Sulphur	0.102	0.101
Total carbon	3.32	3.25
Graphite content	3.26	3.14

The Swiss Federal stipulations concerning the tests of steel bridges require that the material should withstand a bending test of 2.80 tons per square centimetre. It will be seen that the test specimen from the flange was the only one not to give this figure. There is no remark to make in regard to the chemical analyses, apart from the high percentage of phosphorus. The bottom contained 0.12 per cent more graphite carbon than the flange; this rise probably took place during the period of service, for the micrographs of the ends of the specimens 3 and 4, which are reproduced in the report, show that there occurred a modification in the texture of the metal. In both instances the texture is very different from that of normal grey cast iron. The micro-sections prove that the material had long been exposed to high temperatures. It is not possible to say what temperature the flange was subjected to, presumably from 200° to 300° C., whilst the bottom end was probably heated up to 500° C.

The report concludes by advocating casting the autoclaves standing, the gate being over the flange and not over the bottom, for it is most important that the bottom be perfectly sound. It was not possible to determine in what way the vessel which failed was cast.—“Engineering.”

OBITUARY.—We regret to announce the death of the chairman of the British Empire Producers' Organisation (Sir Duncan C. Baillie, K.C.S.I., at Glenquich Lodge, Amulee, on August 30, in his 63rd year.—Mr. Edwin O. Sachs, F.R.S.E., F.R.G.S., died in London yesterday after a long illness in his 50th year. Educated at University College School, London, Mr. Sachs travelled extensively, and made a special study of the practical side of fire protection. In 1897 Mr. Sachs founded the British Fire Prevention Committee, and was responsible for the establishment, two years later, of the first fire-testing station in Europe. He also acted as vice-president of the International Fire Exhibition at Earl's Court, and organised the first Fire Prevention Congress which met in London in 1903. During the war he served as Commissioner of the Special Fire Survey Force, which he himself organised, and as member of the Home Office Departmental Committee on Celluloid Dangers.

SCIENTIFIC AND INDUSTRIAL RESEARCH.

PRIVY COUNCIL COMMITTEE'S ANNUAL REPORT.

(Continued from page 252.)

Oxygen Research.

In May of last year the Advisory Council's Committee on Mine-rescue Apparatus called their attention to the desirability of certain researches being undertaken into oxygen apparatus and the use of oxygen, but the Council understood that several Departments of Government were making investigations into these and allied subjects, though there was no means of knowing the exact scope of their activities. Since the Council are always unwilling to initiate research which appears to fall within the province of other Departments, they approached Sir Arthur Duckham, the chairman of the War Priorities Committee of the War Cabinet, with the suggestion that some means of co-ordinating the work already in hand might be useful. They assured him that they should not recommend the Privy Council to make any provision for research in connection with oxygen until it was clear that no overlapping would result from their action. They were warmly supported in this policy by the Medical Research Committee. Sir Arthur Duckham thereupon summoned a conference of all the Departments concerned, and in July, 1918, an Oxygen Uses Co-ordination Committee was established under the War Priorities Committee for the purpose of associating together those directing oxygen research for the Government. The committee thus constituted was placed under the chairmanship of Professor Jocelyn Thorpe, a member of the Advisory Council. It had no spending powers, and could only recommend a suitable line of action to the Department or body directly concerned. It received reports of the progress of the several researches being carried on, and discussed them with a view, in the first place, to the definition of the particular problems and, in the second, to their rapid solution. Treatises and memoranda were prepared by members and consultants on particular aspects of the work, and certain experiments and tests were recommended and carried out. One of the first recommendations of the committee was an inquiry into light cylinders for the transport of oxygen and other gases to be undertaken by this Department. An account of this work is given below.

In January last the War Priorities Committee ceased to exist, and at their request, with the concurrence of all concerned, the Oxygen Uses Co-ordination Committee was transferred to the Department of Scientific and Industrial Research, and placed in charge of a large part of the researches hitherto conducted by the various Departments of War. The title of the committee was accordingly altered to the Oxygen Research Committee, and an allocation of £5,100. was made for the purposes of their work during the current financial year. The therapeutic uses of oxygen, shown by recent practice to be capable of very great extension, are being actively investigated by the Medical Research Committee in close co-operation with the Oxygen Research Committee. The study of improved containers and cylinders, of gauges and general appliances, of different systems of oxygen production, and of aircraft and industrial uses, falls, on the other hand, to this Department. The development of the methods of holding and transporting liquid oxygen is a matter in which the Oxygen Research Committee are co-operating with the Air Ministry, War Office, and Mine Rescue Apparatus Research Committee, particularly with regard to the use of oxygen for airmen at high altitudes, and for the treatment of patients in hospitals and of casualties in wartime and in mines. The committee have also been giving attention to the uses of oxygen for industrial purposes, and many data have been collected with a view to inviting in due course the co-operation of commercial firms in research work.

Gas Cylinders Research.

An interesting development of the work of this committee has been the establishment of the Gas Cylinders Committee, under the chairmanship of Professor J. C. McLennan, O.B.E., F.R.S. The membership includes the Hon. Sir Charles Parsons, K.C.B., F.R.S., Professor C. V. Boys, F.R.S., Major A. Cooper-Key, C.B., who represents the Home Office, Professor J. F. Thorpe, C.B.E., F.R.S., and representatives of the Admiralty and the Ministry of Munitions, together with Professor H. C. H. Carpenter, F.R.S., president of the Institute of Metals, and other prominent metallurgical experts. An allocation of £1,000. has been approved to cover the work of this committee during the financial year ending March, 1920.

The incentive to the formation of this committee was the desire of the Home Office experts, through the Oxygen Research Committee, that the whole question of the manufacture and transport of cylinders used for compressed gases should be investigated, with a view to amending the present specification of materials of which cylinders must be made in order to comply with the railway regulations. It was suggested that this specification (which was legalised as the result of the findings of the Departmental Committee on the Manufacture of Compressed Gas Cylinders in 1896) was now out of date, in view of the progress which had been made during the last twenty years in steel manufacture and treatment, and that the regulation therefore compelled the employment of an unnecessarily heavy type of cylinder. It was thought possible that a lighter cylinder possessing the necessary factor of safety might be produced. During the war a number of light high-tension steel cylinders for oxygen for airmen had been made to an Air Ministry specification; and these, at the instigation of the Oxygen Research Committee, were thoroughly tested and examined mechanically and metallurgically by the National Physical Laboratory. The Gas Cylinders Committee took up this work, and, on the basis of the reports made by the National Physical Laboratory, are continuing the research with a view to evolving a suitable specification. It is not yet possible to forecast whether the committee will be successful in its efforts; but should this be the case, the advantage to the public should be very great. Oxygen, carbonic acid gas, and other gases are being applied to an ever-increasing variety of purposes, and a saving in the weight of the cylinders would produce considerable economy both in transport and in handling.

Lubricants and Lubrication.

Early in 1917 the Standing Committee on Engineering appointed a committee to report on the field of research in lubricants and lubrication, to give an analysis of the problems involved and to prepare a scheme of research. The committee have had monthly meetings throughout the year under review, and have continued not only their classification of existing research, but also their activities in connection with the experimental work at the National Physical Laboratory initiated with the Advisory Council's concurrence last year. The tests on different kinds of oil in the Lanchester worm-gear have been extended. Valuable results have been obtained and detailed reports prepared indicating the relative values of various lubricants under extremely high pressures. Every oil tested has also been examined and its physical properties determined, so that full particulars are available for comparison.

A new apparatus has been designed by Dr. Stanton and Mr. Hyde at the National Physical Laboratory for testing the change in viscosity of oils and other liquids with change in pressure. The first results of these experiments on different kinds of oil used in commerce have been obtained, and a report classifying them has been prepared. These are remarkable, and provide valuable data not previously available.

Mr. Deely, a member of the committee, has designed a friction or oil-testing machine suitable for comparing both different oils and different surfaces. This apparatus has been constructed and sent to the National Physical Laboratory, and tests will shortly be made with it.

The committee is preparing at the present time a brochure on solid lubricants, such as graphite, steatite, talc, etc., containing references to these substances in colloidal form and their lubricating value used alone, or as an admixture to oils. It is hoped that this brochure will be ready for publication shortly.

The work on the bibliography of research in lubricants is nearly completed. It will contain references to, and a classified index of, all work hitherto done and published in connection with lubricants and lubrication problems. It is hoped that this also will shortly be ready for publication.

The chairman is about to prepare the final report of the committee on the terms of reference submitted to it in 1917. and this report, complete with appendices containing detailed reports of the work carried out by the committee and at the National Physical Laboratory, together with the bibliography and the brochures, will be presented in the autumn of this year. It will also contain a critical survey of the state of knowledge on the problems under consideration by the committee, as well as recommendations as to future research work necessary. It is hoped that this report, together with the bibliography, will be a useful work of reference for engineers and others inquiring into such matters.

(To be continued.)

CORRESPONDENCE.

*, We do not hold ourselves responsible for the opinions expressed by our correspondents.

Zinc Oxide.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—We note that under this heading you refer to a letter from a Mr. Alexander J. McConnell published in *The Times*. Immediately we saw this letter we wrote both Mr. McConnell and the editor of *The Times*, as per enclosed copies. As we have received no reply from him, we enclose copy of a further letter we have addressed to *The Times* to-day.—Yours, etc.,

KEELING & WALKER, LTD.

London, September 5, 1919.

September 1, 1919.

The Editor, *The Times*,

Printing House Square, E.C.

Sir,—We have noticed a letter on "Zinc Oxide" from a Mr. A. J. McConnell to you in your issue of the 30th August. We have addressed a letter to Mr. McConnell as per enclosed copy, as it would be extremely interesting to know in what way zinc oxides manufactured by ourselves and other British manufacturers are so much inferior to the imported zinc oxide.—Yours, etc.,

KEELING & WALKER, LTD.

September 1, 1919.

Alexander J. McConnell, Esq.,

Isthmian Club, Picadilly, W. 1.

Sir,—We have seen your letter of the 29th ult. re Zinc Oxide in *The Times*, and we note with surprise your statement re the difficulty of obtaining a high-grade zinc oxide made in this country. If you care to let us have particulars of what is required, we do not for a moment doubt that we can offer you a zinc oxide equal to anything which can be imported from abroad.—Yours, etc.,

KEELING & WALKER LTD.

September, 5, 1919.

The Editor, *The Times*,

Printing House Square, E.C.

Re ZINC OXIDE.

Sir,—I thought it might interest you to know that so far we have received no reply from our letter addressed to Mr. McConnell, copy of which we sent you on September 1. It, therefore, would appear that Mr. McConnell's British Manufacturer is not really so anxious to obtain a pure zinc oxide, as it would seem from the letter which you published.—Yours, etc.,

KEELING & WALKER, LTD.

Chemists at Gretna Factory.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—I can quite understand the chemists at Gretna factory being discontented. The following is my brief and bitter experience of the Ministry of Munitions.

I gave up a good post in Canada, sold up my home, paid the passage for my wife and family, to accept a position under the Ministry of Munitions at £175 a year (hardly "profiteering?") "Steelworks chemists and chemical engineers preferred," was stated in their letter to me, and as I have had 13 years' experience of steelworks, I naturally thought I had been accepted for such duties.

On arrival in London I was sent to Gretna. I filled up a form for married quarters, and in the meantime lived in a hostel and paid for my wife's and family's apartments, board, etc., elsewhere.

My work was lifting bags of guncotton from trolleys into the N/G washhouse when filled with N/G lifting them back again; washing floors, etc. I suffer from asthma (which I mentioned when applying for the post, no objection being made.) After two months, being off work ill for 1½ days, the Ministry's doctor forbade me to work again in that part of the factory. I was sent to the main laboratory, and a few days after, at the end of the month, was given one month's notice, afterwards altered to three as per the original agreement.

The result of my returning to England under the Ministry of Munitions was, that I found myself considerably out of pocket, and also out of a situation.

I believe a large number of Australian chemists came over and arranged for their wives to follow later. This was then

found to be impossible, and I should imagine that unless salaries were raised considerably after I was discharged, all these chemists would be considerably out of pocket. At the time I worked at Gretna and was drawing money out of the bank to supplement my income, lead burners were being paid large wages by the Ministry of Munitions.

Many of the chemists at Gretna will no doubt have an idea of my identity if I sign myself,—Yours, etc.,

MULDOON, N.5.W.

Leeds, September 3, 1919.

Import Restrictions

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—I notice complaints in some quarters that the restriction of the import of fine chemicals has forced up prices against the consumer, and the case of salicylic acid and salicylates is referred to as proof of the contention. May I be allowed to point out that just prior to the restriction, English makers of these particular products were obliged to sell at below their cost of production in order to compete with foreign salicylic acid and salicylates "dumped" into this country and offered for sale at prices lower than those ruling in the country of origin. One of the chief objects my company has had in view in urging the restriction of the import of certain fine chemicals is to secure to the British manufacturer a reasonable margin of profit, and makers cannot be blamed if they now secure this with the object of so establishing their business as to be in a position to compete with all comers when the import restriction is removed. Manufacturers know quite well that the unreasonable forcing up of prices against the consumer would only result in again opening the market to the foreign competitor. Manufacturer and consumer—wholesaler and retailer—surely realise that import restrictions are only a means to an end—viz., the ultimate establishment of important "key" industries within the British Isles on such a scale as to be proof against all foreign competition. If this commendable object is kept constantly in mind it should not be difficult to adjust business to meet the new conditions without inflicting hardship in any quarter.—Yours, etc.,

RALPH J. PUGH.

London, September 5, 1919.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

(SPECIALLY CONTRIBUTED.)

THE heavy demand upon a coal production, which although larger than it was a fortnight ago is still 13 per cent. to 15 per cent. below what it was in June, has made it impossible for the coke ovens to get all the coal they require. Round coal is having to be crushed to meet the needs of the 380 by-product ovens which are in operation, and even then difficulty is being experienced in keeping the plants working at within two-thirds of their capacity. What the position would be if additional furnaces on ordinary iron were put into blast it is difficult to say. Unfortunately, no change has occurred in the iron trade to render it necessary to obtain a bigger make of coke. The likelihood at present is rather that the make of ordinary iron will be decreased, and that of low phosphorus iron, for which East Coast coke is more suitable, increased. Any diminution of output of ordinary iron is not, however, probable for some months to come, the rail trade, it is stated, having booked sufficient business to maintain the present scale of operations until the end of the year.

The condition of the by-product market does not call for any greater make than is now being secured. It is true that benzol is all being absorbed, and that the entire output of sulphate of ammonia is being marketed, but the same cannot be said of other by-products.

Pitch is in strong demand, but there is not a ready absorption of the make in this district, and creosote is not moving away rapidly.

ZINC AND ZINC DUST PRICES.—The price of Australian high-grade zinc dust (88/92% metallic zinc) is unchanged at £68/£70. per ton c.i.f. U.K. The price of Australian electrolytic zinc (99/95% purity) is unaltered at £42. per ton f.o.b. Australia for direct shipment to New Zealand, India, South Africa, and the Far East.

ITEMS OF INTEREST.

IRON ORE IN NORTHERN QUEBEC.—Official reports just published indicate the existence of almost inexhaustible deposits of iron ore in the Ungava district of Northern Quebec.

GERMAN POTASH SUPPLIES.—*Reuter's* Berlin correspondent says it is reported that the German Government have undertaken to supply Great Britain with 22,000 tons of potash by the end of the present year.

GERMAN DYES FOR AMERICA.—The United States War Trade Board, according to *Reuter's* Washington correspondent, has issued an order allowing the importation of six months' supply of dyes from Germany for American manufacturers.

ENEMY PATENTS.—British Dyes, Ltd., have been granted licences to use twenty-nine patents belonging to the Badische Anilin und Soda Fabrik and Farbwerke vorm. Meister, Lucius, and Brüning. The Pure Russian Liquid Paraffin Co., Ltd., have been granted a licence to use Edeleanu's patent (11140/08) for the purification of paraffin.

TAR.—The Municipality of Bombay invite tenders for supply of 120,000 gals. of tar, 60,000 gals. to fulfil the requirements of the British Standard Specification No. 1, and 60,000 gals. to the British Standard Specification No. 2; to be delivered f.o.b. at an approved port. Forms of tender may be obtained at the offices of Sir John Wolfe Barry, Lyster and Partners, Dartmouth House, 2, Queen Anne's Gate, Westminster, London, S.W. 1. Tenders endorsed "Tender for Tar" must be addressed to the Consulting Engineers and Agents, as above, and delivered before noon on September 15.

MINISTRY OF MUNITIONS ORDERS.—By orders of the Ministry of Munitions the following orders were suspended as from August 1:—The Potassium Compounds Order, 1917, as modified by the Potassium Compounds (Partial Suspension) Order, 1919, the Optical Munitions Order, 1915, the Glass Control (Consolidated) Order, 1917, and the Glass Control (Consolidated) Amendment Order, 1918. It is also notified that the Ministry of Munitions revoke the Munitions (Ordering of Works) Regulations, 1916 and 1917. A similar notice is given by the Admiralty with reference to the Munitions (Ordering of Work in Admiralty Establishments) Regulations of last year.

QUININE CONTROL.—It is understood that Government control of quinine is being removed forthwith. This is satisfactory inasmuch as it will promote normal trade in the drug. A slight increase in price is inevitable, and it is learned that the Dutch Combine, which controls practically the whole world's supply of the drug, has decided to raise the price slightly. This is a natural consequence of the present scarcity of the drug, and the increased demand as against dwindling supplies and a reduced production. It may be said with authority that the Government control price during the war has not been representative of the actual economic conditions affecting the drug.

MANGANESE OUTPUT DECREASES.—Reports to United States Geological Survey covering the first three months of 1919 show that shipments of high-grade manganese ore were 23,937 tons, against 75,465 tons during the last quarter of 1918 and 305,869 tons during the entire year. Shipments of ore containing 10 to 35 p.c. manganese were 35,516 tons, against 320,455 tons during last quarter of 1918, and 913,163 tons during the year. Montana led in shipments of high-grade ore, Nevada in low-grade shipments. Decrease in shipments is due to unwillingness of ferro-manganese makers to increase their rather large stocks of ore, especially as there is now only a small market for the alloy.

THE HÖCHST DYEWORCS.—A recent number of the *Frankfurter Zeitung* announced that, in consequence of coal shortage, a large part of the Höchst dyeworks would be shut down, presumably only for a short time. The pharmaceutical and a few other important departments will continue working. The 1918 report of the Höchst Dyeworks states that so far it has not been possible to restore the production of peace goods to any great extent. In the course of the work of renovating the peace plants it became evident, moreover, that they had suffered so severely—partly from their long inactivity, partly from their war uses—that the amounts hitherto reserved would not suffice for the depreciations effected, and that additional funds must be provided. Apart from the new plant required, the restoration of the business to a peace footing will require considerable expenditure.

MANURES.—The Poplar Board of Guardians invite tenders for artificial manures, as under, for delivery to Laidon Station, Midland Railway (L.T. and S.), for use at the branch workhouse: Ten tons of basic slag; four tons sulphate of ammonia; three tons superphosphate. Forms of tender to be obtained from Mr. H. E. Dennis, clerk, Guardians' Offices, Poplar, E. 14, are to be returned by 6.30 p.m. on September 17.

METALLURGICAL RESEARCH.—Mr. John Dixon Brunton, of Musselburgh, has given £1,000. to the Applied Science Department of the Sheffield University, the income from the sum to be expended yearly on a medal and premium for the best metallurgical research work done at the university during the year. At a meeting at the university a letter was read from Mr. Brunton explaining that he took this course because of the great advantage he had derived from the knowledge he gained at the university when a student there.

CELLULOID BLAZE. A consignment of four tons of celluloid was destroyed by fire on a steam wagon and trailer at Warrington on Wednesday. Messrs. J. Blake and Co., carriers, Manchester and Liverpool, were transferring the celluloid, which was in a number of wooden cases, from the Liverpool docks to the Rexine Co., Ltd., Hyde. When the wagon was passing over Bank Quay railway bridge the steerer heard a woman scream, and on looking round saw a fierce flame rising from the boxes. The flames rose to a height of nearly 50 feet, and they were so fierce that an electric trolley wire was burned through and fell to the ground.

THREATENED STRIKE IN SCOTTISH SHALE OIL TRADE.—On the invitation of the Anglo-Persian Oil Company, representatives of the Federation of Scottish Oil Workers met in conference at the offices of the company, Britannia House, London, on Monday, with representatives of the Anglo-Persian Oil Company, the Scottish Mineral Oil Association, Ministry of Labour and Petroleum Executive, for the purpose of discussing the points of difference at present existing between the companies and the men, and to make an endeavour to reach such a conclusion as will avoid the stoppage of work which is threatened. The decision of the Federation to cease work in support of their demands for a shorter working week and consequent revision of rates, affects fully 9,000 workers.

PERSONAL.—Mr. Forsyth J. Wilson, D.Sc., Ph.D., F.I.C. (late captain and chemical adviser to the 11th Army Corps), who has been appointed Professor of Inorganic and Analytical Chemistry in the Glasgow Royal Technical College, had a distinguished career at Edinburgh University, and was engaged in extensive research in connection with war operations.—Mr. H. Cooper, M.P.S., Ph.C., who was until recently at the Wellcome Chemical Works, Dartford, is shortly proceeding to India to take up an appointment in the works of Messrs. Smith, Stanistreet and Co., Ltd., manufacturing chemists, Calcutta.—Mr. Isidor M. Heilbron, D.S.O., D.Sc., Ph.D., F.I.C. (late lieutenant-colonel and a senior staff officer in the Salonica Forces), who has been appointed Professor of Organic Chemistry in the Glasgow Royal Technical College, was a distinguished student of the college. He was awarded the James Young Exhibition. As a result of his work at the university there his Exhibition was continued, and he took the degree of Ph.D. He became a member of the Technical College Staff in 1908, and is the author of several works on technical subjects.

REFRACTORY MATERIALS.—The fundamental importance of a knowledge of the properties of the refractory materials used in high-temperature furnaces has been for some time recognised by the United States Government, and the Bureau of Standards has for the last two or three years been engaged in researches on the subject. The quartz or ganister bricks used for furnace work in the States are made mainly in Pennsylvania from crushed and ground quartzite rock. About 2.5 per cent. of lime is added, and the mixture moulded in steel moulds, dried, and burnt in kilns at 2500-3000° F. The best procedure to be followed in these processes, and the effects of variations of the procedure, are discussed in Technologic Paper No. 116 of the Bureau by Mr. D. W. Ross, and the effects of repeated burnings on the constitution and micro-structure of the bricks by Messrs. H. Insley and A. A. Klein in No. 124. It appears that the quartz is converted on heating into cristobalite and tridymite, which are both of lower density. Unless this conversion is completed during the original burning, the resulting brick will expand on further heating, with serious results to the structures of which they form a part.

FERTILISER NEWS.

(SPECIALLY CONTRIBUTED.)

Nitrate of soda.—Although showing, as we expected, some increase of 56,000 tons, last month's shipments from Chili were kept within a very narrow compass through the continued dearth of available tonnage. The sailing vessels formerly regularly employed in the trade are now carrying grain and other foodstuffs more urgently required in Europe than nitrate of soda, many of them having, moreover, been sunk during the war by German submarines, which paid particular attention to the valuable cargoes used by the Allies in the manufacture of explosives. So scarce are steamers at the present time that up to 240s. per ton has been paid to French Atlantic ports (Bordeaux, Nantes, La Rochelle), with 10s. more to Marseilles; and it may be imagined what prices the Chilean fertiliser will stand at to the Continental consumer. The output on the West coast fell further away in August to 107,000 tons, only a small number of oficinas remaining at work, and so enormous is the accumulation of stocks that instead of the anticipated increase of production in the autumn months a decrease will be seen unless the congestion can soon be relieved through the arrival of numerous ships. A sale of 6,000 tons of "refined" nitrate is reported at 9s. 3d. to 9s. 6d. per quintal, f.o.b., for October delivery, as also second-hand parcels of ordinary quality at 8s. 11d.; but the deadlock between the Producers' Association and those outside it still continues, and the former threatens to put prices down to 8s. per quintal if the latter do not join the "convenio!" *Brutum fulmen.* Nitrate is likely enough to fall of its own deadweight to that figure without the producers cutting off their nose to spite their face, there being already sellers at 9s. According to the Board of Trade returns, no nitrate of soda was imported into the United Kingdom last month.

Alsatian Potash Sales: Norway a Buyer.—France Alsatian potash is the subject of a proposed contract between France and Norway, which the French Government is quite prepared, it is said, to facilitate. France is in a position, and is willing, to deliver 40,000 tons of potash to Norway during the next five years, and it is suggested that the goods should be shipped at Belgian ports. Prices named are: For Sylvinites, 14 per cent., 70 francs per ton at the mine; rich sylvinites up to 20 per cent., 100 francs per ton; chloride of potassium of 50 per cent., 375 francs per ton; and for transport and packing, the cost at Antwerp, it is calculated, would make 20 francs per ton. The Alsatian Potash Sales Bureau has published the quantities of deliveries of potash in France in the first six months of the current year—namely: Sylvinites (kainit), 12-16 per cent., 77,055 tons; sylvinites, rich, 20-22 per cent., 40,048 tons and chloride of potassium, 50-60 per cent., 14,428 tons; total, 131,531 tons, equal to 27,543 tons pure anhydrous potash. It ought to be remembered in view of the foregoing figures that in the year 1913 the French consumption did not exceed 35,000 tons of pure anhydrous potash.

Sulphate of Ammonia.—Business in this material is moving with a fair amount of activity, but it is clear that consumers are not particularly pleased with the advances in price. They can perhaps have nothing to say about the justice of the increase, but in some cases the fear is expressed that intensive cultivation may be retarded by the upward movement. Everyone will agree that a bigger production of foodstuffs is part and parcel of the great national need of altogether increased production of the moment. At the same time, the multitude of augmented costs affects the sulphate men as it affects other sections of traders, and higher prices must result. Across the Atlantic the tendency is also upwards. There most of the producers are sold up for September, and seem to have all the business they can handle for October. The inquiry for export is steady, but the regular operators are in no position to take care of this business for immediate delivery. Small stocks are reported to be available in second hands.

Potash.—Trade is moving quietly in connection with the new potash supplies, and further announcements indicate that more of this fertiliser is being arranged for transport to Great Britain. Since August 7 authorisation has been given in the United States for the importation into that country of potash produced or manufactured in Germany. Potash may now be sent into the U.S.A. from every foreign source except Hungary and those parts of Russia which are under the control of the Bolsheviks, irrespective of the fact that it may have been produced in Germany.

Other Fertilisers.—These are pretty generally in small request, with perhaps the special exception of basic slag. In that particular section consumers are again complaining of delayed deliveries. The position of this material has been greatly improved by the experience of recent years, and agriculturists are strongly enamoured of it. Miscellaneous fertilisers do not provide much to comment upon this week. Bone-meals remain in very short supply, and blood and tankage are very little more than nominal markets. Fish meal is in a fair trade where any supplies are offered, and is said to command prices like 27s. 6d. for ammonia and 2s. 6d. for phosphates. Even 30s. for ammonia has been mentioned.

SOUTH WALES NOTES.

(SPECIALLY CONTRIBUTED.)

Business in tinplate is getting quite lively, and inquiries are numerous from foreign countries. More mills are being prepared for restarting, and the outlook is now brighter than at any time during the last five years. Manufacturers have still some difficulty in getting sufficient leading workers to man their mills. The independent chairman of the arbitration board has given his award in favour of the employees, who will receive their full demand of the 12½ per cent asked for. Export arrangements are much better and shipments to foreign ports are steadily increasing. The home requirements are also strong and pre-war customers are now reopening negotiations for regular supplies of tinplates.

Big developments are expected in the patent fuel business, for months past chemists have been engaged on research foreign demand for briquettes proves absolutely that this work in some of the best-known factories, and the increasing kind of trade has a great future before it. Mr. W. R. Llewellyn is endeavouring to amalgamate several large colliery and steel manufacturing firms, and the deal involves something like £7,000,000. He has now controlling interest in the Graigola Fuel Works, and since he undertook an active interest in this plant, it has been enlarged and extensions are still going on in order to double the pre-war yield of briquettes made by this company, and should this "big deal" come off the patent fuel trade will be largely extended in order to meet foreign customers' requirements. The principal shipments for the week went to Buenos Ayres, St. Nazaire, Rouen, and Bayonne. Coke orders are now more numerous, and the yields of by-products are consequently increasing. Shipments of coke have during the week been made at Newport for Massamedest, St. Malo, Dieppe, Barcelona, and Treport, and quantities left Cardiff for West Indies and Lisbon. In a few weeks' time there will be several new batteries of by-product ovens working, and as far as South Wales is concerned, the production of sulphate of ammonia, benzol, etc., is to be considerably increased during the next 12 months. There are between 200 and 300 new ovens nearing completion, and it is safe to say that should Mr. W. R. Llewellyn be successful in his negotiations for securing the leading collieries in one huge concern, many more ovens will speedily be erected.

A parcel of phosphoric ore from St. Nazaire arrived at Newport, and some 2,250 tons of iron pyrites have been discharged at Swansea docks.

COMING EVENTS.

Institute of Metals.—The annual autumn meeting will be held in Sheffield on **Wednesday and Thursday, September 24 and 25.**

Iron and Steel Institute.—Autumn meeting at the House of the Institution of Civil Engineers on **Thursday and Friday, September 18 and 19.**

James Watt Centenary.—Celebrations at Birmingham on **Tuesday, Wednesday, and Thursday, September 16, 17, and 18.**

DEPARTMENT OF OVERSEAS TRADE.—The statement which has appeared in the Press as to the control of the Department of Overseas Trade is unauthorised and incorrect. The Department remains under the joint control of the Foreign Office and the Board of Trade, and any arrangements made as regards housing will not affect this joint control.

NEW COMPANIES.

Colour Oxidising Company, Ltd.—Private company. Capital £8,000., £1. shares (2,000 10 per cent. cumulative preference). Electro platers, smiths, chemists, etc. Solicitors: H. S. Holt, 6, Gray's Inn Square, W.C.

Consolidated Mines of Cornwall, Ltd.—Private company. Capital £66,000., £1. shares (33,000 7 per cent. cumulative preference). Object: Agreement with H. Van den Bergh. Winners and workers of and prospectors for china, mica, and fire-clays. Registered office: 8, Hart Street, Mark Lane, E.C.

Dick's Asbestos Company, Ltd.—Private company. Capital £100,000., £1. shares. Objects: To take over the business of Dick's Asbestos Company carried on by W. F. Dick at 47, Fenchurch Street, E.C. Manufacturers of and dealers in asbestos, fibres, non-conducting coverings, asbestos bricks and cements, engine and pump packings, etc. Office: 47, Fenchurch Street, E.C. 3.

Castleary Fireclay Company, Ltd.—Capital £100,000., £1. shares. Miners of and dealers in clay, fireclay, coal, limestone, ganister, etc., and to enter into an agreement with the Silling Company, and James Winning, the liquidator thereof. Solicitor: J. J. McMurdo, 10, Bank Street, Airdrie.

Indo-Burma Oilfields, Ltd.—Private company. Capital £100., £1. shares. Objects: To prospect for, acquire, develop, and deal in oil-bearing lands and properties in India, Burma, the Malay States and elsewhere, etc. Solicitors: Guedalla, Jacobson and Spyer, Austin Friars House, E.C.

Selby Chemical Company, Ltd.—Private company. Capital £55,000., £1. shares. Registered office: Holme Works, Holme Lane, Selby, E. Yorks.

Southdown Chemical Company, Ltd.—Private company. Capital £60,000., £1. shares. Objects: To take over the business of chemical manufacturers, makers of dyes, intermediates, drugs, lubricants, and other substances, etc. Registered office: Beaufort Road, Birkenhead.

Welsh Tinplate and Metal Stamping Company, Ltd.—Private company. Capital £500,000., £1. shares. Objects: To take over the business of the Welsh Tinplate and Metal Stamping Company, Ltd. (incorporated in 1911), manufacturers of and dealers in iron, steel, terne and black plates, etc. Registered office: Cambrian Works, Sea Side, Llanelli.

Apex Trinidad Oil Fields, Ltd.—Capital £200,000., £1. shares. Objects: To acquire petroleum and other properties in Trinidad or elsewhere, to refine and deal in petroleum and other mineral oils, and to enter into an agreement with the Anglo-French Exploration Company, Ltd., and the British Borneo Petroleum Syndicate, Ltd. Solicitors: Holmes, Son and Pott, Capel House, E.C.

LEGAL INTELLIGENCE.

Alleged Theft of Government Metal.

Alleged extensive thefts of Government metal during the war formed the subject of a charge at Bow Street Police Court, when Albert Evan Watcott, a general dealer, of Pyrland Road, Canonbury, was charged with obtaining by false pretences forty tons of scrap lead, the property of the Ministry of Munitions, and valued at £1,291. 12s. 8d. Detective-sergeant Aldridge gave formal evidence of the arrest of the defendant on Monday night, and stated that when charged Watcott said "Righto." The officer asked for a remand. The magistrate granted the application, and fixed bail in one surety of £400.

Commonwealth Oil Corporation.

In the Vacation Court, London, Mr. Justice Greer had before him an application in reference to the Commonwealth Oil Corporation, Ltd., a considerable number of debentures in which are held in Scotland. Counsel asked that the company's petition for the sanction of the Court to a scheme of arrangement should be in the paper for hearing on September 17. There was an important agreement dependent upon the sanction of the Court being obtained during the present month. As evidence had to come from Scotland, it might be that it would be necessary to ask for further indulgence on the 17th. His Lordship, in acceding to the application, mentioned that he himself was a debenture holder and had a general knowledge of the scheme, of which he had formed a very favourable opinion. In the circumstances, he did not know whether he could deal with the matter, but for the present he would preserve an open mind. The parties, however, should be informed that he was a debenture holder.

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 4, Queen Anne's Gate Buildings, London, S.W. 1, whence, unless otherwise stated, further information may be obtained:—

Australia.

A Sydney firm, with useful connections throughout Australia, desire to obtain the representation, for Australia, of United Kingdom manufacturers of dry colours for cement and magnesite work. The inquiring firm would prefer to do business solely on a commission basis. (Reference No. 554.)

Canada.

A Canadian firm desire the addresses of United Kingdom firms prepared to import high-grade felspar, phosphate, and pyrites.

Egypt.

A United Kingdom firm, whose business organiser for the Egyptian district has returned to this country on a short visit, wish to get into touch, with a view to obtaining agencies, with first-class United Kingdom manufacturers of dyes and soap. (Reference No. 559.)

South Africa.

A Johannesburg agent desires to secure the representation of United Kingdom firms for soaps. (Reference No. 563.)

Belgium.

An old-established firm in Liège desire to purchase, and would also accept agency, with dépôt, for the following articles: Chemical products, drugs, pharmaceutical products, and soap. (Reference No. 565.)

A wholesale firm in Verviers, with twenty-two years' experience in the textile industry, wish to obtain an agency, with dépôt, for chemicals for dyeing and glue for the manufacture of tissues. The firm claim to have a good clientele in Liège and Brussels. (Reference No. 566.)

Brazil.

A partner of a firm of general commission agents in Pernambuco (a British subject), who has had several years' experience in Brazil, is at present in this country, and desires to obtain agencies, on a commission basis, for varnishes, chemicals, drugs, and dyes. He is also desirous of exporting native produce from Pernambuco, including oil seeds and fibres and carnauba wax. (Reference No. 585.)

GAZETTE NEWS.

LIMITED COMPANIES.—Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions, Orders, and Official and Other Notices.

Acetylene Equipment Company, Ltd.—Meeting of creditors, Palmerston House, Old Broad Street, E.C., September 10.

Adams British Oil Company, Ltd., Deptford, S.E.—R. H. Johnston ceased to act as receiver August 16.

Fleetwood Fish Meal Company, Ltd.—Resolved August 6, confirmed August 22: That the company be wound up. W. F. Harris, Bank Chambers, Parliament Street, Hull, chartered accountant, liquidator. Meeting of creditors at Hodgson, Harris and Co.'s, Bank Chambers, London Street, Fleetwood, September 6. Claims to liquidator by October 18.

Hay's Waterproof Glue and New Patent Enamel and Varnish Company, Ltd.—Meeting of creditors, 24A, Commercial Road, Portsmouth, September 17, at 11 a.m.

Premier Oil and Pipe Line Company, Ltd.—Meeting of creditors, Institute of Chartered Accountants, Moorgate Place, E.C., September 15, at 11 a.m.

Welsh Tinplate and Metal Stamping Company, Ltd., Llanelli.—Resolved August 1, confirmed August 22: That it is desirable to reconstruct the company, and having regard to the agreement, dated June 4, 1919, and made between Danl. Williams on behalf of himself and all the other holders of shares in the company of the one part, and Thos. Jones Randell on behalf of the new company therein mentioned of the other part (being an agreement providing, amongst other things, for the exchange of shares in this company for shares in the said new company), and to the fact that such agreement has been duly ratified, that this company be wound up. D. Williams, Box House, Llanelli, and others, liquidators, who are authorised to consent to the registration of a new company, to be named the Welsh Tinplate and Metal Stamping Company, Ltd.

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

The specifications of the following applications are not printed by the Patent Office until the complete specifications have been accepted.

September 1st to 6th (inclusive).

Catalysts. Adam, M. A.; and Legg, D. A. 21,667.
 Manufacture of Coarsely Crystalline Substances from Solutions. Aktieselskapet de Norske Saltverker. 21,684.
 Explosives. Atlas Powder Co. 21,438.
 Apparatus for Aerating Liquids. Bailey, A.G. 21,787.
 Artificial Silk. Bouffe, G. F. J. 21,643.
 Bleaching Process. Brierley, S. 21,720.
 Soap Manufacture. Brown, R. 21,786.
 Treatment of Explosives for Use as Fuel. Crittall, R. G., and Musgrave, J. L. 21,647.
 Composite Fuel. Day, T.; Johnston, J.; and Summerfield, W. 21,960.
 Cellulose Derivatives. Dreyfus, H. 21,474, 21,661, 21,662, and 21,773.
 Aromatic Derivatives. Dreyfus, H. 21,554.
 Apparatus for Splitting Up or Getting Pitch, etc. Guldner, G. W. 21,505.
 Fixation of Atmospheric Nitrogen. Island, J. S. 21,690.
 Concentration of Bituminous Coal by Flotation. Jackson, W. J. Mellersh (Metals Recovery Co.). 21,573.
 Process of Evaporating Liquids. Krause, G. A. 21,553.
 Roasting and Sintering Ores, etc. Lloyd, R. L. 21,812.
 Electric Furnaces. Luca, D. de. 21,582.
 Treatment of Sulphide Ores. Mackay, P.A. 21,819.
 Flotation Separation of Mineral Substances. Nevett, R. D.; Palmer, T. H.; and Seale, H. V. 21,608.
 Production of Liquid Ammonia. Norsk Hydro-Elektrisk Kvælstofaktieselskab. 21,447.
 Separating Fats, Oils, etc., from Waste Waters. Poumier, R. 21,451.
 Still for Distilling Tar, Pitch, Benzol, Naphtha, Ammonia, and Carboic Acid. Sinfeld Bros.; Sinfeld, D.; and Sinfeld, H. 21,483.
 Drying-plants. Zimmermann, O. 21,881.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 6d. in stamps to the Comptroller, Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane, W.C.

1916.

Obtaining of Nitrogen Compound from the Nitrogen of the Atmosphere. Montgomery, C. J.; and Royston, E. R. 9,210.
 131,609

1918.

Process for Purifying Liquids. Riiland, A. 5,016. 121,452
 Tubular Evaporating and Cooling Apparatus. Barbet et Fils et Cie. E. 5,232. 114,838
 Production of Glycols. Weizmann, C.; and Bainbridge, E. G. 9,131. 131,628
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 Manufacture of Liquid Nitrogen Peroxide and Nitric Acid. W. R.; and Nobel's Explosives Co. 10,869. 131,642
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 Ferrotitanium. Blackwell, H. A. 12,364. 131,675
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 Evaporating-apparatus. Thunholm, K. L. E. 13,760. 118,635
 Regenerative Furnaces of the Soaking Pit Type. Stein et Cie, C. M. 14,177. 120,039
 Roasting and Refining Impure Tin. Bolitho, H. 14,233. 131,743
 Compound of Lime and Bromine. Arthur, J. S.; and Kilby, L. G. 14,661. 131,750
 Devices for Discharging Predetermined Quantities of Glass from Glass Furnaces. British Thomson-Houston Co.; and Gray, J. 14,862. 131,756
 Electric Furnaces. British Thomson-Houston Co. (General Electric Co.). 15,320. 131,767
 Chrome Liquors and Salts. Blockey, J. R.; and Walker and Sons, W. 15,786. 131,772
 Centrifugal Pumps. Frame, W. J. 17,074. 131,781
 Alkaline Electric Accumulators. Cave, A. M. 17,338. 121,118
 Means for Extracting Water from Washed Coal. Burnett, C. 17,874. 131,788
 Pressplates for Oil-Expressing Presses. French, A. W. 18,789. 131,798
 Complete Separation of Liquor and Remelted Syrup Directly in Remelting Centrifugal Machines. Lemoine, J. L. 12,244. 131,860
 Device for Use with Furnaces for Enabling the Progress of Combustion to be Ascertained. Hintze, J. G. W. 18,686. 131,864

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Portland Cement. W. S. Akerman, Burnham, Somersetshire. British Patent, 128,750, of 1918.

Raw merl composed of limestone and shales, with which may be mixed a portion of the fuel used in the second part of the process, is heated in a closed chamber so as to drive off carbonic acid and other gases and the oil and tar constituents, and then introduced into a vitrifying chamber of the kiln, the oil, etc., driven off from the calcining-chamber being recovered, and the gases from the calcining-chamber being collected for further use, such as for supplementing the heat for vitrifying, or to assist the waste heat from the vitrifying-kiln which passes to the walls of the calcining-chamber. The calcining-chamber may be in the form of a pipe, which is situated in a continuous kiln of the type having oscillatory shafts, and is provided with means for excluding the air while the contents are automatically discharged by gravitation.

Antimonious Oxide. E. F. Morris, Roby, near Liverpool. British Patent, 128,818, of 1918.

To assist the aerial oxidation of antimony to antimonious oxide, the presence of a small proportion of one or more of the following substances, sulphur, sulphide of arsenic, and sulphide of antimony, is maintained throughout the process.

Tin Salts. A. W. Gregory, Greenwich, London. British Patent, 128,833, of 1918.

Tinned scrap is treated with a hot solution of ammonium polysulphide prepared by adding an ammonium salt such as the sulphate to sodium polysulphide. Caustic soda may also be present in the solution. The saturated solution is treated to recover the tin as sulphide by neutralising, for instance, with nitre cake, sulphuric acid, hydrochloric acid, or sulphur dioxide.

Paints. J. F. Bottomley, Brighouse, Yorkshire. British Patent, 128,402, of 1918.

A priming or paint for surfaces of concrete, cement, artificial stone, etc., comprises a solution of zinc sulphate and a small proportion of an azo-compound such as the sodium salt of *p*-sulpho-benzene-azo- β -naphthol. Azo-compounds suitable are those which are suitable for acid dyes on wool and similar fibres.

Amines. W. Rintoul, J. Thomas, and Nobel's Explosives Company, Ardeer Factory, Stevenston, Ayrshire. British Patent, 128,372, of 1918.

Tertiary amines are separated from admixed secondary amines by treating the mixture at low temperatures with phosgene to convert the secondary amine into the corresponding urea chloride; if the tertiary amine is present in excess, the separation can be effected in one stage, the mixture of urea chloride, tertiary amine hydrochloride, and free tertiary base being washed with dilute hydrochloric acid which extracts all the tertiary base as hydrochloride, which is then decomposed by alkali. If the secondary base is in excess in the mixture, either free tertiary base is added until there is excess thereof and the resulting mixture is treated as above, or the initial mixture is treated with half the equivalent of phosgene; the product is washed with water to extract the hydrochlorides of the bases, and the bases precipitated from this solution by alkali, and subjected again to the action of phosgene, and the operations repeated until the separation is complete. The secondary bases are regenerated from the urea chlorides by hydrolysis by boiling with dilute acid or water. Examples are given of the treatment of crude diethylaniline containing monoethylaniline and of a mixture of mono- and di-ethyl-*o*-toluidine.

Manufacture of Ammonia. I. W. Cederberg, H. M. Backstrom; and G. A. Kyhlberger, Stockholm, Sweden. British Patent, 127,063, of 1918.

Ammonia is produced at temperatures below 400° C. and at pressures exceeding 250 atmospheres by treating mixtures of nitrogen and hydrogen with a catalytic agent consisting of one or more of the following: metallic copper, silver, gold, zinc, cadmium, mercury, gallium, indium, thallium, germanium, tin, lead, arsenic, antimony, or bismuth, or a compound of such a metal which is capable of reacting with nitrogen or hydrogen or both to form ammonia, or a compound which under the conditions of the catalytic operation yields either the metal or a compound such as those indicated

above. Examples of catalysts mentioned are copper asbestos, zinc powder, mercury nitride-bromide, 2HgBr_2 , Hg_3N_2 , copper hydride, zinc amide, copper ferrocyanide. In an example, copper oxide is precipitated on asbestos and heated in ammonia at 325°C ., which produces cuprous nitride. This is used as a catalyst at a pressure of 680 atmospheres.

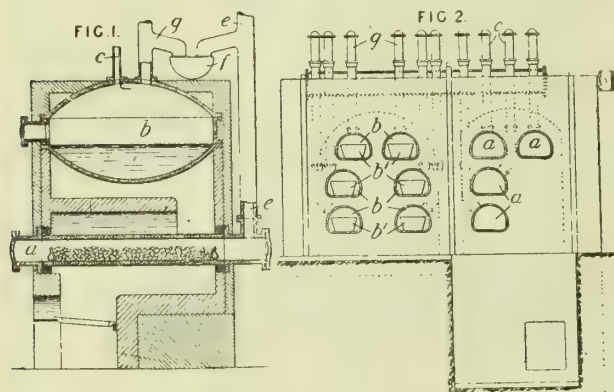
Dyes.—A. G. Perkin, Leeds. British Patents, 126,764 and 126,765, of 1918.

N-Dihydro, 1': 2: 2': 1'-anthraquinoneazine is obtained by fusing 2-aminanthraquinone with caustic potash and a sugar, such as glucose, cane sugar, or lactose.

Dibenzanthrone is prepared by fusing benzanthrone with caustic potash in the presence of a sugar, such as glucose, cane sugar, or lactose.

Distilling and Carbonising Pitch. F. M. Perkin and Nitrogen Products and Carbide Company, London. British Patent, 129,091, of 1918.

The destructive distillation and carbonisation of pitch is carried out in two or more stages at different temperatures, the first in metal stills or retorts at a temperature not exceeding 600°C ., and another at a temperature of from 900° to 1000°C ., the coke or carbon finally obtained being particularly suitable for the manufacture of carbon electrodes. Fig. 1 shows an iron still or retort *b* for the first stage of the



process arranged above ordinary horizontal retorts *a*. The pitch may be run into the still *b* at *c*, and this may be heated by the waste heat from the high-temperature retorts below; *f* are catch-pots through which the gases from the outlet pipes *g*, *e* pass for collecting the oil, etc. Fig. 2 shows an arrangement in which horizontal gas retorts are used for both stages, the low-temperature retorts *b* being provided with iron trays *b'* to receive the pitch.

Lactic Acid. A. P. H. Desborough, Holton Heath; J. Reilly, St. Ambrose, Parkstone; and A. C. Thaysen, Dorsetshire. British Patent, 128,687, of 1918.

Lactic acid is formed by fermenting sugars, such as maltose, which may be obtained by the action of malt or moulds upon cereals, chestnuts, acorns, etc., dextrose, saccharose, mannite, raffinose, and arabinose, with a new type of lactic-acid producing organism—viz., *bacterium volutans*,—which is found in sour mash, maize or other cereal meal, soil, carrots, and parsnips, and is identified by the size and by the production of volutine, which can be detected microscopically by staining with polychrome methylene blue solution. The acidity developed by the fermentation is reduced by repeated addition of preferably sterilised alkali, alkaline-earth compounds such as calcium carbonate or oxide, or other oxides, hydroxides, or carbonates such as zinc or ammonium compounds. The lactates may be separated by evaporation and crystallisation, and other lactates obtained by double decomposition. The crude lactates may be washed with small quantities of water, and the wash-liquors worked up for separation of volatile fatty acids, such as acetic or butyric, which are formed during the fermentation. The lactates may be decomposed with sulphuric or other acid, and the lactic acid separated by extraction with butyl or isobutyl alcohol. Volatile fatty acids may be separated from the lactic acid by distillation. The lactic acid may be purified by converting it into lactide by heating in a current of air or otherwise, separating the lactide by distillation under reduced pressure, purifying it by crystallisation, and reconvert it into lactic acid by heating with

lactic acid solution, or into lactates by treatment with metal hydroxides. Solutions for fermentation may be obtained by treating brewers', distillers', or other mash which have been spoilt by entry of foreign organisms by saccharifying with malt if necessary, and boiling.

Phenols. South Metropolitan Gas Company and E. V. Evans, London. British Patent, 129,002, of 1917.

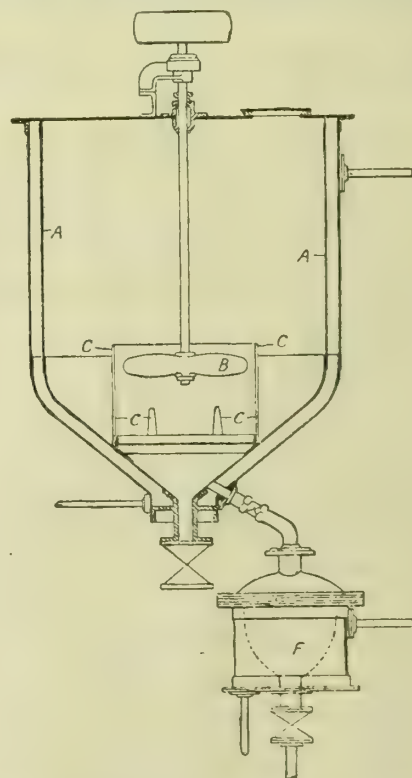
In the manufacture of aromatic hydroxy compounds by fusing aromatic sulphonic acid with caustic alkali, the alkali sulphite resulting from the fusion is electrolysed to give caustic alkali for further use in the fusion, and sulphur dioxides, which is either converted into sulphuric acid and used in the sulphonation, or is used to convert the alkali phenolate into free phenol. Or, instead of removing the alkali sulphite, the whole mass of alkali phenolate, alkali sulphite, and excess alkali is dissolved in water and electrolysed, giving free phenol.

Varnishes. British Aeroplane Varnish Company, London; and J. G. Ward, Felling-on-Tyne, Durham. British Patent, 129,033, of 1917.

The viscosity of varnishes consisting of solutions of celluloid nitrocellulose, or other cellulose ester in organic solvents such as ketones or esters, to which may be added diluents such as benzole, benzene homologues, or alcohols, or softening agents such as oils or gums, is preserved by addition of small quantities of an organic polybasic acid such as citric or tartaric acid. The amount of acid may be only sufficient to neutralise the alkalinity; or if the solution is neutral or acid, a salt of the acid may be added.

Derivatives of Benzene, Toluene, and Naphthalene. H. N. Morris and Co., H. N. Morris, and W. J. Sable, Manchester. British Patent, 129,074, of 1918.

Di- and tri-nitro derivatives of benzene, toluene, and naphthalene, and ketonic derivatives such as benzophenone, are treated with a silicious earth such as fuller's earth or kieselguhr to decolorise them and remove impurities such as



iron, etc., which affect the crystallisation. The substance, melted or in solution, is mixed with the earth in a steam-jacketed pan *A* by a rotating stirrer *B* which is surrounded by an open cylinder *C* having slots *e* in its base. The liquid is run through a steam-jacketed filter *F* to crystallising troughs.

REPORTS OF COMPANIES.

Yorkshire Dyeware and Chemical Company.

The trading profits of the Yorkshire Dyeware and Chemical Company for the year ended June 30 were £59,216, and £6,451. was brought forward. Debenture interest absorbed £3,591, and a final dividend of 5 per cent. and a bonus of 25 per cent. are proposed, making 35 per cent. for the twelve months, adding £15,000. to the reserve, and £20,000. to the extensions fund, and carrying forward £8,701. The board recommend that the share capital be raised to £150,000. by the capitalisation of £75,000. of the reserve fund, and that one new 15s. share be added to every similar share now held. Mr. J. E. Bedford and Mr. G. H. Clemons (directors) and Messrs. Armitage and Norton (auditors), ask re-election. The company's trading profits for 1917-18 were £46,351., for 1916-17, £57,956., and for 1915-16, £54,002., and distributions for each period were similar to those proposed for the past year. Twelve months ago £25,000. was reserved, in 1917, £30,000., and in 1916 £29,000.

British Gas Light.

Report for half-year ended June 30 last states that, after providing for debenture interest, the net revenue amounted to £15,470., which with balance brought forward makes available total of £66,845. The directors recommend dividend at rate of 10 per cent. p.a., less tax, payable October 3, leaving £46,895. to be carried forward. Earnings of past half-year are disappointing and at most of company's stations very inadequate. It will be necessary to further advance price of gas at those stations at which the maximum price authorised by Parliament has not already been reached. Meeting, 11, George Yard, Lombard Street, E.C., September 24, noon.

Calico Printers' Association.

Owing to fact that directors have still been unable to arrive at a settlement with the Inland Revenue authorities in respect of the company's liabilities for excess-profits duty, and are not yet in a position to submit accounts for year ended June 30. In these circumstances the directors propose to adjourn the meeting so far as presentation of report and accounts is concerned, but to transact the other business of

an ordinary general meeting. Directors recommend dividend at rate of five per cent. p.a. on preference for half-year ended June 30 last, and dividend of 5 per cent. for year on ordinary, both less tax, payable September 30 to shareholders registered September 15. Meeting, Memorial Hall, Albert Square, Manchester, September 17, at noon.

Cordoba Copper.

The directors announce that the negotiations referred to at the annual general meeting in April last have been brought to a successful conclusion, the whole of the company's property in Spain having been disposed of, with the consent of the Board of Trade, for a sum of 1,000,000 pesetas, payable in cash. The sale has been completed and the purchase money received. The total assets of the company are now represented by a sum of approximately £70,000., which is invested in Government securities. With regard to future policy, the Board will submit their recommendations to the shareholders at the earliest possible date.

DIVIDENDS.

MUNTZ'S METAL.—Interim dividend for half-year at rate of 5 per cent. per annum (6d. per share), less tax, on ordinary, payable October 1. The same dividend was paid last year.

HARRISONS AND CROSFIELD.—The directors have declared a dividend on the cumulative preference shares at the rate of 6 per cent. per annum for the three months ending September 30, 1919, less tax at 6s. in the £. Warrants will be posted September 29.

MANDLEBERG (J.) AND Co.—Interim dividend for half-year at rate of 10 per cent. per annum (1s. per share), less tax, on ordinary, payable September 15. The same dividend was paid last year.

OIL PRODUCTION IN CANADA.—An oil-refining plant is to be erected at Regina, Saskatchewan, involving an expenditure of £200,000. While it will be impossible to complete construction this year, it is hoped that sufficient work will be done to enable the company to proceed with the distillation of crude oil, and further additions will be made as business demands. The crude oil will reach Regina from the Wyoming oil fields, and a modern refinery will be erected to meet the rapidly expanding business in Saskatchewan.

MARKET REPORTS.

TAR AND AMMONIA PRODUCTS

WEDNESDAY.

Benzole: London 90%, 1s. 10d. to 2s.; North, 1s. 8d. to 1s. 9d.; 50%, 1s. 10d.; North, 1s. 8d. to 1s. 9d. naked. Carbolie acid, crude, 60%, East and West Coast, nominally 1s. 7d. to 1s. 8d.; crystals, 39-40%, 9d. to 9½d., f.o.b. Crude tar, London, 45s. to 50s.; Midlands, 44s. to 46s.; North, 45s. per ton, ex works. Pitch 77s. 6d. to 80s.; East Coast, 67s. 6d. to 75s., f.o.b.; West Coast, 60s. to 65s., f.a.s. Solvent naphtha, naked, London, 90-190%, 2s. 5d.; North, 2s. 3d. to 2s. 4d.; 90-160%, naked, London, 2s. 5d.; North, 2s. 2d. to 2s. 3d. Crude naphtha naked, 30%, 9d.; North, 8d. to 8½d. Refined naphthaline, £16. to £18.; salts, £6. to £7. Toluol, naked, London, 2s. 6d.; North, 2s. 5d. Creosote, naked, London, 6½d.; North, 5½d. to 6d.; heavy oil, 6½d. Anthracene, 40-45%, 7d. per unit. Cresylic acid, 95%, 2s. 5d. to 2s. 6d.; 97-99%, 2s. 7d. to 2s. 8d., ex works, London, and f.o.b., other ports. Sulphate of ammonia; home trade, £19. 10s. per ton; basis 24½%. Nitrate of soda, £22. to £22. 10s.

FERTILISER MATERIALS.

LIVERPOOL, THURSDAY.

Nitrate of soda.—The market for this material is unchanged. The quotation on spot for 95/96% quality being £20. 2s. 6d. per ton, net cash, f.o.r. prompt delivery. Best Indian Bone Meal.—For shipment is without alteration, the nearest value being £15. 5s. per ton, net cash, ex-ship, Liverpool. September/November shipment. On spot holders require £15. per ton, net cash, for 4½% and 45% quality. Mineral Phosphates.—There is no alteration to report in this market, and values are at present only nominal. Dried Blood.—This article is very scarce, the nearest value being about 30s. per unit of ammonia per ton.

LONDON METAL MARKET.

THURSDAY.

Copper: Standard brands, £100. 10s. to £100. 15s. cash; £101. to £101. 5s. three months; electrolytic, £109. to £120. Tin: Standard, £282. to £283. cash; £276. to £276. 10s. three months; Straits, £284.; English, £279. Lead: Soft foreign, £25. 2s. 6d.; English, £26. 5s. Spelter, £40; hard, £30. to £31. Antimony, English regulus, 90%, £45. Aluminium £150. Nickel £205. delivered, packages extra. Quicksilver £23. 10s. to £24. Bismuth 12s. 6d. Platinum 442s. per oz. Wolfram 32s. 6d. per unit.

MANCHESTER CHEMICAL MARKET.

THURSDAY.

There is a continued steady demand for all heavy chemicals, both on home and export account, and values all round are well maintained with only few exceptions. Makers' quotations for caustic soda are unchanged viz., 76% £24., 74% £23. 5s., and 70% £22. per ton. Refined bicarbonate of soda easy at £7. per ton, bags f.o.r. Bleaching powder is only moving slowly, but price is unaltered. Soda crystals, bags, £4. 2s. 6d., rails. Chlorates are slow of sale—soda at 6½d. and potash 1s. per lb. Makers' quotations for bichromates are without change. Sales of sulphate of copper are still on the small side, and price is weak at £42. per ton, f.o.b. Cornish hypo of soda firmly held for £16. per ton on rails. Phosphate of soda £26. per ton. Saltcake 60s. per ton, carriage paid. Recovered rock sulphur steady at £17. on rails. Supplies of arsenic are still difficult to obtain, and price is nominally £60. per ton. Yellow prussiate of potash is firm at 1s. 9d. per lb. Soda has advanced during the week to 8d. per lb., and has an upward tendency. Carbonate of potash 80/85% £95. per ton. Lead salts are in fairly good request. English white at £83. and brown £70. Nitrate £56. per ton. Acetic acid unchanged at recent rates. Acetate of soda quiet at £52. per ton. English brown acetate of lime scarce and dearer

at £11. 10s. per ton delivered. Grey £17. 10s. per ton. Borax continues scarce and £52. per ton is asked for spot parcels. All tin, zinc, and ammonia salts are moving off steadily. Green copperas in only small request and price easy at £4. 10s. per ton.

SWANSEA MARKET REPORT.

WEDNESDAY.

There were plenty of buyers for tinplates, and prices ruled very firm for all grades. Standard boxes were quoted at 36s. per box basis, f.o.b. Copper has a tendency to recede, buyers displaying caution in transactions, which ruled at £100. 5s. per ton for prompt and £101. 5s. three months. Tin was dearer at £282. cash and £275. three months. Lead remains steady, with only small orders passing at £25. 2s. 6d. per ton for Spanish and £26. 5s. for English. Spelter rather quiet and easier at £40. 5s. per ton over next six weeks. Zinc sheets, English, quoted at £64. per ton, and American £65., f.o.b. at New York. Silver 61d. per ounce. Quicksilver £23. 10s. per bottle. Nickel £205. per ton, delivered London, or equal. Aluminium £150. Antimony, English regulus, 90%, £42. Pitch scarce at 55s. per ton at ship. Sulphate of ammonia steady, United Kingdom prices for current month £19. 10s., next month £20. 10s. Nitrate of soda quiet but steady at 21s. 6d. per cwt., in bags. Seed oils remain scarce, with cottonseed edible quoted at 110s., and ordinary 95s., per cwt. Rape Oil dull. English refined, 119s. per cwt. in barrels. Palm oil quiet and dull. Lagos £90. 5s., softs £90., Benin £86., and hards £83. per ton. Petroleum in moderate supply and firm at 1s. 6½d. to 1s. 7½d. per gallon, in 40gal. barrels. Turpentine £6. 10s. per cwt. net. Copperas quiet at £4. per ton, delivered. Oxalic acid 1s. 2½d. per pound. Arsenic has assumed a better tone and in better request at £54. 10s. per ton for white powdered, in bags, f.o.b. Sulphate of copper, small trading at £42. 10s., in casks, less 5%, f.o.b.

TURPENTINE MARKET REPORT.

Messrs. James Watt & Son, Ltd., of 101, Leadenhall Street, London, E.C.3, report that the stocks of turpentine on September 6 were: American, 32,299 barrels, compared with 6,155 barrels at the corresponding date of 1918; French 44 barrels (14 barrels); and Spanish, 674 barrels (1,674 barrels). Deliveries during the week ended September 6 were 1,553 barrels, against 98 barrels last year, and since January 1 49,484 barrels, compared with 17,290 barrels in 1918. The price on Saturday last was 129s. per cwt., compared with 120s. at the corresponding date of last year. October-December delivery was quoted at 130s. 6d. and January-April (1920) 133s.

LIVERPOOL CHEMICAL MARKET.

THURSDAY.

A fairly active inquiry for chemicals has been experienced since the beginning of the week, the demand, both from the export branch and from the home branch of the trade showing an improvement. Supplies of some of the more important articles have become very short, so that prices continue high, and the situation is inducing freer offerings of supplies from outside sources. Bleaching powder has been quieter, with prices, £14. 10s. to £15. per ton, free on rail or conveyance, in buyers' packages, for home trade uses; and £17. per ton, for export. Chloride of calcium has been in fair demand and is £8. to £11. per ton, in casks, f.o.r. Caustic soda has been in good request and has been more inquired for on export account. Quotations are: £24. per ton for 76%; £22. per ton for 70 to 72%, and £19. per ton for 60 to 62%. Nitrate of soda has moved more freely, and the price is slightly higher. It is £21. to £22. per ton. Saltcake has been in very fair demand and is £6. 10s. per ton, in casks, f.o.b. Soda crystals have been steadily called for and are £5. per ton, in 2cwt. bags, f.o.r. at works. Bicarbonate of soda has been in fairly active demand and is £7. 5s. to £10. per ton, according to terms of delivery. Borax continues to be well inquired for, and supplies available for early deliveries have been very small. This has led to offerings of American borax but the prices quoted for it have been too high for much business to be done in this product. Prices for English borax may be given as; ordinary, £42. per ton; powdered, £44. per ton, in bags. Ammonia alkali has been in good request, and is £6. to £6. 5s. per ton, f.o.r. at works. Hyposulphite has been in moderate demand and is £17. per ton for ordinary, and £22. per ton for pea crystals. Sulphite of sodium has again been but little in request and is £10. per ton for ordinary, and £16. to £18. per ton for pea crystals, in 1cwt.

kegs. Bichromate of soda has been in very fair demand and is 9d. per lb. Phosphate of soda has been rather more in request and is £25. per ton. Sulphide of sodium has had a moderate inquiry and is £20. per ton in casks and £22. per ton in drums. Chlorate of potash has been quieter and is 1s. 1d. to 1s. 2d. per lb. Permanganate of potash has met with a steady inquiry and is 3s. 3d. to 3s. 6d. per lb. Sulphate of potash has moved but slowly and is £40. per ton. Carbonate of potash has been in very fair demand and is £90. to £95. per ton for 80 to 85%. Caustic potash has sold rather freely and is £110. to £120. per ton. Nitrate of potash has been more in request and is £55. to £60. per ton for refined, and £40. per ton for ordinary. Canadian potashes have had a very limited sale. Montreal first quality are £210. to £220. per ton and second quality, £190. to £210. per ton. Bichromate of potash has been in quietly steady demand, and is 1s. 6d. to 1s. 7d. per lb. Yellow prussiate of potash has been in somewhat better request and is 1s. 9d. to 1s. 10d. per lb. Salammoniac has sold a little more readily, and is £80. per ton for lump, £75. per ton for seconds and £5. per ton extra for ground. Sulphate of ammonia has been rather more inquired for, and is £19. 10s. per ton, for September; £20. 10s. for October; £20. 15s. for November; £21. for December; £21. 7s. 6d. for January, 1920; £21. 15s. for February; and £22. per ton for March to May, 1920. Carbonate of ammonia has met with a fair inquiry and is 6½d. per lb. Muriate has been very quiet and the price is easier. It may be given as £45. to £50. per ton, according to quality. Magnesia has sold more readily. Carbonate is £3. per cwt. and sulphate, £10. to £16. per ton, according to grade. Alum continues to meet with a rather active inquiry, and has been in very short supply for early deliveries. It is £18. 10s. per ton for the home trade, and £18. 10s. to £19. 10s. per ton for export. Aluminoferric has been inactive and is £8. 10s. to £12. per ton according to quality. Sulphate of alumina has been in moderate request and is £12. to £17. per ton, according to grade. Sulphur has been in good request, and in very light supply. English kinds are: Flowers, £32. per ton; roll, £28. per ton, and rock, £22. per ton, in bags, f.o.r. Sicilian grades are: flowers, £28. per ton; roll, £22. 10s. per ton, and rock, £17. 15s. per ton. Cream of tartar has been in fairly active demand and is £11. 10s. to £11. 15s. per cwt. Tartaric acid has had a quietly steady sale but has been in very light supply. It is 3s. 2d. to 3s. 3d. per lb. Boracic acid has sold with some freedom and is £72. per ton for crystals, and £74. per ton for powdered. Oxalic acid has sold more readily and is 1s. 2d. to 1s. 3d. per lb. according to time of delivery, the price being easier, for forward dates. Citric acid has been rather more in request and is 4s. 4d. per lb. White acetate of lead has been but little in request and the price has eased. It is £83. to £85. per ton. Arsenic has had a slow sale, but the price has again risen. White powdered is £55. per ton. Sulphate of copper has met with a somewhat freer inquiry, and export prices are a little lower. Quotations are: £44. per ton for farm uses in the United Kingdom, and £42. per ton, in bags, and £43. per ton in casks; less 5 per cent., f.o.b. at Liverpool.

TYNE CHEMICAL REPORT.

TUESDAY.

There is no change to report; the demand for bleaching powder and caustic soda, home consumption, continues good; for export the inquiry improves. Soda crystals are in strong request at £5. per ton, 2cwt. bags. Sulphur continues scarce and firm. The following prices are per ton, net: Bleaching powder, softs, £15.; do., hards, £15.; caustic soda, 74-77%, £23. 5s.; do., 70%, £22.; do., 60%, £20.; recovered sulphur, 2cwt. bags, £23.; hyposulphite of soda, 5-7cwt. casks, £19.; do., 1cwt. kegs, £25.; sulphite of soda, 5-7cwt. casks, £12.; do., 1cwt. kegs, £20.; silicate of soda, 75° Tw., £9. 12s. 6d.; do., 100° Tw., £10.; do., 140° Tw., £10.; soda crystals, 2cwt. bags, £5.; sulphate of soda (saltcake), in bulk, £3. 10s.; pure white sulphate of alumina, £19. 10s.; blanc fixe, £22.; sulphide of sodium, crystals, £18.; do., refined concentrated solid, 60-62%, £25.; hydrate of barium, crystals, £56.

COALS.—The demand for all classes of coal is insistent, and apparent supplies continue far below ordinary requirements. Steam and bunker coals are in very strong request. All Scandinavian countries are pressing orders on the market. To-day's prices: Best Northumbrian steam, 95s. to 100s. per ton; second qualities, 85s. to 90s.; Northumbrian small coals, 75s. to 80s.; seconds, 70s. to 72s. 6d.; best Durham gas coals, 80s. to 85s.; seconds, 65s. to 75s.; Durham bunker coals, 70s.

to 80s.; seconds, 65s.; foundry coke, 90s. to 100s.; gas coke, 95s. to 100s.

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Wednesday.

There is being maintained a fairly steady demand for all classes of chemicals as far as this market is concerned, and, generally speaking, the tone of the market is firm. Prices do not show any material alteration, and the most noticeable change since last report is in the case of arsenic, which is now selling at £56. per ton, as against £55. previously. Big deals are more in the picture than for some time past, but some buyers are still pursuing a very cautious policy. Current quotations are: Arsenic, £56. per ton, net, Glasgow; bicarbonate of soda, £8. 15s. and £10. per ton for 6-8 casks and 1cwt. kegs, Liverpool; boracic acid crystals, English refined, £72. for 2cwt. bags, and borax crystals, £39. for 2cwt. bags, carriage paid; caustic soda, white, 70-72%, £24. per ton, net, Glasgow; chlorate of potash, 1s. 1d. per lb., net, Glasgow; chlorate of soda, £3. 4s. per cwt. net, Glasgow; citric

acid, 4s. 4d. per lb. 5% Glasgow; cream of tartar 98% £11. 5s. per cwt., net, Glasgow; paraffin wax U.K. deliveries 125°, 6½d. to 6¼d.; 121-3°, 5½d. to 5¼d.; 118-20°, 5½d.; 110-120°, 4d. to 4½d.; and 98-102°, 4d. to 4½d.; salammioniac, £80. and £75. per ton, net, any port, for first and second lump respectively; salammioniac crystals, £85. per ton, net, Glasgow; saltpetre, £3. 4s. net, Glasgow; tartaric acid, 3s. 1d. per lb., 5% Glasgow.

In the sea oils there is still a wider selection of the different oils available, and prices remain without change of any kind. The demand for the different varieties of whale oils has been well maintained, and pale has been selling at 102s., brown at 76s., and black at 74s. Yellow, however, is still minus any quotation. Newfoundland cod continues to change hands at 79s.; pale seal when on offer stands at 96s.; and Menhaden has many inquiries at 86s.

In the coal trade the position is quite unchanged. All classes of fuel are in strong demand by local consumers, and industrial works generally seem to be absorbing as much as ever. On the export side trade continues limited, and, more or less, the whole output is being kept for home purposes.

IMPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

BRISTOL.

Publication of Official Returns
Suspended.

GLASGOW.

Week ending September 6.

CREAM OF TARTAR—
Genoa, 20 brls.

DYESTUFFS—

Cutch
Rangoon, 650 bxs.

WHITE LEAD—

Philadelphia, 42 brls.

ZINC OXIDE—

New York, 201 brls.

GOOLE.

Week ending September 6.

NIL.

GRANGEMOUTH.

Week ending September 6.

ROSIN—

Christiania, 86 brls.

GRIMSBY.

Week ending September 6.

DYESTUFFS (otherwise undescribed)
Dieppe, 10 cks.

GLUE—

Antwerp, 1 brl.

ROSIN—

Skutskar, 91 brls.

HULL.

Week ending September 6.

ANTIMONY SALTS—

Rosario, 3 cks.

BEESEWAX—

W. C. Africa, 1,324 pkgs.

DYESTUFFS—

Myrobalans
Bombay, 2,560 bgs.

LITHOPONE—

Rotterdam, 60 cks.

MAGNESITE—

Christania, 102 bgs.

NITRATE—

Dunkirk, 50 cks.

TALLOW—

Freemantle, 166 cks.

TAR—

Archangel, 3,197 brls.

TURPENTINE—

Halmstad, 35 cks.

LEITH.

Week ending September 6.

NIL.

LIVERPOOL.

Week ending September 6.

ACETATE OF LIME—
Boston, 3,851 bgs.

BARIUM BROMIDE—
Halifax, N.S., 5 cs.

BARIUM CARBONATE—
Baltimore, 325 bgs.

BARYTES—
Barcelona, 5,050 bgs.; Malaga,
60 brls.

BEESE WAX—

W. C. Africa, 1 cs.

BORATE—

Galveston, 13,324 sks.

BORAX—

Baltimore, 925 bgs.

CARNAUBA WAX—
Ceara, 334 bgs.; Parmahya, 125
bgs.

COPPER PRECIPITATE—
Secoundee, 5 bxs.

CREAM OF TARTAR—
Bordeaux, 53 cks.; Tarragona, 24
brls.

DEXTRINE—

New York, 1,290 bgs.

DISINFECTANTS (otherwise undes.)
Karachi, 1 drm.

DYESTUFFS—

Bark Extract

Baltimore, 120 brls.

Chestnut Extract

New York, 75 brls.

Cutch

Karachi, 95 bgs.

Myrobalans

Bombay, 3,676 bgs.

Quebracho Extract

Buenos Ayres, 115,517 bgs.

Tanner's Extract

Norfolk, 496 brls.

Tartar

Bordeaux, 120 bgs.; Karachi,
52 cks.

IRON OXIDE—

Malaga, 332 brls.; Valencia, 66
brls.

MANGANESE ORE—

Bombay, 1,000 t.

OCHRE—

Cartagena, 123 bgs.

OXALIC ACID—

Amsterdam, 10 cks.

PARAFFIN SCALE—

New York, 1,836 brls.

PARAFFIN WAX—

Baltimore, 750 brls.

POTASSIUM BROMIDE—

Halifax, N.S., 20 cs.

ROSIN—

Bayonne, 709 cks.; Galveston,
28 sks.; Mobile, 1,500 brls.

SALTPETRE—

Karachi, 2,500 bgs.

SOAP—

Galveston, 950 brls.; Malaga,
100 bgs.; New York, 456 brls.;
Seville, 100 cs.

SODIUM BICHRIMATE—

Baltimore, 84 cks.

STEARINE—

Monte Video, 435 tes.

TALLOW—

Buenos Ayres, 26 hds., 131 pkgs.,
1,497 tes., 836 cks.; New York,
289 cks.

TIN OXIDE—

Barcelona, 13 brls.

TURPENTINE—

Mobile, 1,000 brls.

WAX—

Galveston, 28 sks.; Karachi, 11
cs.; Manao, 605 cs.; New York,
105 bgs.; Parahyba, 109 bgs.

ZINC OXIDE—

Antwerp, 15 kgs.

LONDON.

Week ending September 6.

ACETIC ACID—
U.S.A., 82 pkgs.

ALUM—

British India, 34 cks.

ANTIMONY OXIDE—

France, 2 cks.

BARYTES—

Belgium, 143 bgs.; Spain, 1,100
brls., 200 sks.; U.S.A., 32 brls.,
104 cks.

BEESE WAX—

British India, 35 cs.; Cape, 177
pkgs.; Egypt, 24 bgs.; Pt. E.
Africa, 267 pkgs.; Portugal, 245
pkgs.

CALCIUM LACTATE—

U.S.A., £295.

CAMPOR—

China, 25 cs.; Hong Kong, 15
cs.; India, 100 cs.

CARBON BLACK—

U.S.A., 150 cs.

CARNAUBA WAX—

Brazil, 56 bgs.

CHEMICALS (otherwise undescribed)

Switzerland, £1,398.

CITRATE OF LIME—

British Guiana, 3 pkgs.; Italy,
87 cks.

CREAM OF TARTAR—

France, 10 cks., 40 kgs.

DYESTUFFS—

Aniline Dye
Switzerland, 1 pkg.

Argols

Cape, 19 bgs.; France, 323 bgs.

Cochineal

Canary Islands, 10 pkgs.; U.S.A.,
25 pkgs.

Cutch

India, 600 pkgs.

Indigo

British India, 26 chts.

Myrobalans

British India, 6,000 pkgs.; India,
3,598 pkgs.

Soap Dye

U.S.A., 40 pkgs.

Sumac

Switzerland, 40 pkgs.

Tanner's Bark

Natal, 30 t.

Tartars

France, 57 bgs.; Spain, 94 bgs.;
U.S.A., 1,146 bgs.

FISH OIL—

Japan, 600 cs.; Natal, 81 drms.

GELATINE—

France, £590.

GLUE—

France, £890.; U.S.A., £3,434.

HYDROQUINONE—

U.S.A., £55.

MAGNESITE—

Holland, £456.; India, £8,000.

METHYL SALICYLATE—

U.S.A., £127.

PARAFFIN WAX—

U.S.A., 450 t. 10 c.

PHENAZONE—

France, £360.; Switzerland, £610.

PITCH—

Holland, 11 brls.

PLUMBAGO—

Japan, 150 brls.; Natal, 243
bgs.; U.S.A., 81 brls.

POTASSIUM SULPHATE—

France, 200 bgs.

PYROGALLIC ACID—

Switzerland, £27.

ROSIN—

France, 1,385 cks., 120 brls.

SOAP—

Canada, £100.; Channel Islands,
£13.; U.S.A., £37.

SODIUM BICHRIMATE—

U.S.A., 20 t. 4 c.

STEARINE—

Argentine Republic, 25 cks.;
Natal, 350 bgs.

TALLOW—

N.Z., 1,047 t. 9 c.; Queensland,
90 t. 11 c.; S. Australia, 28 t,
9 c.; Victoria, 69 t. 3 c.

TANNIC ACID—

Switzerland, £16.

TAR—
U.S.A., 150 brls.
TARTARIC ACID
Italy, 52 pkgs.
TITANIUM AND POTASSIUM OXALATE—
U.S.A., £100.
WAX—
Holland, 7 cks.
WHITE LEAD—
Belgium, 58 brls.; U.S.A., 511 cks.
WOOD OIL
Hong Kong, £1,520.

MANCHESTER

Week ending September 6.

ANILINE COLOUR
Antwerp, 177 cks.
ANTIMONY SALTS
Rouen, 50 cks.
DYESTUFFS
Dyewood Extract
New York, 59 brls.
GLUE—
Rotterdam, 40 bgs.
PHOSPHATE OF LIME
Boston, 95 brls.

SALT
Rotterdam, 49 t. 10 c.

MIDDLESBROUGH

Week ending September 6.

NIL.

NEWCASTLE-ON-TYNE

Week ending September 6.

PITCH—
Vardol, 210 t.

N. & S. SHIELDS.

Week ending September 6.

NIL.

STOCKTON-ON-TEES.

Week ending September 6.

NIL.

SWANSEA.

Week ending September 6.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

BRISTOL.

Publication of Official Returns Suspended.

GLASGOW.

Week ending September 6.

AMMONIUM PHOSPHATE
Bordeaux, 2 t.
CHEMICALS (otherwise undescribed)
Bordeaux, 5 t.; Beira, 2 t.; Cape Town, 5 t.; Delagoa Bay, 1 t.; Natal, 6 t.
CHLOROFORM—
Colombo, £25.
COAL PRODUCTS (otherwise undes.)
Calcutta, £804.; Demerara, £80.; Natal, £144.
DISINFECTANTS (otherwise undes.)
Madras, 2 t. 4 c.
DYESTUFFS (otherwise undescribed)
Gothenburg, 1 c.
GLUE AND GELATINE
Montreal, 6 c.
PARAFFIN WAX
Bordeaux, 7 t. 5 c.
SODIUM BICARBONATE
Antwerp, 250 pkgs.; Helsingfors, 314 pkgs.; Hong Kong, 252 pkgs.; Palermo, 80 pkgs.; Pt. Sudan, 50 pkgs.; Pelotas, 100 pkgs.; Pt. Stanley, 4 pkgs.; Pt. Swettenham, 40 pkgs.; Rockhampton, 260 pkgs.; San Juan, 4 pkgs.; Tuticoran, 1,000 pkgs.; Wellington, 174 pkgs.
SODIUM BICHRIMATE
Bordeaux, 5 t. 9 c.; Madras, 10 t. 5 c.; Montreal, 19 c.

GOOLE.

Week ending September 6.

NIL.

GRANGEMOUTH.

Week ending September 6.

NIL.

GRIMSBY.

Week ending September 6.

NIL.

HULL.

Week ending September 6.

ALUMINOFERRIC
Bergen, 165 slbs.; Christiania, 123 slbs.
AMMONIUM CARBONATE
Aalesund, 10 kgs.
BEESWAX
Copenhagen, 7 pkgs.
BORAX—
Antwerp, 100 bgs.
CHEMICALS (otherwise undescribed)
Antwerp, 2 cks., 35 kgs., 25 brls.; Barcelona, 200 cs.; Bombay, 15 brls.; Copenhagen, 6 kgs., 15 drms., 12 cs.; Dieppe, 27 drms.;

CHEMICALS (otherwise undescribed)
Gothenburg, 182 bgs., 42 kgs., 29 brls., 5 cs.; Genoa, 285 cks.; Karachi, 370 brls.; New York, 10 kgs., 3 cs.; Rotterdam, 4 kgs., 12 pkgs., 25 brls.; Trieste, 2 cks., 3 drms.; Wiburg, 35 cs., 11 cks., 10 kgs.
DISINFECTANTS (otherwise undes.)
Christania, 3 cs.; Gothenburg, 200 drms.; Karachi, 1,000 drms.
FATTY ACIDS
Rouen, 106 brls.
GLUE
Rotterdam, 20 cs.
MANGANESE ORE
Antwerp, 250 t.
PARAFFIN WAX
Venice, 400 bgs.

PITCH
Amsterdam, 11 pkgs.; Copenhagen, 90 brls.

SALT—
Aalesund, 136 sks.

SOAP
Bergen, 300 kgs.; Copenhagen, 1 cs.

SODA
Helsingfors, 20 cs.

TALLOW
Amsterdam, 10 cs.; Genoa, 30 brls.

TAR
Helsingfors, 189 brls.

WOOD PRESERVATIVE—
Dunkirk, 15 brls.

LEITH.

Week ending September 6.

AMMONIUM SULPHATE
Dunkirk, 404 t. 8 c., £7,214.

BORIC ACID—
Dunkirk, 10 t., £720.

SODIUM BICHRIMATE
Rouen, 73 t. 18 c., £3,729.

TANNIC ACID
Dunkirk, 2 c., £39.

LIVERPOOL.

Week ending September 4.

ACETIC ACID
Constantinople, 1 t., £124.; Lisbon, 2 t. 1 c., £63.; Para, 1 c., £9.; Rio de Janeiro, 1 t. 17 c., £112.

ALUM
Abo, 3 t. 7 c., £59.; Accra, 1 c., £1.; Bahia, 8 c., £26.; Bilbao, 5 t., £150.; Calcutta, 30 t. 4 c., £15.; Cape Coast, 1 c., £1.; Desterro, 1 t. 5 c., £28.; Fremantle, 10 c., £10.; Lagos, 1 c., £1.; Pelotas, 1 c., £10.; Porto Alegre, 2 t. 19 c., £63.; Rio de Janeiro, 6 t. 10 c., £143.; Singapore, 1 c., £1.; Salomika, 10 c., £11.; Santos, 5 t. 2 c., £95.; Sierra Leone, 1 c., £1.

ALUMINOFERRIC
Buenos Ayres, 18 t. 16 c., £142.; Calcutta, 75 t., £368.

AMMONIA—
Buenos Ayres, 5 c., £20.; Koomassie, 2 c., £12.; Manaos, 1 c., £8.; Rio de Janeiro, 1 t. 4 c., £98.; Warri, 1 c., £4.

AMMONIA (ANHYDROUS)
Lagos, 4 c., £51.

AMMONIUM CARBONATE
Bahia, 15 c., £42.; Constantinople, 4 c., £11.; Desterro, 12 c., £52.; Lisbon, 2 t. 10 c., £152.; Manaos, 1 c., £7.; Pelotas, 4 c., £15.; Rangoon, 1 t. 11 c., £141.; Rio Grande do Sul, 1 c., £40.; Rio de Janeiro, 1 t. 4 c., £335.; Santos, 1 t. 10 c., £104.

AMMONIUM CHLORIDE—
Brisbane, 6 c., £19.; Monte Video, 2 c., £7.

AMMONIUM MURIATE—
Antwerp, 4 t. 17 c., £224.; Baltimore, 26 t. 16 c., £1,314.; Bombay, 2 t. 10 c., £130.; Calcutta, 2 t. 3 c., £95.; Constantinople, 2 t. 10 c., £158.; Genoa, 9 t. 1 c., £303.; Habana, 5 c. £17.; Ibiury, 1 t., £60.; Karachi, 9 t. 19 c., £566.; Kobe, 10 t., £527.; Naples, 2 t. 10 c., £144.; New York, 2 t. 5 c., £158.; Patras, 1 t., £58.; Yokohama, 14 t. 19 c., £799.

AMMONIUM PHOSPHATE
Algiers, 3 t., £360.; Piraeus, 1 c., £6.

ANILINE ORE—
Amsterdam, 8 c., £60.

ANILINE SALTS
Alexandria, 2 t., £284.; Smyrna, 2 t., £270.

ANTIMONY—
Sydney, 1 cs.

ANTIMONY REGULUS
Bahia, 10 c., £45.

ANTIMONY SULPHATE
Ghent, 1 t. 2 c., £37.; Naples, 7 t., £132.; Valencia, 2 c., £9.

ARSENIC
Bahia, 5 t. 9 c., £1,068.; Buenos Ayres, 1 t. 19 c., £80.; Lagos, 1 c., £4.; Sarawak, 10 c., £115.

BARIUM CARBONATE—
Bordeaux, 24 t. 10 c., £441.

BARIUM CHLORIDE—
Barcelona, 5 t., £130.

BITUMASTIC SOLUTION
Singapore, 125 drms.

BLEACHING POWDER
Bombay, 14 t. 10 c., £320.; Dunkirk, 10 t. 3 c., £114.; Lagos, 1 c., £1.; Monte Video, 5 t., £84.; Malaga, 9 t. 17 c., £252.; Rotterdam, 7 t. 14 c., £147.; Rio de Janeiro, 16 t. 14 c., £303.; San Francisco, 1 t. 12 c., £55.; Valencia, 5 t. 10 c., £73.

BORAX—
Bahia, 2 c., £12.; Constantinople, 2 c., £4.; Copenhagen, 2 t., £80.; Dunkirk, 5 t., £205.; Desterro, 1 c., £8.; Para, 5 c., £30.; Rosario, 3 c., £7.

BORIC ACID
Constantinople, 3 c., £16.; Para, 5 c., £25.; Pelotas, 2 c., £10.

CALCIUM CHLORIDE—
Barcelona, 7 t. 3 c., £161.; Bombay, 16 t. 4 c., £113.; Brisbane, 4 t. 19 c., £38.; Buenos Ayres, 16 t. 8 c., £123.; Rio de Janeiro, 11 c., £5.

CARBIDE—
Rio del Rey, 3 c., £7.

CAUSTIC POTASH—
Secondee, 5 c., £80.

CAUSTIC SODA—
Adelaide, 8 pkgs.; Algoa Bay, 496 drms.; Antwerp, 306 drms.; Cologne, 160 drms.; Dunedin, 258 pkgs.; East London, 223 drms.; Napier, 20 pkgs.; Palermo, 15 pkgs.; Pt. Elizabeth, 25 pkgs.; Porto Alegre, 256 drms.; Rio de Janeiro, 644 drms.; San Francisco, 25 cs.; Santos, 400 drms.; Sao Paulo, 15 drms.; Singapore, 40 drms.; Sydney, 160 drms.; Valparaiso, 31 drms.; Yokohama, 477 pkgs.

CHEMICALS (otherwise undescribed)
Bahia, 10 c., £11.; Buenos Ayres, 2 c., £31.; Cairns, 10 c., £22.; Constantinople, 8 t. 9 c., £402.; Lagos, 2 c., £22.; Rio de Janeiro, 5 c., £80.; Santos, 5 t. 2 c., £90.

CHINA CLAY—
Madras, 25 t.

CITRIC ACID—
Porto, 6 c., £139.; Rio Grande do Sul, 1 c., £40.

COAL PRODUCTS

Aniline Dye
Antwerp, 1 t., £280.; Barcelona, 1 c., £42.; Bombay, 6 t. 15 c., £3,358.; Brisbane, 17 c., £210.; Buenos Ayres, 2 c., £55.; Copenhagen, 6 c., £93.; Calcutta, 1 t. 17 c., £1,218.; Melbourne, 4 c., £784.; Pernambuco, 3 t. 12 c., £1,514.

Carbolic Acid
Copenhagen, 6 c., £20.; Buenos Ayres, 1 t. 13 c., £75.; Desterro, 2 c., £6.; Kobe, 12 t. 10 c., £583.; Rio de Janeiro, 3 t. 1 c., £175.; Rosario, 1 c., £3.

Dyes
Barcelona, 4 t. 19 c., £625.; Genoa, 3 t. 3 c., £1,887.; Montreal, 1 c., £36.; Shanghai, 9 t. 8 c., £3,412.; Sydney, 5 c., £216.

Naphthalene
Accra, 1 c., £9.; Algiers, 5 t., £175.; Buenos Ayres, 46 t. 10 c., £1,531.; Hankow, 5 c., £6.; Lagos, 15 c., £240.; Pelotas, 1 c., £11.; Smyrna, 19 c., £20.

Pitch
Addah, 3 c., £3.; St. Thome, 3 c., £34.; Victoria, 2 c., £17.

Tar
Accra, 11 c., £7.; Cape Coast, 1 t. 9 c., £18.; Grand Bassam, 2 t. 4 c., £17.; Iquitos, 4 c., £6.; Lagos, 12 c., £10.; Palermo, 3 t. 4 c., £1.; St. Thome, 5 c., £44.; Sierra Leone, 3 t. 15 c., £40.

COAL PRODUCTS (otherwise undes.)
Bombay, 5 c., £105.

COPPERAS
Calcutta, 100 pkgs.

CREAM OF TARTAR—

Santos, 1 c., £15.

CREOLINE—Buenos Ayres, 27 t. 16 c., £775.;
Manaos, 1 c., £6.; Porto Cortez,
25 galls., £8.**CRESYLIC ACID—**

Monte Video, 19 t. 2 c., £700.

DISINFECTANTS (otherwise undes.)Bahia, 2 t. 10 c., £146.; Bombay,
5 t., £47.; Buenos Ayres, 1 t.
3 c., £18.; Cape Coast, 7 c.,
£22.; Halmstad, 11 c., £61.;
Koomassie, 13 c., £42.; Lagos,
10 c., £56.; Rangoon, 19 c., £56.;
Shanghai, 1 t. 16 c., £81.;
Secondee, 2 t. 7 c., £166.;
Trinidad, 10 c., £20.**DYESTUFFS (otherwise undescribed)**Kilindini, 1 c., £21.; Madras,
5 t., £688.**FERRO PHOSPHORUS—**

Paris, 4 t. 10 c.

FORMIC ACID—Antwerp, 6 t. 4 c., £700.; Genoa,
4 c., £40.**GLUE—**

Tuticorn, 1 pkg.

GLUE, SIZE, AND GELATINE—Algiers, 10 pkgs.; Auckland, 10
pkgs.; Bombay, 1 pkg.; Copen-
hagen, 40 pkgs.; Colombo, 31
pkgs.; Hong Kong, 520 pkgs.;
Kobe, 400 pkgs.; Melbourne,
80 pkgs.; Lisbon, 6 pkgs.;
Montreal, 370 pkgs.; Para, 5
pkgs.; Rio de Janeiro, 10 pkgs.;
Santa Cruz, Teneriffe, 2 dbl.
bgs.**GLYCERINE—**Calcutta, 40 pkgs.; Osaka, 50
drms.; Yokohama, 200 pkgs.**HYDROFLUORIC ACID—**

Bahia, 2 c., £11.

HYDROGEN PEROXIDE—

Santos, 10 c., £90.

IODELITE—Kobe, 1 t. 17 c., £97.; Sarawak,
13 c., £14.**LEAD ACETATE—**

Dunkirk, 6 c., £28.

MAGNESIUM CARBONATE—

Para, 1 c., £5.

MAGNESIUM CHLORIDE—

Leghorn, 10 t., £172.

MAGNESIUM SULPHATE—Bahia, 2 t. 9 c., £34.; Burutu,
3 c., £4.; Buenos Ayres, 20 t.,
£230.; Lagos, 1 c., £2.; Monte
Video, 5 t., £57.; Para, 1 c., £1.**NICKEL SULPHATE—**

Rotterdam, 20 t., £900.

OXALIC ACID—Bahia, 1 c., £8.; Buenos Ayres,
2 c., £10.; Rio de Janeiro, 3 c.,
£25.**POTASSIUM BICARBONATE—**

Dunkirk, 10 c., £99.

POTASSIUM BICHROMATE—Alexandria, 1 t. 19 c., £450.;
Barcelona, 3 t. 8 c., £539.;
Buenos Ayres, 4 c., £33.; Con-
stantinople, 1 t. 1 c., £169.;
Dunkirk, 2 c., £16.; Smyrna,
5 c., £38.**POTASSIUM CHLORIDE—**

Rio Grande do Sul, 5 c., £60.

POTASSIUM NITRATE—Buenos Ayres, 10 c., £35.; Para,
1 c., £6.; Vigo, 1 t. 18 c., £135.**POTASSIUM OXALATE—**

Algiers, 2 c., £20.

POTASSIUM PRUSSATE—

Buenos Ayres, 4 c., £40.

SALAMMONIAC—Buenos Ayres, 14 c., £55.; Copen-
hagen, 10 c., £39.; Constantinople,
3 t. 12 c., £268.;
Marseilles, 2 t. 10 c., £185.;
Naples, 1 t. 19 c., £140.; Piraeus,
1 t., £71.; Prevesa, 5 c., £18.;
Rangoon, 15 c., £55.; Smyrna,
2 t., £148.; Secondee, 1 c., £4.**SALICYLIC ACID—**

Copenhagen, 10 c., £108.

SALT—Aboisso, 5 t.; Abonema, 176 t.;
Acera, 204 t.; Addah, 60 t.;
Adjuah, 5 t.; Algoa Bay, 5 t.;
Atani, 39 t.; Axim, 33 t.;
Barbados, 71 t.; Baro, 10 t.;
Beira, 5 t.; Buenaventura, 7 t.;
Buenos Ayres, 14 t.; Burutu,
220 t.; Cadiz, 1 t.; Calabar, 170
t.; Callao, 15 t.; Calcutta, 4,060
t.; Cape Coast, 12 t.; Cayenne,
23 t.; Copenhagen, 108 t.;
Delagoa Bay, 2 t.; Demerara,
167 t.; Dixcove, 3 t.; Duala, 80
t.; Dunkwa, 28 t.; Durban, 105
t.; Elmina, 6 t.; Fiume, 3,510 t.;
Ghent, 505 t.; Grand Bassam,
25 t.; Halifax, N.S., 758 t.;
Iradan, 100 t.; Iquitos, 50 t.;
Koko, 104 t.; Lagos, 1,843 t.;
Lokoja, 100 t.; Malmo, 300 t.;
Kingston, Jam., 402 t.; Mauri-
tius, 100 t.; Monrovia, 5 t.;
Montreal, 1,250 t.; Nantes, 59
t. 10 c.; New Orleans, 644 t.;
New York, 350 t.; Onitsha, 60
t.; Opobo, 215 t. 10 c.; Oron,
25 t.; Para, 119 t.; Pt. Harcourt,
148 t.; Puerto Barrios, 25 t.;
Quebec, 454 t.; Rangoon, 1,267
t.; Rio de Janeiro, 123 t.; Rio
Grande do Sul, 32 t.; Rosario,
92 t.; St. John's, N.F., 20 t.;
Saltpond, 44 t.; Santa Cruz, 41
c.; Sapele, 40 t.; Secondee,
195 t.; Sherbro, 3,923 bgs.;
Shanghai, 23 t.; Sierra Leone,
101 t.; Sydney, N.S.W., 407 t.;
Talcahuano, 2 t.; Tarkwa, 11 t.;
Valparaiso, 9 t. 10 c.; Warri,
1,339 t.; Winnebah, 247 t.**SALT CAKE—**

Santos, 521 pkgs.

SALTPETRE—Cape Coast, 1 c., £5.; Funchal,
14 c., £12.; Lagos, 1 c., £3.;
Patras, 5 t., £300.; Rio de
Janeiro, 5 c., £16.**SHEEP DIP—**Buenos Ayres, 64 t. 4 c., £3,138.;
Constantinople, 5 c., £132.;
Monte Video, 33 t. 9 c., £1,537.;
Para, 6 c., £16.; Porto Alegre,
1 t. 1 c., £193.; Rio de Janeiro,
3 t. 5 c., £277.; Santos, 3 t. 13 c.,
£266.**SOAP—**Aalborg, 1 cs.; Aboisso, 5 cs.;
Abonema, 1,300 brls.; Acera,
244, 1,693 cs.; Aden, 20 cs.;
Alexandria, 8 bxs.; Amboina,
600 bgs.; Antwerp, 3,000 cs.,
1,855 bxs., 160 kgs., 120 brls.;
Appam, 100 bxs.; Arica, 24 cs.;
Athens, 100 cs.; Auckland, 2 cs.,
1 bx.; Axim, 100 bgs.; Bahia,
110 pkgs.; Balik Papan, 300
pkgs.; Bangkok, 1,761 pkgs., 580
bxs.; Barbados, 1,205 pkgs.;
Batavia, 1,437 bxs.; Bathurst,
2,355 bxs.; Batoum, 33 bxs.;
Bergen, 20 bxs.; Bombay, 34
bxs.; Bonny, 250 bxs.; Boston,
2 pkgs.; Braila, 505 bxs., 144
pkgs.; Brisbane, 20 pkgs.; Brus-
sels, 200 pkgs.; Calabar, 57 cs.;
Calcutta, 496 bxs.; Cape Coast,
315 bxs.; Cape Town, 103 cs.;
Catania, 11 cs.; Cartagena, 1 bx.,
50 cs., 25 bdl.; Casablanca, 629
bxs., 26 cs.; Cebu, 10 cs.;
Cheribon, 20 cs.; Chinde, 1 cs.;
Cologne, 137 cs.; Copenhagen,
314 cs., 1 brl.; Colombo, 12 cs.,
10 bxs.; Cristobal, 260 c., 200
cs.; Degama, 224 bxs.; Demerara,
550 bxs., 5 cs.; Dixcove,
2 cs.; Donggola, 10 cs.; Duala,
169 cs.; Dunkirk, 5,604 cs.;
Durban, 177 bxs.; East London,
16 cs.; Eten, 50 cs.; Fountdigne,
25 bxs.; Freetown, 56 cs.;
Gaboon, 20 bxs.; Galatz, 500
cs.; Genoa, 687 bxs., 61 cs.;
Gibraltar, 610 bxs., 100 cs.;
Gijon, 1 cs.; Gorontalo, 50 cs.;
Guadeloupe, 500 cs.; Havre,
3,309 cs., 300 bxs.; Havana,
11 cs.; Hong Kong, 50 cs.;
Huelva, 25 cs.; Iquique, 60 cs.;
Iquitos, 1,822 bxs., 125 bdl.;
Karachi, 57 cs.; Kingston, Jam.,
20 cs., 750 bxs.; Mauritius, 4
cs.; Melilla, 125 bxs.; Menado,
1,106 bxs.; Kobe, 65 cs.; Koko,
160 cs.; Kota Baru, 50 bxs.;
Lagos, 460 bxs., 195 cs.; Lib-
reville, 100 bxs.; Limon, 25 cs.;**SOAP—**Majunga, 500 bxs.; Macassar,
450 bxs.; Manezales, 4 cs.;
Madras, 106 cs.; Kingston, Jam.,
1,000 bxs.; Monrovia, 10 bxs.;
Nantes, 200 bxs.; Naples, 92
bxs.; New York, 22 bxs.;
Obuassi, 4 pkgs.; Opobo, 2,260
pkgs.; Oporto, 30 pkgs., 9 bxs.;
Padang, 12 pkgs.; Palembang,
50 bxs.; Panama, 400 pkgs.;
Patras, 1 bx.; Pointe-a-Pitre,
250 bxs.; Pt. Harcourt, 40 pkgs.;
Pt. Sudan, 29 pkgs.; Pt. Said,
4,203 bxs.; Rabat, 25 bxs.;
Rangoon, 1,255 bxs.; Rio de
Janeiro, 6 bxs.; Sabang, 87
pkgs.; St. Kitts, 1 pkg.; Saffi,
14 cs.; St. Louis, 90 bxs.;
Salonika, 600 cs., 23 bxs.;
Samarang, 430 bxs.; San Miguel,
1 cs.; Santa Cruz, 1,198 bxs.;
Sapele, 300 pkgs.; Sassandra,
50 cs.; Secondee, 1,419 bxs.;
Seville, 27 cs.; Shanghai, 4,105
bxs., 10 brls.; Sherbro, 590 bxs.;
Sierra Leone, 25 bxs., 6 pkgs.;
Singapore, 2,941 bxs.; Smyrna,
25 cs., 25 bxs., 19 pkgs.; Soura-
baya, 2,450 bxs., 15 pkgs.;
South Georgia, 47 bxs.; Surinam,
15 cs.; Sydney, N.S.W., 5 bxs.;
Stamboul, 50 cs.; Tabou, 2
bxs.; Tangiers, 927 bxs.; Toco-
pilla, 40 bxs.; Toronto, 15 bxs.;
Tripoli, 167 bxs.; Trieste, 20
bxs.; Trondhjem, 20 bxs.; Tu-
maco, 100 bxs.; Valparaiso, 62
bxs.; Vigo, 6 pkgs.; Warri,
2,019 bxs.; Wellington, 26 bxs.;
Winnebah, 1,212 bxs.; Zanzibar,
2 bxs.**SODA ASH—**Aarhus, 250 pkgs.; Bahia, 100
pkgs.; Beira, 219 pkgs.; Bom-
bay, 100 pkgs.; Calcutta, 6,638
pkgs.; Copenhagen, 2,140 pkgs.;
Dairen, 3,360 pkgs.; Karachi,
1,660 pkgs.; Melbourne, 41
pkgs.; Tientsin, 12,460 pkgs.;
Tuticorn, 8 pkgs.; Yokohama,
1,608 pkgs.; Zaria, 10 pkgs.**SODA CRYSTALS—**Lisbon, 30 pkgs.; Rio de Janeiro,
200 pkgs.**SODIUM BICARBONATE—**Amsterdam, 200 pkgs.; Antwerp,
22 pkgs.; Bahia, 25 pkgs.;
Bangkok, 60 pkgs.; Beira, 250
pkgs.; Bordeaux, 10 pkgs.;
Brisbane, 337 pkgs.; Copen-
hagen, 120 pkgs.; Dairen, 840
pkgs.; Halifax, 110 pkgs.;
Havana, 25 pkgs.; Lisbon, 280
pkgs.; Manila, 200 pkgs.; Mel-
bourne, 461 pkgs.; Penang, 20
pkgs.; Santos, 1,550 pkgs.;
Toronto, 250 pkgs.**SODIUM CYANIDE—**

Secondee, 30 cs.

SODIUM SALICYLATE—

Copenhagen, 2 c., £30.

SODIUM SILICATE—Adelaide, 8 pkgs.; Alexandria,
97 pkgs.; Barcelona, 51 pkgs.;
Durban, 10 pkgs.; Porto Alegre,
16 pkgs.; Rangoon, 16 pkgs.**SODIUM SULPHIDE—**Adelaide, 4 t. 19 c., £90.; Sydney,
9 t. 17 c., £193.**STEARINE—**

Delagoa, 112 bgs.

SULPHUR—

Copenhagen, 1 t., £78.

SULPHURIC ACID—Manaos, 3 c., £10.; Para, 4 c.,
£25.; Rio de Janeiro, 2 t. 5 c.,
£130.; Sierra Leone, 5 c., £23.**SUPERPHOSPHATE OF LIME—**

Las Palmas, 100 bgs.

TALLOW—Elmina, 2 cs.; Rotterdam, 130
pkgs.; St. Thome, 2 brls.**TANNIC ACID—**Barcelona, 8 c., £182.; Bahia,
6 c., £54.**WOOD PRESERVATIVE—**Accra, 5 c., £4.; Monte Video,
5 t. 19 c., £183.**WOOD TAR—**

Malaga, 1 t. 19 c., £24.

LONDON.

Week ending September 3.

ACETIC ACID—Constantinople, 2 cs., £6.; Genoa,
22 brls., £360.; Rio de Janeiro,
3 cs. (pt.), £14.**ACETO SALICYLIC ACID—**Athens, 4 cs. (pt.), £6.; Batavia,
2 cs., £38.; Calcutta, 4 cs. (pt.),
£6.; Constantinople, 6 cs., £120.;
Hong Kong, 1 cs. (pt.), £6.;
Kobe, 10 cs., £252.; Melbourne,
9 cs., £188.; Pt. Elizabeth, 1 cs.,
£26.; Shanghai, 1 cs. (pt.), £6.;
Sydney, 1 cs., £11.**ALUM—**Buenos Ayres, 4 c., £6.; Bombay,
6 c., £6.; Pt. Elizabeth, 11 c.,
£18.; Pt. Sudan, 5 c., £6.**ALUM (CALCINED)—**

Lima, 1 c., £5.

AMMONIA—Amsterdam, 14 cs. (pt.), £8.;
Barbados, 2 drms., £5.; Batavia,
9 cs., £16.; Brussels, 63 pkgs.,
£332.; Buenos Ayres, 106 pkgs.,
£320.; Calcutta, 10 pkgs., £28.;
Cape Town, 19 cs., £32.; Chris-
tiania, 10 cs. (pt.), £9.; Cyprus,
1 cs., £6.; Durban, 4 cs., £8.;
Gibraltar, 2 cs., £5.; Hong Kong,
13 cs., £26.; Rio de Janeiro, 10
cs., £31.; Rosario, 40 pkgs., £99.;
Singapore, 20 cs., £440.**AMMONIA (ANHYDROUS)—**Batavia, 6 cysls., £48.; Calcutta,
31 cysls., £210.; Durban, 50 cysls.,
£458.; Jaffa, 2 cysls., £22.**AMMONIUM ACETATE—**

Mauritius, 1 cs., £6.

AMMONIUM BENZOATE—

Calcutta, 1 ck. (pt.), £25.

AMMONIUM BROMIDE—

Durban, 1 cs. (pt.), £6.

AMMONIUM CARBONATE—Asunsion, 10 c., £53.; Batavia,
10 c., £77.; Buenos Ayres, 4 c.,
£20.; Calcutta, 1 c., £5.; Cologne,
3 t. 4 c., £192.; Constantinople,
4 c., £22.; East London, 1 c.,
£5.; Lima, 2 c., £10.; Monte
Video, 3 c., £13.; Padang, 13 c.,
£48.; Pt. Elizabeth, 2 c., £8.;
Rio de Janeiro, 1 t. 16 c., £160.**AMMONIUM CHLORIDE—**Calcutta, 5 cs., £35.; Constanti-
nople, 2 cks., £11.**AMMONIUM IODIDE—**

Calcutta, 1 ck. (pt.), £13.

AMMONIUM MOLYBDATE—

Shanghai, 3 cs. (pt.), £5.

AMMONIUM MURIATE—Bombay, 7 t. 10 c., £549.;
Karachi, 1 c. (pt.), £6.; Lima,
2 c., £12.; Rockhampton, 2 c.,
£8.; Tripoli, 5 c., £16.**AMMONIUM PHOSPHATE—**

Bordeaux, 2 t., £47.

AMMONIUM SULPHATE—Cheribon, 10 t., £250.; Samarang,
520 t., £13,000.; Soerabaya, 170
t., £4,250.; Tjilatjap, 300 t.,
£7,500.**AMYL ACETATE—**

Brussels, 1 drms., £19.

ANTIMONY SULPHIDE—Brussels, 3 cks., £61.; Buenos
Ayres, 2 pkgs., 3 cks., £206.;
Rotterdam, 10 cks., £279.**ARSENIC—**Calcutta, 6 t. 13 c., £522.;
Mazagan, 11 c., £33.; Rio de
Janeiro, 4 c., £22.; Rouen, 10 t.,
£495.**ARSENIC SULPHIDE—**

Cape Town, 2 t. 3 c., £267.

BARBITONE—

Sydney (F.), 1 cs. (pt.), £9.

BARIUM BINOXIDE—

Sydney, 11 drms., £160.

BARIUM CHLORIDE—Lisbon, 1 cs., £7.; Soerabaya,
1 kg., £17.**BASIC SLAG—**

Marlaise, 260 t. 7 c., £911.

BISMUTH CARBONATE—

Athens, 4 cs. (pt.), £5.; Kilindini, 1 cs. (pt.), £5.; Sao Paulo, 1 ck. (pt.), £6.

BISMUTH SUBGALLATE—

Athens, 4 cs. (pt.), £9.; Maceio, 1 ck. (pt.), £7.

BISMUTH SUBNITRATE—

Maceio, 1 ck. (pt.), £6.

BORAX—

Albany, 5 c., £10.; Constantino-
nople, 1 t., £55.; Fremantle,
9 c., £18.; Havre, 10 t., £390.;
Madras, 2 c., £11.; Rotterdam,
10 t., £370.

BORIC ACID—

Switzerland *via* Antwerp (F.), 1 t.,
£74.; Barcelona (F.), 4 t. 10 c.,
£377.; Calcutta, 9 c., £34.; Con-
stantinople (F.), 1 t., £97.;
Cyprus, 1 c., £6.; Durban, 2 c.,
£11.; Fremantle, 2 c., £10.;
Madras, 2 c., £15.; Valencia (F.),
10 t., £42.

CALCIUM CARBIDE—

Bangkok, 4 c., £17.; Colombo,
1 t. 16 c., £48.; Delagoa Bay,
4 t. 18 c., £122.

CALCIUM CARBONATE—

Ghent, 2 c., £7.; Secondee, 15
c., £21.

CALCIUM GLYCEROPHOSPHATE

Beyrout, 7 cs. (pt.), £11.;
Christiania, 1 cs., £94.

CALCIUM LACTATE—

Durban, 1 cs. (pt.), £6.; Maceio,
1 ck. (pt.), £17.

CARBIDE—

Iddo, 1 t., £31.

CARBON BISULPHATE—

Novorossisk, 100 cts., £540.

CAUSTIC POTASH—

Rio de Janeiro, 8 cs. (pt.), £12.;
Shanghai, 1 cs., £31.

CAUSTIC SODA—

Batoum, 29 t. 18 c., £562.;
Constantinople, 20 t. 7 c., £350.;
Smyrna, 30 t., £600.

CERESINE WAX—

A'sterdam, 1 t. 1 c.; Genoa, 10 c.;
Nantes, 3 c.; Pt. Elizabeth, 4 c.

CHEMICALS (otherwise undescribed)

Adelaide, 11 pkgs., £150.; Alex-
andria, 1 cs. (pt.), £9.; Batavia,
3 pkgs., £55.; Italy, *via* Bou-
logne, 1 cs. (pt.), £5.; Brussels,
8 cs., £85.; Calcutta, 6 pkgs.,
£55.; Constantinople, 2 cs., £14.;
Durban, 6 cs., £23.; Hobart,
2 cs., £59.; Madras, 2 cs., £20.;
Melbourne, 4 cs., £27.; Montreal,
14 pkgs., £160.; Osaka, 2 cs.,
£62.; Penang, 5 pkgs. (pt.), £94.;
Pt. Elizabeth, 24 cs. (pt.), £94.;
Rangoon, 10 pkgs., £59.; Shang-
hai, 19 cs., £1,058.; Singapore,
1 cs. (pt.), £52.; Tokio, 1 cs.,
£135.; Italy, *via* Treport, 2 cs.,
£60.

CHROMIC ACID—

Amsterdam, 1 dr., £110.

CITRIC ACID—

Archangel, 1 c., £24.; Batavia,
5 c., £150.; Calcutta (F.), 1 c.,
£14.; Durban, 5 c., £150.; East
London, 2 c., £50.; Fremantle,
1 c., £30.; Gothenburg, 2 t.,
£963.; Groningen (F.), 10 c.,
£240.; Nelson, 1 c., £25.; New
York, 7 t. 10 c., £3,527.; Ran-
goon, 1 cs. (pt.), £13.; Rio de
Janeiro, 6 c., £185.; Townsville
(F.), 2 cs. (pt.), £7.; Valparaiso,
1 c., £17.

COAL PRODUCTS—

Alizarine
Kobe, 10 cks., £448.; Madras,
175 pkgs., £1,399.

Aniline Dye

Bombay, 6 pkgs. (pt.), £252.;
Brussels (F.), 3 kgs., £192.;
Brussels, 5 pkgs., £79.; Calcutta,
3 cs. (pt.), £57.; Genoa, 27 cks.,
£543.; Hong Kong, 1 cs., £54.;
Naples, 3 cks., £153.; Rio de
Janeiro, 1 cs. (pt.), £25.; Shang-
hai, 4 pkgs., £168.; Singapore,
1 cs., £18.

Benzole

Amsterdam, 5 drms., £9.

COAL PRODUCTS—

Benzonaphthol
Alexandria, 1 cs. (pt.), £8.;
Maceio, 1 cs. (pt.), £23.

Bitumen

Hong Kong, 18 brls., £106.;
Karachi, 5 cks., £21.; Singapore,
96 pkgs., £476.

Carbolic Acid

Adelaide, 31 pkgs., £67.; Ant-
werp, 1 ck., £12.; Boulogne, 101
cs., £584.; Calcutta, 7 pkgs.,
£22.; Colombo, 2 cs., £5.;
Constantinople, 5 pkgs., £171.;
Genoa, 1 dr., £7.; Osaka,
82 drms., £747.; Penang, 2 cs.,
£6.; Soerabaya, 10 cks., £60.;
Suez, 8 drms., £8.

Cresol

Karachi, 1 ck., £6.; Montreal,
10 cks., £38.

Naphthalene

Buenos Ayres, 1 cs., £8.; Cal-
cutta, 67 tcs., £230.

Pitch

Alexandria, 5 drms., £9.; Ant-
werp, 124 t., £535.; Buenos
Ayres, 150 kgs., £19.; Fecamp,
110 t., £385.; Pt. Said, 150 brls.,
£115.; Rio de Janeiro, 46 cks.,
£80.

Pyridine

Singapore, 25 cks., £29.; Sydney,
40 drms., £338.

Tar

Durban, 4 cks., £13.; Malta,
4 rnlts., £8.; Rio de Janeiro,
94 cks., £200.

Terebine

Melbourne, 2 cs., £21.

Xylol

Amsterdam, 5 drms., £9.; Ba-
tavia, 7 cs. (pt.), £9.

COBALT OXIDE—

Genoa, 4 cs., £157.

COPPER OXIDE—

Italy, 1 cs., £10.

COPPER SULPHATE—

Callao, 15 c., £31.; Calcutta, 5 t.,
£205.; Rockhampton, 3 c., £7.;
Valparaiso, 1 t. 6 c., £45.

COPPERAS—

Pt. Elizabeth, 12 cs., £5.

CREAM OF TARTAR—

Bombay (F.), 4 c., £49.; Buenos
Ayres (F.), 2 c., £29.; Calcutta,
10 c., £118.; Constantinople, 1
c., £14.; Copenhagen, 2 t., £360.;
Durban, 10 c., £116.; Hong
Kong, 1 c., £12.; Karachi (F.),
2 c., £26.; Kobe (F.), 13 c., £152.;
Lima, 1 c., £14.; Madras, 7 c.,
£185.; Osaka (F.), 5 t., £1,225.;
Pt. Moresby (F.), 1 c., £8.; Rio
de Janeiro, 2 c., £50.; Rotter-
dam (F.), 5 c., £70.; Valparaiso,
1 cs. (pt.), £10.

DISINFECTANTS (otherwise undes.)

Alexandria, 3 c., £5.; Amsterdam
(F.), 18 c., £120.; Amsterdam,
4 c., £11.; Antwerp, 5 t. 3 c.,
£632.; Batavia, 6 t. 16 c., £489.;
Belewan, 15 c., £12.; Bombay,
1 t. 12 c., £33.; Buenos Ayres,
1 t. 19 c., £150.; Brussels, 17 c.,
£40.; Calcutta, 4 t. 4 c., £165.;
Cape Town, 11 t. 19 c., £434.;
Cochin, 4 c., £13.; Delagoa Bay,
3 t. 4 c., £108.; Durban, 5 t.
11 c., £202.; Madras, 1 t. 7 c.,
£25.; Medan, 5 t. 11 c., £312.;
Melbourne, 8 c., £15.; Penang,
2 t. 10 c., £126.; Pt. Elizabeth,
5 c., £8.; Pt. Swettenham, 10 t.
15 c., £536.; Rangoon, 1 t. 10 c.,
£61.; Rotterdam, 5 t., £155.;
Rio de Janeiro, 11 c., £132.;
Sandakan, 8 c., £16.; Samarang,
5 t. 8 c., £350.; Singapore, 2 t.
3 c., £116.; Soerabaya, 8 t. 1 c.,
£349.

ETHER—

Batavia, 26 cs. (pt.), £38.; Con-
stantinople, 6 cs., £75.; Cyprus,
1 cs., £11.; Durban, 1 cs., £10.;
Seville, 2 cs., £10.

ETHYL CHLORIDE—

Soerabaya, 2 cs., £10.

FATTY ACIDS—

Nantes, 50 t.; Paris, 12 t. 9 c.;
Rouen, 10 t.

FISH OIL—

Haarlem, 19 c.

FLUORIC ACID—

Melbourne, 1 cs., £7.

GELATINE—

Melbourne, 6 c.; Montreal, 2 t.;
Pt. Elizabeth, 1 c.

GLUE—

Gothenburg, 1 t.; Kobe, 25 t.;
Karachi, 1 t. 5 c.; New York,
3 t.; Ostend, 3 t. 6 c.

GLUE, SIZE, AND GELATINE—

Adelaide, 2 c.; Antwerp, 13 c.;
Auckland, 1 t. 7 c.; Barcelona,
23 t. 12 c.; Bangkok, 10 c.;
Bombay, 10 c.; Beira, 1 c.;
Buenos Ayres, 2 t. 2 c.; Calcutta,
1 c.; Cape Town, 2 t. 4 c.;
Christiania, 2 t.; Cologne, 4 t.
17 c.; Colombo, 10 c.; Durban,
1 c.; East London, 2 c.; Ghent,
2 c.; Hong Kong, 1 t. 1 c.;
Karachi, 2 c.; Kilindini, 2 c.;
Rangoon, 1 t.; Rio de Janeiro,
1 c.; Rotterdam, 2 c.; Shanghai,
10 t. 3 c.; Yokohama, 20 t.

GLYCERINE—

Alexandria, 6 c., £50.; Amster-
dam, 4 t., £320.; Bangkok, 1 c.,
£8.; Barcelona, 4 c., £20.;
Beyrout, 2 c., £25.; Bombay,
2 c., £20.; Brussels, 1 c., £9.;
Constantinople, 1 t., £125.;
Karachi, 3 c., £27.; Lima, 4 c.,
£33.; Malaga, 2 c., £17.; Paris,
5 t., £560.; Rio de Janeiro, 1 c.,
£11.; Samarang, 1 c., £7.;
Seville, 2 c., £16.; Valparaiso,
1 c., £9.

GOLD CHLORIDE—

Bangkok, 1 ck. (pt.), £13.

HEXAMETHYLENETETRAMINE

Malaga (F.), 1 cs. (pt.), £8.

HYDROBROMIC ACID—

Madras, 1 cs., £9.

HYDROCHLORIC ACID—

Shanghai, 5 c., £17.

HYDROFLUORIC ACID—

Bilbao, 1 cs., £8.; Genoa, 1 btl.,
£75.

HYDROGEN PEROXIDE—

Alexandria, 2 cs., £9.; Colombo,
2 cs., £10.; Kilindini, 4 cs., £35.;
Pt. Elizabeth, 2 cs., £14.; Pt.
Said, 1 cs., £7.; Soerabaya, 10
cs., £63.

HYPOPHOSPHITE OF LIME—

Genoa, 18 pkgs. (pt.), £103.

IODINE—

Genoa (F.), 60 kgs., £5,040.;
Maceio, 1 ck. (pt.), £11.

IODINE (RESUBLIMED)—

Malaga, 1 cs. (pt.), £45.

IRON AND AMMONIUM CITRATE

Madras, 1 cs., £45.

IRON AND POTASSIUM CYANIDE

Alexandria, 2 cs., £23.

LACTIC ACID—

Barcelona, 12 cks., £62.; Nantes,
5 cks., £72.

LEAD ACETATE—

Antwerp, 34 cks., £675.; Bom-
bay, 14 kgs., £498.; Constanti-
nople, 1 ck., £17.; Madras, 5
kg., £33.; Salonika, 1 ck., £35.;
Shanghai, 1 kg., £11.

LEAD CARBONATE—

Rio de Janeiro, 2 cs., £20.

LEAD OXIDE—

Salonika, 1 ck., £21.

MAGNESIA (CALCINED)—

Paris, 20 cks., £102.; Rio de
Janeiro, 2 cs., £18.; Sao Paulo,
1 cs., £11.

MAGNESIUM CARBONATE—

Buenos Ayres, 4 cs., £15.;
Malaga, 2 cs., £15.; Shanghai,
2 cs., £8.; Seville, 2 cs., £8.

MAGNESIUM CITRATE—

Barbados, 1 cs., £5.; Constanti-
nople, 2 cs., £11.; East London,
1 cs., £5.; Rio de Janeiro, 1 ck.,
£17.; Valparaiso, 1 cs., £10.

MAGNESIUM SALICYLATE—

Pelotas, 1 cs. (pt.), £5.

MAGNESIUM SULPHATE—

Barbados, 5 c., £13.; Bombay,
8 c., £18.; Durban, 4 c., £9.;
East London, 4 c., £6.; Fre-
mantle, 2 t. 8 c., £87.; Kilindini,
8 c., £13.; Mauritius, 5 c., £7.;
Pt. Elizabeth, 4 c., £7.; Seville,
4 c., £7.; Wangarmi, 11 c., £23.

MANGANESE BORATE—

Genoa, 3 cks., £85.

MANGANESE DIOXIDE—

Constantinople, 2 cks., £20.

MANGANESE OXIDE—

Lisbon, 8 cks., £140.

MERCURY ARSENATE—

Christiania, 5 cs., £370.

MERCURY CHLORIDE—

Amsterdam, 1 cs. (pt.), £20.

MERCURY OXYCYANIDE—

New York, 2 cs., £88.

MERCURY OXIDE—

Amsterdam, 10 cs., £842.

MERCURY PIRCHLORIDE—

Calcutta, 1 cs., £6.

MERCURY SUBCHLORIDE—

Madras, 1 cs., £100.

METAPHOSPHORIC ACID—

Paris, 10 cs., £190.

METHYL SALICYLATE—

Italy, 8 drms., £64.

NITRIC ACID—

Alexandria, 3 c., £19.; Tripoli,
2 c., £9.

OXALIC ACID—

Valparaiso, 1 cs. (pt.), £6.

PARAFFIN WAX—

Genoa, 60 t. 14 c.

PARAFORMALDEHYDE—

Amsterdam, 1 cs., £73.

PHOSPHORIC ACID—

Melbourne, 22 cs., 1 t., £207.;
Sydney, 7 cs., £37.; Wellington,
10 c., £80.

PHOSPHORUS—

Soerabaya, 1 cs., £10.

PLUMBAGO—

Dunedin, 11 c.; Gothenburg,
2 c.

POTASSIUM ACETATE—

Canton, 12 cs. (pt.), £6.; Rio
de Janeiro, 5 cks. (pt.), £17.

POTASSIUM BICHROMATE—

Antwerp, 54 cks., £2,950.; Con-
stantinople, 1 cs., £39.; Ham-
burg, 6 cks., £490.; Rio de
Janeiro, 9 cks. (pt.), £7.;
Salonika, 1 ck., £39.; Swatow,
2 cks., £31.

POTASSIUM BROMIDE—

Calcutta, 2 cs., £45.

POTASSIUM CARBONATE—

Alexandria, 1 ck., £6.; Antwerp,
24 cs., £121.; Rio de Janeiro,
18 cs. (pt.), £32.

POTASSIUM CHLORATE—

Cyprus, 1 c., £13.

POTASSIUM CHROMATE—

Canton, 12 cs. (pt.), £12.

POTASSIUM CYANIDE—

Canton, 6 c., £155.; Rio de
Janeiro, 1 c., £26.

POTASSIUM HYDROXIDE—

Shanghai, 3 cs. (pt.), £9.

POTASSIUM IODIDE—

Alexandria, 1 cs. (pt.), £9.;
Beyrout, 7 cs. (pt.), £8.; Bang-
kok, 1 cs. (pt.), £48.; Durban,
1 cs. (pt.), £39.; Maceio, 1 ck.
(pt.), £39.; Madras, 5 cks., £450.;
Rio de Janeiro, 28 cks. (pt.),
£166.; Rio de Janeiro (F.), 2 cs.,
£164.

POTASSIUM PERMANGANATE—

Colombo, 1 kg., £21.; Melbourne,
3 cs., £58.; Rio de Janeiro, 22
cks. (pt.), £91.; Sao Paulo, 1 cs.,
£75.

POTASSIUM SULPHATE—

Canton, 1 c., £6.

POTASSIUM SULPHIDE—

Buenos Ayres, 1 cs., £77.; Rio
de Janeiro, 46 cks. (pt.), £117.;
Sao Paulo, 1 ck., £21.

PYROGALLIC ACID—

Bangkok, 1 ck. (pt.), £5.

QUININE—

Alexandretta, 125 ozs.; Alexandria, 585 ozs.; Amoy, 1,000 ozs.; Cyprus, 64 ozs.

SALICYLIC ACID—

Amsterdam, 1 ck., £28.; Antwerp, 1 ck., £17.; Batavia, 1 ck., £13.; Colombo, 1 cs. (pt.), £6.; Italy, 4 pkgs., £49.; New Plymouth, 1 cs., £10.

SALT—

Durban, 1 t.; Mombasa, 1 t.; Paramaribo, 1 t.; Sabang, 4 c.; Trinidad, 6 t.

SALTPETRE—

Axim, 5 c., £19.; Barcelona, 4 t., £200.; Batavia, 1 c., £5.; Buenos Ayres, 10 t., £580.; Canton, 1 c., £5.; Colombo, 4 c., £14.; Durban, 8 c., £30.; Pelotas, 10 c., £41.; Rio de Janeiro, 3 c., £17.; Rosario, 1 t. 19 c., £108.; Santander, 2 t. 4 c., £104.; Wellington, 4 t., £200.

SHEEP DIP—

Delagoa Bay, 10 c., £23.; Hastings, N.Z., 5 c., £8.; Pt. Elizabeth, 15 t. 6 c., £552.

SILVER NITRATE—

Hong Kong, 2 cs., £149.

SOAP—

Aden, 7 c.; Alexandria, 14 c.; Auckland, 9 c.; Antwerp, 387 t. 13 c.; Amsterdam, 7 c.; Archangel, 3 t. 3 c.; Ascension, 11 c.; Bombay, 17 t. 13 c.; Batavia, 2 t.; Boulogne, 107 t. 15 c.; Buenos Ayres, 1 c.; Calais, 3 c.; Cape Town, 6 c.; Calcutta, 17 c.; Channel Islands, 1 t. 10 c.; Cheribon, 2 c.; Christchurch, 3 c.; Cologne, 109 t. 1 c.; Colombo, 1 t. 4 c.; Constantinople, 9 t. 15 c.; Copenhagen, 48 t. 4 c.; Cyprus, 3 c.; Danzig, 7 t. 16 c.; Delagoa Bay, 1 c.; Demerara, 8 c.; Dunkirk, 6 t. 4 c.; Durban, 1 c.; East London, 1 c.; Genoa, 18 c.; Ghent, 2 t. 3 c.; Hong Kong, 4 c.; Karachi, 1 t. 14 c.; Kobe, 4 c.; Leghorn, 11 t. 10 c.; Lisbon, 1 c.; Montreal, 14 c.; Macassar, 7 c.; Mazagan, 19 t. 13 c.; Medan, 5 c.; Melbourne, 6 c.; New York, 1 t.; Paris, 1 t. 6 c.; Penang, 3 c.; Piraeus, 4 c.; Rio de Janeiro, 1 t.; Rostoff, 1 c.; Rotterdam, 5 t. 2 c.; St. Helena, 2 c.; Shanghai, 19 c.; Singapore, 1 t. 7 c.; Smyrna, 2 t. 1 c.; Soerabaya, 4 c.; Sydney, 4 c.; Suez, 8 c.; Vienna, 1 t.; Wellington, 3 c.; Yokohama, 1 c.

SODA CRYSTALS—

Rotterdam, 9 t. 14 c., £63.; Tripoli, 1 t., £5.

SODIUM & POTASSIUM TARTRATE—

Rio de Janeiro, 5 cks. (pt.), £17.

SODIUM ARSENITE—

Durban, 2 t. 1 c., £110.

SODIUM BENZOATE—

Athens (F.), 4 cs. (pt.), £7.; Calcutta, 1 cs., £21.; Calcutta (F.), 1 cs., £12.; Maceio (F.), 1 cs. (pt.), £8.

SODIUM BICARBONATE—

Antigua, 3 c., £5.; Batavia, 11 c., £12.; Bombay, 3 c., £10.; Buenos Ayres, 6 c., £16.; Demerara, 10 c., £6.; Fremantle, 1 t. 5 c., £15.; Lima, 10 c., £9.; Malaga, 4 c., £5.; Rotterdam, 10 t., £90.; Seville, 4 c., £5.; Smyrna (F.), 3 t. 6 c., £120.; Tripoli, 10 c., £5.

SODIUM BISULPHITE—

Antwerp, 1 t., £33.; Batavia, 7 t., £210.; Colombo, 40 drms., £56.

ODIUM CARBONATE—

Alexandria, 10 c., £26.; Batavia, 1 c., £5.

SODIUM CITRATE—

Calcutta, 1 cs. (pt.), £23.; Perth, 1 cs. (pt.), £7.

ODIUM CYANIDE—

Cape Town, 2 c., £15.

SODIUM GLYCEROPHOSPHATE—

Athens, 4 cs. (pt.), £5.; Amsterdam, 1 dr., £34.

SODIUM HYPOPHOSPHITE—

Constantinople, 6 cks., £250.; Genoa, 18 pkgs. (pt.), £44.

SODIUM HYPOSULPHITE—

Antwerp, 5 t., £105.; Bangkok, 12 pkgs. (pt.), £13.; Lisbon, 10 c., £15.; Rio de Janeiro, 4 c., £6.; Singapore, 20 kgs., £22.

SODIUM IODIDE—

Calcutta, 1 cs. (pt.), £12.; Beyrout, 7 cs. (pt.), £10.; Gothenburg, 1 cs., £34.

SODIUM NITRATE—

Gibraltar, 5 t., £117.; St. Kitts (F.), 8 t., £204.

SODIUM PRUSSATE—

Genoa, 2 t. 19 c., £200.; Kobe, 38 cks., £646.; New York, 60 t. 5 c., £4,436.; Osaka, 5 t. 3 c., £337.

SODIUM SALICYLATE—

Calcutta, 4 cs. (pt.), £10.; Colombo, 1 cs. (pt.), £8.; New Plymouth, 1 cs., £22.

SODIUM SULPHATE—

Antwerp, 1 t., £15.; Buenos Ayres, 3 t., £38.; Mauritius, 9 c., £8.

SODIUM SULPHITE—

Alexandria, 10 c., £31.; Batavia, 2 c., £7.; Brussels, 6 c., £9.; Shanghai, 1 t., £22.

SODIUM TARTRATE—

Amsterdam, 2 cks., £34.; Calcutta, 1 ck., £14.; Montreal, 10 c., £70.; New York, 5 t., £700.; Sydney, 10 cks., £70.

STEARINE—

Paris, 10 t.

SULPHATE OF QUININE—

Calcutta, 11,500 ozs.

SULPHUR—

Amsterdam, 2 c., £8.; Brussels, 17 c., £34.; Paris (F.), 10 t., £180.; Rouen (F.), 4 t., £90.

SULPHUR (FLOWERS)—

Paris, 1 t., £40.

SULPHURIC ACID—

Canton, 4 c., £20.; Madras, 2 c., £10.; Penang, 1 c., £14.; Rio de Janeiro, 6 c., £30.; Seconade, 520 t., £13,000.

SULPHUROUS ACID—

Ghent, 60 cks., £158.

SUPERPHOSPHATE OF LIME—

Gibraltar, 10 t., £97.

SUPERPHOSPHATES—

Channel Islands, 60 t., £390.; Cyprus, 70 t., £665.

TALLOW—

Nantes, 14 t. 13 c.; Rotterdam, 2 t. 13 c.

TANNIC ACID—

Bahia, 1 cs., £27.; Pelotas, 1 cs. (pt.), £21.; Sydney (F.), 2 cs., £41.

TARTARIC ACID—

Bahia, 1 c., £21.; Bombay (F.), 3 c., £59.; Cape Town, 2 c., £37.; Demerara, 1 c., £10.; Karachi (F.), 1 t. 4 c., £420.; Lima, 1 c., £19.; Lytleton, 15 c., £228.; Madras, 2 c., £19.; New York, 1 t. 10 c., £518.; New York (F.), 2 t. 10 c., £910.; Pt. Sudan, 1 c., £18.; Rio de Janeiro, 3 c., £68.; Suez, 1 c., £20.; Valparaiso, 1 c., £12.

THEOBROMINE—

Kobe (F.), 2 cs., £204.

WAX—

Antwerp, 3 t.; Christchurch, £7.

WHITE LEAD—

Antwerp, £643.; Batoum, £300.; Bombay, £483.; Bordeaux, £2,120.; Buenos Ayres, £823.; Calais, £474.; Dunkirk, £300.; East London, £115.; Ghent, £335.; Hong Kong, £136.; Karachi, £74.; Lytleton, £118.; Malta, £65.; Paris, £1,560.; Piraeus, £623.; Shanghai, £233.

ZINC OXIDE—

Madras, 2 cs., £40.

MANCHESTER.

Week ending September 3.

ALUM LUMP—

Alexandria, 69 brls. Tunis, 20 dbl. bgs. Turin, 25 brls.

ALUM AMMONIA—

Jaffa, 35 brls.

AMMONIUM CARBONATE—

Tunis, 5 cks.

AMMONIUM MURIATE—

Turin, 7 kgs.

ANILINE OIL—

Antwerp, 13 drms.

ANILINE SALT—

Beyrout, 32 cks. Tunis, 10 cks.

BORAX—

Beyrout, 5 cks.

BORIC ACID—

Beyrout, 1 ck.

COAL PRODUCTS (otherwise undes.)

Antwerp, 146 tes.

DYESTUFFS (otherwise undescribed)

Antwerp, 1 kg.

DYESTUFFS—

Aniline Colours

Tunis, 1 cs.

Sumac Extract

Alexandria, 5 kgs.

Turnerle

Turin, 26 bgs.

GLUE—

Limassol, 1 bg.

GLYCERINE—

Beyrout, 7 cs.

INDIGO—

Turin, 4 chts.

MAGNESIA (CALCINED)—

Tunis, 2 cs.

MAGNESITE—

Havre, 100 bgs.

OXALIC ACID—

Havre, 8 cks.

POTASSIUM CARBONATE—

Tunis, 1 cs.

RED LEAD—

Limassol, 1 kg.

Turin, 5 cks.

SALAMMONIAC—

Turin, 2 brls.

SALT—

Quebec, 2,400 sks.; St. Johns, 5,880 sks.

SOAP—

Alexandria, 1,601 cs.; Jaffa, 32 cs.; Malta, 316 cs.

SODIUM BICARBONATE—

Alexandria, 20 bgs.; Beyrout, 40 kgs.

SODIUM SULPHIDE—

Havre, 2 cks.

SULPHUR (ROLL)—

Limassol, 3 kgs.

TARTARIC ACID—

Limassol, 1 kg.

WAX—

Alexandria, 80 cs.

WHITE LEAD—

Turin, 10 kgs.

WOOD TAR—

Limassol, 1 brl.

MIDDLESBROUGH.

Week ending September 6.

ARIUM BINOXIDE—

Dieppe, 22 t. 14 c., £2,724.

ARIUM NITRATE—

Antwerp, 2 t., £100.

BENZIDINE BASE—

Dieppe, 9 c., £111.

CAUSTIC SODA—

Calcutta, 51 t. 16 c., £898.

CHEMICALS (otherwise undescribed)

Calcutta, 10 t. 19 c., £159.; Cocanada, 4 t. 7 c., £76.

COAL PRODUCTS—

Benzole
Dieppe, 5,076 galls., £506.;
Nantes, 258 galls., £26.

Creosote Oil

Horsens, 182,265 galls., £5,486.

Naphthalene

Dieppe, 45,461 galls., £4,320.;
Melbourne, 10 t., £170.; Nantes,
1,296 galls., £123.

Pitch

Antwerp, 1,674 t. 12 c., £5,172.

Toluol

Dieppe, 20, 041 galls., £1,878.

MAGNESIA—

Dieppe, 10 t., £391.

SALT—

Kilindini, 17 c., £15.; Khartoum,
16 c., £32.; Melbourne, 24 t.
13 c., £999.; Malmö, 125 t.,
£312.; Sydney, 24 t., £1,011.;
Tanga, 16 c., £32.

NEWCASTLE-ON-TYNE

Week ending September 6.

AMMONIUM MURIATE—

Bergen, 1 t.

ANTIMONY—

Copenhagen, 30 t.; Gothenburg,
31 t.; Rotterdam, 11 t.

ARSENIC—

Gothenburg, 2 t. 10 c.

BLEACHING POWDER—

Antwerp, 24 t. 15 c.; Copen-
hagen, 4 t. 17 c.; Gothenburg,
25 t.; Rotterdam, 43 t. 2 c.

CAUSTIC SODA—

Bergen, 5 t.; Copenhagen, 75 t.;
Gothenburg, 30 t.

COAL PRODUCTS—

Tar
Gothenburg, 4,000 galls., 24 t.

FERRO MANGANESE—

Bilbao, 100 t.; Gothenburg, 129
t. 16 c.

FERRO PHOSPHORUS—

Bilbao, 5 t.

GELATINE—

Copenhagen, 30 t.

MAGNESIUM CARBONATE—

Antwerp, 3 t.

PITCH—

Rotterdam, 8 t. 3 c.

RED LEAD—

Gothenburg, 10 t. 1 c.; Antwerp,
3 t. 7 c.; Copenhagen, 3 t.

SOAP—

Bergen, 6 c.

SODA CRYSTALS—

Rotterdam, 10 t.

SODIUM HYPOSULPHATE—

Antwerp, 10 t.

SODIUM HYPOSULPHITE—

Gothenburg, 6 t.

SODIUM SILICATE—

Gothenburg, 7 t. 15 c.

SODIUM SULPHITE—

Antwerp, 6 t.; Gothenburg, 19
c.; Rotterdam, 19 c.

SULPHUR—

PRICES CURRENT.

THURSDAY, Sept. 11, 1919.

PREPARED BY MESSRS. HIGGINBOTTOM AND CO., 21, SPRING GARDENS, MANCHESTER.

The values stated are F.O.R. at makers' works, or at usual ports of shipment in U.K., unless otherwise specified
The prices in different localities may vary.

Acids:—

		£	s.	d.
*Acetic 40% and 60% ...	per cwt.	30/-	&	45/-
* " Glacial ...	per ton	85	0	0
Arsenic, S.G. 2,000° ...	per ton	70	0	0
Boric Crystals ...	"	72	0	0
*Fluoric ...	per lb.	0	0	7
*Muriatic (Tower Salts), 28° Tw. ...	per carboy	0	6	6
*Nitric, 80° Tw. ...	per ton	32	0	0
Oxalic ...	per lb.	0	1	2½
Phosphoric, 1,750° ...	"	0	1	9
*Sulphuric (fuming, 70%) ...	per ton	—	—	—
* " (Pyrites, 168°) ...	"	7	18	9
* " (" 140°) ...	"	4	10	0
* " (free from arsenic, 144°) ...	"	5	7	4
Tannic (commercial) ...	per lb.	0	2	6
Tartaric (crystals) ...	"	0	3	2
*Acetone ...	per ton	89	0	0
*Alum, loose lump (delivered) ...	"	17	0	0
Alumina Sulphate (pure) ...	"	17	0	0
Aluminoferric (in slabs) ...	"	8	10	0
Aluminium (Ingot Metal, 98/99%) ...	per ton	150	0	0
*Ammonia, Anhydrous ...	per lb.	0	1	10
* " 880 ...	per ton	33	0	0
* " 920 ...	per ton	20	0	0
" Carbonate ...	per lb.	0	0	6½
" Muriate (grey) ...	per ton	47	10	0
" " (sal ammoniac) 1st & 2nd, ...	per cwt.	80/-	&	75/-
" Nitrate ...	per ton	60	0	0
" Phosphate ...	"	110	0	0
" Sulphate (grey), London, net ...	"	—	—	—
" " Hull ...	"	—	—	—
" " Manchester ...	"	—	—	—
*Aniline Oil (pure) ...	per lb.	0	1	2
Aniline Salt ...	"	0	1	2
Antimony ...	per ton	45	0	0
" (tartar emetic), 43/44% ...	per lb.	0	3	4
" (golden sulphide) ...	"	0	1	3
Arsenic, white powdered ...	per ton	60	0	0
Barium Chloride (in casks) ...	"	23	10	0
" Carbonate (native), 92/94% ...	"	11	10	0
" Sulphate (native levigated) ...	"	£7 to £14		
Baryta Chlorate ...	per lb.	0	1	3
*Bisulphide of Carbon ...	per ton	55	0	0
Bleaching Powder, 35% ...	"	15	0	0
* " Liquor, 7% ...	"	6	0	0
Casein (commercial) ...	"	90	0	0
Chromium Acetate (crystals) ...	per lb.	0	1	0
Calcium Chloride ...	per ton	8	0	0
China Clay (at Runcorn), in bulk ...	"	70/-	to	90/-

Coal-tar Products and Dyes:—

Alizarine (artificial), 20% ...	per lb.	0	2	0
Magenta ...	"	18/-	to	35/-
Anthracene, 40/50% A, f.o.b., L'don, per unit, ...	"	0	0	7
Benzol, 90's (naked) ...	per gal.	0	1	11
" 50/50's ...	"	0	1	10
Carbolic Acid (crude, 60°) ...	"	0	1	7½
" (crystallised, 40°) ...	per lb.	0	0	9½
" Acid (pale liquid, 97/98%) ...	per gal.	0	2	9
*Creosote (ordinary), naked ...	"	0	0	6½
*Crude Naphtha, 30% at 120°C. ...	"	0	0	9
*Grease Oils, 18° Tw. (naked) ...	per ton	6	10	0
Pitch, f.o.b., Liverpool or Garston ...	"	3	2	6
*Solvent Naphtha, 90% at 160° ...	per gal.	0	2	5
Copper ...	per ton	101	10	0
" Sulphate ...	"	42	0	0
Dross Salts ...	"	38	10	0
*Glycerine (crude), 80% ...	"	72	0	0
" (industrial, S.G. 1,260) ...	"	110	0	0
*Iodine ...	per oz.	0	1	0
*Iron Nitrate, 80° Tw. ...	per ton	12	0	0
" Sulphate (copperas), delivered ...	"	4	10	0
" Sulphide ...	"	7	15	0
Lead (Foreign Pig) ...	"	25	0	0
" Litharge Flake ...	"	45	0	0
" Acetate (white) ...	"	83	0	0
" " (brown) ...	"	70	0	0

Lead, Carbonate (White lead), pure ...	per ton	50	0	0
" Nitrate ...	"	56	0	0
Lime, Acetate (brown) ...	"	11	0	0
" (grey), 80% ...	"	17	0	0
Magnesium Chloride ...	"	15	10	0
" Carbonate (light) ...	per cwt.	2	5	0
" Calcined Magnesite ...	per ton	21	10	0
" Sulphate (Epsom Salts) (coml.) ...	"	11	0	0
" (druggists) ...	"	16	0	0
Manganese, Sulphate ...	"	80	0	0
" Borate ...	"	100	0	0
*Methylated Spirit, 64° (industrial) ...	per gal.	0	5	7
*Naphtha (Wood), Solvent ...	"	0	10	0
" " Miscible, 60° p. ...	"	0	10	0

Oils:—

*Cottonseed ...	per ton	135	0	0
*Linseed ...	"	135	0	0
Stearine, 115-120° M.P. ...	"	105	0	0
Potassium, Bichromate ...	per lb.	0	1	6
" Carbonate, 80/82% ...	per to	95	0	0
" Chlorate ...	per lb.	0	1	0
" Hydrate (Caustic Potash) 90% ...	per ton	16½	0	0
" " 75/80% ...	"	140	0	0
" Potash Hydrate Liquid, 38° B. ...	"	70	0	0
" Nitrate (refined) ...	"	60	0	0
" Permanganate (commercial) ...	per lb.	0	3	3
" Prussiate (yellow) ...	"	0	1	9
" (red) ...	"	0	5	6
" Sulphate, 90% (ex ship) ...	per ton	30	0	0
" Muriate, 80% ...	"	25	0	0
Silver (metal) ...	per oz.	0	5	1
Sodium (metal) ...	per lb.	0	1	3
" Acetate ...	per ton	51	0	0
" Arseniate, 45% ...	"	60	0	0
" Borate (Borax), Crystals ...	"	39	0	0
" Bicarbonate (1 cwt. kegs) ...	"	9	10	0
" Bichromate ...	per lb.	0	0	11
" Carb. (Caustic Soda-ash), 48% ...	per ton	12	10	0
" (Alkali), 58% (bags) ...	" f.o.r.	6	0	0
" (Soda Crystals), (bags) ...	" wks.	4	2	6
" Chlorate ...	per lb.	0	0	6½
" Cyanide (100% basis) for export ...	"	0	0	10
" Hydrate (76% C. Soda) (f.o.r.) ...	per ton	24	0	0
" " (74% C. Soda) ...	"	23	5	0
" " (70% C. Soda) ...	"	22	0	0
" " (60% C. Soda) ...	"	21	0	0
" " (pure liquid, 90° Tw.) ...	"	10	2	6
" 77/78% Powdered (99%) Hydrate ...	"	24	10	0
" Hyposulphite (commercial) ...	"	16	10	0
" Manganate, 25% ...	"	65	0	0
" Nitrate, 96% refd., f.o.r., L'pool ...	"	21	0	0
" Nitrite, 100% ...	"	58	0	0
" Phosphate ...	"	26	0	0
" Prussiate ...	per lb.	0	0	8
" Silicate (glass) Alkaline ...	per ton	12	5	0
" (liquid, 100° Tw.) ...	"	9	10	0
" Sulphate (Saltcake), delivered ...	"	3	0	0
" (Glauber's Salt) ...	"	4	0	0
" Sulphate (conc.), 60/65% casks ...	"	19	0	0
" Sulphide ...	"	10	0	0
Sulphocyanide, Ammonium, 95% ...	per lb.	0	2	0
" Barium, 95% ...	"	0	1	4
" Potassium ...	"	0	2	4
" Calcium, 70% ...	per lb.	0	1	4
Sulphur, (Flowers) ...	Sicilian per ton	23	0	0
" (Roll Brimstone) ...	"	21	0	0
" Brimstone (best thirds) ...	"	21	0	0
" (ex ship) ...	"	14	10	0
Tallow ...	"	100	0	0
Tin Crystals ...	per lb.	0	1	10
" English Ingots ...	per ton	276	0	0
Titanium, Potass. Oxalate ...	per lb.	0	1	6
Titanous Chloride ...	per cwt.	4	10	0
Zinc (Spelter) ...	per ton	41	0	0
" Powder, 88/92% ...	"	70	0	0
" Chloride (solution, 102° Tw.) ...	"	3	10	0
" Sulphate, Crystal ...	"	22	0	0

* Packages extra or returnable; other wise, prices usually include packages.

THE CHEMICAL TRADE JOURNAL AND CHEMICAL ENGINEER.

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LONDON, SATURDAY, SEPTEMBER 20, 1919.

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EDITORIAL NOTICES.

Communications for the Editor, if intended for insertion in the current week's issue, should reach the office not later than Wednesday morning.

CURRENT TOPICS.

FUEL ECONOMY.

THE Fuel Economy Committee of the British Association, owing to the present critical position of the coal industry, have refrained from presenting their final report. That presented at the Bournemouth meeting of the Association on Friday of last week was in the nature of an interim communication. The members of the committee, in the course of their statement, and several of the speakers who took part in the subsequent discussion, criticised the Fuel Research Board of the Department of Scientific and Industrial Research mainly on account of the policy of the Board in holding itself aloof from other bodies and individual workers actively engaged on problems of fuel economy. The Fuel Research Board was established early in 1917, but notwithstanding the offers of the British Association Committee to collaborate with the new body, the proffered assistance was disregarded. The work of the Fuel Economy Committee was suspended until October last, when it resumed its labours "in response to a widespread and growing feeling that there was need of an organised body of independent scientific opinion that could be brought to bear in the public interest upon any proposals for research with regard to fuel." Mr. Robert Mond, who is the nominee of the Association of British Chemical Manufacturers on the Fuel Economy Committee, Sir Robert Hadfield, and Professor Armstrong were among the critics of the Fuel Research Board, the last-named urging that the Board, instead of reserving the work to themselves for investigation, should bring the competent research workers of the country together to discuss and to deal with the problems involved. With that view we have the greatest sympathy. The question of fuel economy is too important a factor in the national welfare to risk the loss that may result through shutting the door on the scientific knowledge that is available outside the personnel of the Fuel Research Board and their staff. What is most needed, as the British Association Committee justly emphasise, is a broadly planned policy which will aim at stimulating and assisting experimental work on the chemistry of coal, fuel economy, and cognate subjects everywhere throughout the whole kingdom. On the other hand, it is too early yet to criticise the Fuel Research Board on the ground of absence of results. For various reasons arising out of the war, the erection of the Research Station at East Greenwich has not been completed, and will probably not be completed much before the end of next year, though a portion of the buildings has been in use for some time. That Sir George Beilby, who is the

Director of the Board, has not been idle since its formation two and a half years ago may be relied upon with confidence. The Advisory Council for Scientific and Industrial Research, in their last annual report, stated that, in view of the cessation of war conditions and of the recent developments in the coal-mining industry, the Fuel Research Board felt it desirable that they should reconsider the whole outlook as regards their researches into the more economical use of the fuel resources of the nation, and a statement dealing with this subject, we are promised, will be issued shortly.

GERMAN ACTIVITY IN SOUTH AMERICA.

DURING the course of the war the agents or branches of the big German chemical manufacturing companies in the States of South America were extremely busily occupied in making preparations for the working up of trade connections with customers and prospective clients of all kinds for the purpose of promoting exports from Germany after the ratification of the Peace Treaty. To those who have become familiar with this work of organisation it is really astonishing what the Germans have endeavoured to accomplish. Acting upon instructions received from Germany, the South American representatives have followed out a programme of dividing up each country—principally the Argentine and Brazil—into a number of districts according to the native trades and industries located in them and likely to become customers for dyes and other chemicals. Having thus mapped out the country, the representatives or their travellers have taken the districts in succession and paid visits to all possible customers in each locality. Naturally all this occupies a large amount of time; but it has to be borne in mind that this organising activity has been extended over a period of five years, and it is possible in this way to cover a lot of ground in the period mentioned, so much, indeed, that the work should have been entirely completed. The results of these visits and inquiries, district by district, have been embodied in reports forwarded to Germany, accompanied by lists of names and addresses of prospective customers and statements regarding the financial standing of each. A similar policy has been also pursued in the case of China and Japan, and it can be easily understood that a mass of information has been collected in this manner of great value to the German chemical industry.

ITALIAN CHEMICAL INDUSTRY.

MANY articles have been published in the past four years concerning the Italian chemical industry, but little notice has been taken of the fact that before the war there was a rapidly growing and fairly extensive chemical and drug manufacturing industry in Italy. The value of such products manufactured in Italy in 1910 was estimated to be approximately £5,000,000. In 1913 this industry employed 12,500 workmen, used 56,000 horse-power, and manufactured products to the value of £7,000,000. The principal chemicals produced were boric, hydrochloric, nitric, and sulphuric acids; caustic soda in solution; sulphates of ammonia and copper; calcium hypochlorite; carbonate of lead (white lead); nitrate of potassium; calcium carbide; calcium cyanamide; glycerine; corrosive sublimate; borax; and chemical fertilisers. Exports in 1913 amounted to about £3,000,000, the principal items being boric, oleic, sulphuric, tartaric, and impure tannic acids, oxide of iron, corrosive sublimate, calcium carbide, citric acid, citrate of calcium, borax, raw tartar, glycerine, and perfumery.

Much progress was made during the war, and numerous small plants were established to manufacture chemicals and drugs which could no longer be obtained from abroad. If the present tariff is retained, many of these will find themselves unable to compete with foreign manufacturers in the Italian

market, although for items such as calcium carbide the tariff is very high. There is a plentiful supply of iron pyrites, and 710,000 tons of sulphuric acid were produced in 1913. A plant in Lombardy, established in 1914, has a capacity of nearly 5,000 tons of nitric acid per year obtained through the utilisation of electricity. Of calcium cyanamide some 17,000 tons were manufactured in 1914. With the addition of sulphate of ammonia, already produced in Italy; calcium cyanamide can be used as a nitrogenous manure.

Before the war Italy retained for use within the country about £4,000,000. worth of the chemicals and drugs of domestic manufacture, and imported additional chemicals and drugs to the value of £6,000,000 per annum. Of the products imported, the following were not manufactured within the country, or, if so, only in small quantities: Chlorides of lime, potash, and soda; chromates of the same; nitrates of all kinds; permanganates of potash and soda; sulphates of all kinds (except sulphate of iron), particularly sulphate of copper; bicarbonates; bisulphides of potash and soda; silicates of all kinds; bromine and bromides; iodine and iodides; acetates of all kinds, particularly of lime; impure acetic acid; arsenic, carbolic, oleic, oxalic, sulphurous, and pure tannic acids; ammonia; caustic potash; impure caustic soda; oxides of lead, tin, and zinc; and non-alcoholic perfumery. Cartridges to fit American-made pistols and exploding caps, both classified as chemicals in the Italian tariff, also find a market. Italy obtains chloride of potassium from Eritrea in considerable quantities. This product was formerly supplied by Germany. There is on hand only a small stock of many of the chemicals mentioned, and the prohibition of import by the Italian Government is all that prevents dealers laying in good stocks. Drugs are also very scarce and high-priced, particularly those manufactured from coal-tar products.

In spite of the efforts of Italian manufacturers to supply the demand for fertilisers, imports of raw nitrate of potash, sulphate of potash, chloride of potash, sulphate of ammonia, Thomas slag, and chemical fertilisers increased year by year before the war. These, with sulphate of copper, made up £2,400,000. of the £6,000,000. of imported chemicals and drugs per annum. Sulphate of copper is manufactured in large quantities in Italy—49,000 tons in 1913,—but the constantly increasing demand offers foreign manufacturers an exceptional opportunity.

Great Britain ranked first in supplying goods prior to the war. Its trade in chemicals and drugs, valued at about £1,440,000. per annum, half of it in sulphate of copper, made up one-fourth of all imports. Germany, supplying about £1,200,000., followed, with trade well distributed throughout the list, although holding almost a monopoly in supplying drugs derived from coal-tar products. France came next with £920,000., also well distributed. The United States exported about £420,000. worth per annum, nearly all in rosin and solid paraffin, the rest being made up principally of oleic acid, oxide of zinc, sulphate of copper, and acetate of lime. The only article of importance from Austria was solid paraffin, which amounted to £190,000. yearly, with sulphate of ammonia to the value of £36,000., second. Belgium furnished £110,000. worth of Thomas slag. The lack of statistics makes it impossible to present an analysis of this kind for the period of the war. The imports of chemicals into Italy increased from £52,000,000. in 1917 to £56,000,000. in 1918, and the exports decreased from £9,200,000. to £5,600,000.

Varnishes containing alcohol pay a heavy duty under the present Italian tariff, and as a consequence imports of this class are small. The average per year for 1910-1913 was 18 tons, of which Germany furnished 53 per cent. and France 9 per cent. In 1917, 15 tons were imported, and in 1918, 14 tons. Non-alcoholic varnishes containing mineral oil averaged 1,033 tons per annum in 1910-1913, of which Great Britain furnished 37 per cent., Germany 33 per cent., France 13 per cent., and the United States 11 per cent. In 1917, 554 tons were imported, the United States furnishing 45 per cent. and Great Britain 42 per cent., and in 1918, 362 tons, Great Britain furnishing 40 per cent., the United States 38 per cent., and France 19 per cent.

In 1910-1913 imports of varnishes other than the two just mentioned, but without alcohol or spirits, averaged 2,089 tons per year; Germany supplied 37 per cent., France 29 per cent., and Great Britain 24 per cent. The United States furnished less than 35 tons. The disappearance of Germany and Austria from this trade caused it to be divided between Great Britain and France. Of the 437 tons imported in 1917 Great Britain furnished 56 per cent. and France 39 per cent., and of the 133 tons in 1918, 64 per cent. came from Great Britain and 31 per cent. from France.—*U.S. Com. Rep.*

THE BRITISH ASSOCIATION.

(Continued from page 279.)

CHEMICAL WARFARE.

PROFESSOR P. PHILLIPS BEDSON, President of Section B. (Chemistry), in opening the discussion on Brigadier-General H. Hartley's paper on "Chemical Warfare" (this *Journal*, September 13, page 278), remarked that one of the sad things of the war was the manner in which scientific knowledge had been prostituted, more especially in connection with gas warfare. It was clear that this weapon would now be permanently established, and chemists would have to take a more active part not only in offensive but also in defensive matters.

Professor H. E. Armstrong, F.R.S., said this was the first public opportunity that had been afforded of thanking Brigadier-General Hartley and his class for the wonderful work they had done on behalf of the nation, and it all went to show what we were capable of when we were forced to do it. He ventured to deprecate, however, the conclusion drawn by the author that the Germans displayed lack of foresight in introducing gas warfare. Nobody could have foreseen what the effects of such a new method of attack would be. He did not believe, as the President had stated in his address, that the system of education alone was at the bottom of the difference between us and the Germans, although it had a great deal to do with it, and if we were aiming to put ourselves on a level with the Germans we must adopt their system of higher education in principle. At the same time, it was the "nature of the beast" which made the German so different from us.

Professor Morgan said that one question had scarcely been touched upon, and that was, "What about the future?" Chemical warfare had come to stay, and within the next 50 years, or even 20 or 10 years, our soldiers would have to go out and face a new chemical warfare; and that being so, it was essential for the military staffs of all nations which looked forward to being aggressors or defenders in the future to investigate the new compounds which could be discovered far more noxious than those already employed, bad enough as they were. He was especially interested in arsenical compounds, and it would be easily possible to find new compounds in this connection more irritating than any used hitherto, and he believed that was true of other compounds as well. At the moment we were losing our war psychology, and were going in for peace and retrenchment all round. Chemical warfare research, however, was not a very expensive matter relatively, and, say, £200,000, a year would enable us to hold a watching brief on what was being done elsewhere. Hitherto most of the research had been done voluntarily, but he thought the time had come when chemists should be well paid for this work.

Professor Armstrong thought the paper of such value that the Section ought to arrange for its publication in full.

The President said that the suggestion would be placed before the committee of the Section.

The author, replying to the discussion, agreed with what Professor Morgan had said about the study of gas warfare being continued during peace time. The whole question of military research was an extremely important one, and if the Section could take some steps to see that a portion of the money now being allocated to research was set aside for the particular purpose referred to, it would be a good thing. By spending large sums on the fighting services without providing for research meant wasting the whole of the money so used.

HIGH EXPLOSIVES.

In the afternoon of Tuesday (September 9), Lieutenant-Colonel C. D. Crozier delivered a lecture on the subject of high explosives. The author, who was Director of Inspection of High Explosives during the war, said that although he was not a professional chemist, he felt that he was in a unique position to put before the Association what an immense debt this country owes to its chemists and chemical engineers—and, in fact, to the whole chemical industry.

Before the war practically every nation used picric acid either direct or with admixture with paraffin wax, and perhaps with some other slight additions. At the commencement of the war, however, our only sources of supply were a few small firms in Yorkshire. As demonstrating how the problem was tackled he exhibited a curve showing that

whereas the total home production in the six months of 1914 was 331 tons, in some weeks in 1917 it reached 1,000 tons per week. In 1918 production was slackened off as T.N.T. and ammonium nitrate forged ahead, but in 1917 the total output was 32,053 tons, which fell to 15,160 tons on December 31, 1918. The production of ammonium nitrate in 1918 was 182,551 tons and of T.N.T. 84,979 tons, the latter falling from 94,796 tons in the previous year. The curve also showed that with all three we did not seriously start manufacture until 1916, the previous year and part of 1914 being taken up in getting to a really large production.

Picric Acid.

Picric acid in 1914 was entirely made by the pot process—a very uneconomical method. Theoretically, 100lb. of carbofic should make 242lb. of picric, but 180lb. was about the average result, and 185lb. was a very good one. Altogether the pot process was not one adapted to large outputs. Numerous cases had occurred of drying stoves getting on fire, and then the picric would burn off violently or actually explode or detonate. It was a peculiar thing that since the war cases of stoves exploding instead of burning off had been more numerous than in peace times. This had been a matter of great concern to the Ministry of Munitions and the Home Office, but so far no satisfactory explanation had been forthcoming. Very great improvements, however, had been made in isolating the "dry end" of picric works from the "wet end" where the nitration and washing was carried out. In order to improve the supplies of picric acid the dinitrophenol method was adopted. Dinitrochlorobenzene was a product largely manufactured in peace times by the United Alkali Company for the manufacture of aniline dyes, and the conversion of this into dinitrophenol was worked out and put into operation by this company. The problem then was to further nitrate this dinitrophenol into dinitrophenol or picric acid—that is, to add the third nitro group. This problem, which opened up a totally new field of supply, was entrusted to Major L. B. Holliday, of the newly-formed firm of L. B. Holliday and Co., Ltd., of Huddersfield, and in all 7,988 tons of the very best picric acid was delivered by the company by this process. Meantime, very great improvements had been made over the old pot method of making picric acid, and the new factory of Holliday's was illustrated as typical of the great change that had come over the method of manufacture.

The considerable stocks of synthetic phenol which were accumulating made it desirable to consider an improved method for the direct nitration of picric. In view of the experience gained by Major Holliday in the D.N.P. nitration process, and from experiments carried out in his factory, the Ministry of Munitions decided to erect a new factory at Bradley, built to the design of Major Holliday, for the direct nitration of phenol in large quantities in large enamelled vessels instead of by the old pot method. Major Holliday, in bringing both these processes to a successful issue, had proved himself a pioneer in the manufacture of picric acid.

There was another and quite novel process of making picric which the war had produced, known as Brooke's continuous process. Early in the war Mr. Newton Brooke, who previously had not had anything to do with the chemical industry, started making picric acid on the old pot method, but, dissatisfied with the labour involved in this, started to devise something else. The continuous plant which had been devised consisted of an acid-proof brick tank about 160ft. long, and a tank of this length would produce 20 to 30 tons per week continuously. The phenol sulphonic acid, diluted with water, was first made, and entered the plant at one end; the nitric acid, of 65 per cent. strength, is admitted by a series of aluminium jets. It comes in contact with the phenol sulphonic acid, and the reaction at once commences. A little waste nitration acid is allowed to flow along with the phenol and nitric acid, and it acts as a carrier for the picric acid, both by solution and mechanically, by increasing the flow through the trough. When nitration is complete, the picric acid moves forward through cooling sections of the trough, and is finally delivered at vacuum filters, where it is separated from the waste nitration acid. The picric is then washed in the ordinary way. An essential feature of the process is the low temperature of nitration, which, on the average, does not exceed 102° C., thus saving oxidation of the

phenol as in the pot method, where temperatures of 115° and even 120° C. are frequently experienced. With a prolonged run, the yield of picric on the original weight of phenol was found to be 194 per cent., against 180 per cent. with the pots. Altogether it was a very convenient process to work, and Mr. Brooke and his chemists were to be congratulated on their enterprise. They came new to the trade, and had certainly achieved quite a new departure.

T.N.T.

Turning to T.N.T., here, again, said the lecturer, the methods of manufacture had been considerably improved. The biggest factory for the production of this was at Queen's Ferry, Chester, which delivered some 55,000 tons. This factory, and also that at Gretna, which was devoted to the production of propellants, were outstanding monuments to the genius of Mr. K. B. Quinan, and although he had read some criticisms of these factories, he had yet to read how the war could have been won without them. The other great factory and rival of Queen's Ferry in the production of T.N.T. was H.M. Factory, Oldbury, managed by Messrs. Chance and Hunt. In addition to a great deal of useful experimental work, an entirely novel method of manufacture of T.N.T. by a continuous process was evolved, and eventually the whole of the T.N.T. was turned out by this process. He was not, however, at liberty to give details, but it was a method he should like to employ if he were a T.N.T. manufacturer.

Ammonium Nitrate.

Owing to the great demand for high explosives, it was found necessary to devise means for making the T.N.T. go further, and this was effected through the agency of ammonium nitrate, and the mixture of these two was known as amatol. In all, 378,395 tons of ammonium nitrate were provided, and the simple method of mixing nitric acid and ammonia to make ammonium nitrate was quite impossible to supply the huge war consumption, as less nitric acid than ever was available. Here the well-known and progressive firm of Brunner, Mond and Co. came to the rescue, and they undertook the manufacture of ammonium nitrate, in addition to many other products. Altogether nine large separate and distinct installations in England were employed by them either directly or under their control. At first it was made from Norwegian nitrate of lime, but the supplies of this were inadequate, and Brunner, Mond and Co. adapted plant at their Lostock works to make ammonium nitrate directly from sodium nitrate by reaction with ammonium bicarbonate—a process of great complexity and difficulty, the chemical equilibria involved being most delicate. Still the cry came for more ammonium nitrate, and it was decided to make calcium nitrate at home. The raw material was at hand in the form of calcium chloride, which was a waste product of the ammonia-soda process. The very large Victoria Works at Wincham, Cheshire, were designed and built with the greatest possible speed to supply the ever-growing demands for this calcium nitrate, and Lostock, where the conversion took place, had to be enlarged to deal with these large supplies.

All this time, in spite of what had already been done, a long and difficult laboratory investigation was being carried out by Brunner, Mond's research staff, and they capped their previous efforts by working out an entirely new process for the direct preparation of ammonium nitrate from ammonium sulphate and sodium nitrate. This new sulphate-nitrate process was put into operation first at the firm's Sandbach works. It proved very successful, and a large plant was erected at Swindon from the experience gained at Sandbach. The United States Government Commission, after a careful study of the various processes, decided to adopt the new sulphate-nitrate process, and the huge works at Perrivale, Maryland, with a producing capacity of some 3,000 tons per week, was working the process with great satisfaction. For these works, Brunner, Mond and Co. supplied the plans and details.

Ammonium Perchlorate.

Finally, the paper dealt with ammonium perchlorate explosives, which, being more sensitive than ammonium nitrate, were not used in gunshell. They were, however, used extensively in submarine mines, and the principal minefields across the North Sea were filled with ammonium perchlorate explosives, of which the perchlorate was manufactured by the United Alkali Company at their works at Flint. The great advantage of ammonium perchlorate was that it could be made in this country from our own raw materials. The

details of the process, however, were secret. The erection of the plant was begun at the end of 1915, and manufacture on a commercial scale was commenced on October 1, 1916. The output was 60 tons per week.

In concluding his paper, the author gave an account of the formation of the Explosives Department, and paid a tribute to the work of the universities contiguous to manufacturers—viz., Birmingham, Leeds, Liverpool, Manchester, and, later, Edinburgh,—and their chief officials, for assistance in regard to testing the vast quantities of explosives that went through their hands. Due to this assistance, the cost of inspection of £100 sterling worth of material was only a few pence. He also expressed the thanks of the Department to the manufacturers for their assistance, and, incidentally, expressed the hope that the Press, which was always accusing Government Departments of waste, would sometimes look on the other side, and give credit for good work done.

Professor H. B. Dixon proposed a vote of thanks to the lecturer.

Sir Robert Robertson, in seconding, said that after the achievements of the highest technical order which had been attained at Queen's Ferry, the plant and buildings there should be taken advantage of. He had suggested that it should be turned into a university, with Mr. K. B. Quinan as principal. That was off, but some use should be made of the Queen's Ferry works because of the multitude of technical matters which were dealt with there, and the manner in which technical difficulties had been overcome.

In a paper on Wednesday (September 10), on

SOME GEO-CHEMICAL PROBLEMS DEALT WITH DURING THE WAR,

Professor P. G. Boswell said that the borderland between chemistry and geology was a wide country, but imperfectly explored. It seemed that the stress of war was needed before its little-known tracks could be re-trodden and extended. The co-operation of pioneers pushing forward from both sides of the border had led to the clearing away of much of the undergrowth of doubt, and to the consequent discovery of alternative routes and the new paths to knowledge. Many of these essays into the unknown had been admittedly exploratory and opportunistic; others had resulted in the discovery of ways and means the value of which ensured their permanent retention. In either case the results had justified the early work, and served to emphasise the benefit accruing to the community from the co-operation of the chemist in the laboratory and the geologist in the field.

The question as to the exact scope of the subject of geochemistry was perhaps a debatable one. A well-known American authority had expressed his view of the functions of the geochemist thus: "To determine what changes (in the rocks constituting the earth's crust) are possible, how and when they occur, to observe the phenomena which attend them, and to note their final results. . . ." In the course of pleas made recently for the establishment of a Geo-chemical Institute in this country, the connotation had been extended to include not only the chemical investigation which was required before problems like those outlined above could be solved, but also chemical research dealing with and controlling the industrial uses to which rocks and minerals might be put. As would be expected, the industrial application of our knowledge of geological raw materials had been the outcome of pure scientific research. On the other hand, in the course of the solution of practical problems much information of real value to the man of "pure" science had accumulated, and in due time the results would become available. One outcome of these extended geochemical investigations had been the replacement of certain rock and mineral substances hitherto imported from abroad by British materials—either precisely similar in character, or as substitutes "just as good," at times distinctly better, and at other times of the character of makeshifts. Not only was shipping thus relieved, or, in the case of certain substances of enemy origin, deprivation overcome, but at the time of the great strain upon internal means of communication and transport it was found possible to indicate suitable sources of raw materials close to works requiring them. In this way carriage was reduced and coastal trade and railway transport diverted into less congested areas.

Shortly after the outbreak of hostilities many British industries connected with the output of munitions or the maintenance and increase of food supplies, found themselves wholly or in part deprived of certain essential raw or "semi-manu-

factured" materials of mineral origin. As examples might be mentioned the key industries of glass-making, and steel manufacture (in particular, steel-founding) which suffered from the shortage of potash, glass-sands, moulding-sands, etc., besides other chemical materials made from mineral products. In connection with food supply, the lack of nitrates, potash salts, and phosphates became acute. The chemists solved the nitrate difficulty by the fixation of atmospheric nitrogen. The investigation by the geologists and mining engineers of home supplies of potash-bearing minerals, such as feldspar, and the recovery by the chemist, in co-operation with the geologist, of potash from blast-furnace flues in Britain and cement-kiln flues in America, temporarily overcame the difficulties produced by the absence of German salts. The coprolite-bearing deposits of the Cambridge green-sand were after some delay opened up for the purpose of obtaining the contained phosphate of lime, and at the date of the armistice were yielding helpful supplies.

The impetus given to the working of home supplies of metallic minerals such as the ores of iron, copper, lead, zinc, tin, and tungsten, and of veinstones like barytes, fluor spar, and quartz, were familiar to all. The treatment of the ores and the manufacture of "intermediate" products like ferro-tungsten demanded the co-operation of the metallurgical chemist.

Geochemical research had shown that the quality of silica-bricks made by burning at a temperature of over 1300° C. a ground-up mixture of gannister and other siliceous rocks, with 1 per cent. of milk of lime as a bond, might be appreciably improved by burning the bricks for a longer period at a higher temperature than was previously the practice. Greater inversion of the quartz to other low-density forms of silica occurring occasionally in rocks, and known as tridymite and cristobalite, was thus ensured, with the consequence that less expansion of the brick subsequently occurred when it was set in the furnace.

For the successful laying down of specifications of refractory materials for particular purposes, a task which was undertaken before the war by the Institution of Gas Engineers, and during the war by the Society of Glass Technology and the Iron and Steel Institute, a large amount of geochemical research was, and is still, required. Cognate problems were met with in the production of laboratory porcelain, hard paste, etc. In the Potteries, British feldspar, sand, and flint were substituted for the unobtainable foreign supplies. In consequence of the cutting off of supplies of Austrian and Greek magnesite, the home resources of dolomite had been largely drawn upon, with noteworthy success.

A danger existed that in consequence of the cheapness of foreign supplies of raw materials, and of the lowness of the through freight-rates from adjacent Continental countries, it might be impossible to continue to work British supplies of these materials. It was the energetic exploitation of these mineral resources, so essential for key industries, which saved the situation time after time during the war. A renewal of dependence upon foreign resources is not only grossly unfair to those who have laid down plant and sunk their capital in British mineral enterprises during the last four years, but was a source of grave national danger, inasmuch as it placed the country in precisely the same position as that which arose during the early months of the war. If it was not possible to impose restrictions on the importation of certain foreign raw materials, recourse must be had to the revision of railway freights and the rapid development of internal water transport.

GLASS MANUFACTURE AT THE END OF THE WAR.

Dr. Morris W. Travers, F.R.S., in a paper on this subject, on Wednesday (September 10), said that circumstances arising out of the war had done much to dissipate the idea that success in industry depended upon the possession of trade secrets. The Society of Glass Technology, and the new trade associations, had already done much to bring manufacturers together, and to promote the spirit of co-operation. Thus the way had been paved for the formation of a Glass Research Association under the Government scheme for industrial and scientific research. Such research as had been carried out during the war had aimed rather at the solution of problems arising out of the need for producing goods previously imported from enemy countries, and it was difficult to lay one's hand on a really original discovery in connection with glass. However, the lines which future investigations must follow were fairly well defined.

It was generally recognised that at a comparatively early stage in the war, British manufacturers succeeded in producing glasses for many essential purposes which compared very favourably with the foreign goods, but it would be unfortunate if they failed to realise that there was yet scope for improvement. No resistance glass for chemical glassware had yet been discovered which was sufficiently highly resistant to all ordinary reagents to be considered to be an approach to perfection. It must be admitted that the lamp workers (workers at the table blowpipe) had reason to be highly dissatisfied with the general quality of the tube with which they had to work. The poor quality of much of the tube manufactured in this country was due to the fact that the furnaces were not capable of working at high enough temperatures. Investigations with a view to the improvement of glasses for thermometers, for all kinds of scientific goods, and for ordinary domestic and commercial glassware, should be pressed forward.

Almost nothing was known of the chemistry and physics of the founding and plaining of glass: exactly why it was, for instance, that a checked pot of metal would not plain, or how and why the various kinds of cords were formed. We had very little quantitative knowledge of the properties of plastic and liquid glass, and very few attempts had been made to work out methods of investigation. The viscosity of glasses, about which nothing was known, was a matter upon which information would be of use to manufacturers who employed mechanical methods of glass-blowing. There was, said the author, considerable scope for investigations on the materials used in the glass trade, particularly with a view to substituting cheaper materials for those in use before the war. The best quality of resistance lighting ware manufactured in Austria before the war contained a large proportion of boric acid, which would make the goods almost prohibitively expensive at the present price of borax. A good deal had been done during the war in the way of substituting soda for potash in glasses, but the results, at least so far as glass for electric-lamp bulbs and lamp-working tube were concerned, had not proved satisfactory. The influence of ingredients of glasses, such as magnesia and alumina, which had generally been introduced into glasses accidentally, as impurities in the raw materials, was a subject for research. In 1915 it was still possible to obtain Swedish feldspar containing 13 per cent. of potash and very little iron, delivered flour-ground in London at less than £3. per ton. During the present year the cost of Cornish feldspar, containing 10 per cent. of potash and a considerable amount of iron, delivered in lumps in London, was over £7. per ton. The difference in the quality of the material was even more important than the increase in price.

Except in some of the larger works, very crude methods were employed in the handling and treatment of materials, and in this the glass trade might be considered to be very backward. The best methods of grinding and mixing batch and cullet, and the use of magnetic separators, conveyors, etc., in the industry really required investigation. The treatment of different kinds of material required special study. On the proper treatment of the materials and the mixing of the batch depended the quality of the glass, and the saving of loss due to stones and cords. Glassmakers cordially disliked machinery, but they would have to put up with it if the trade was to hold its own against foreign competition. Success or failure in every branch of the industry depended in a great measure on the efficiency and economy with which the metal, or molten glass, could be produced. Furnace problems therefore ranked high in importance, and first amongst furnace problems came those which related to the manufacture and treatment of refractory materials. Refractories in the glass industry had to withstand not only the high temperatures, but also the fluxing action of glass, and must therefore be studied from the particular standpoint of the industry.

The problem might be illustrated by reference to pot furnaces. In the old days of direct firing, the pots were filled on Friday afternoon, so as to be ready for working on the Monday, and some of the pots might have been filled and plained once again during the week. Such furnaces were often built of green clay blocks, which were fired in position, and lasted for years. With the introduction of semi-gas-firing, and gas-firing without recuperation, higher temperatures were attained, and production was intensified, as it was possible to fill and plain each pot in the furnace two or three times in the week, provided that the pots were emptied quickly enough. Such furnaces burned out in about two years, and trouble was

experienced with the pots. No doubt failures were in a considerable measure due to a lack of understanding of the proper treatment of refractories on the part of the glass manufacturers, but it also became clear that improvement in the quality of British refractory materials was highly desirable.

At the moment special interest attached to certain branches of the industry which were scheduled for protection in accordance with the new trade policy—viz., optical glass, including lenses, prisms, and like optical devices, scientific glassware, and illuminating glassware. The country was now practically self-supporting with regard to scientific hollow-ware, and it might be hoped that the labours of the Standardisation Committee of the Society of Chemical Industry, which had aimed at the standardisation of chemical apparatus, would be of value to the industry. The output of lamp-blown apparatus and of graduated apparatus had increased enormously, but it might be anticipated that that branch of the industry would meet with keen competition, particularly for the supply of such articles as test tubes, which required cheap labour such as was available in Central Europe and Japan. The scientific public, critical of home-made goods, had suddenly awakened to the fact that much of the imported graduated ware was very inaccurate, and were insisting on a higher quality of goods, which the British manufacturers were succeeding in supplying.

Sir Robert Hadfield, F.R.S., said he was interested in this paper because he was particularly anxious to know where it was possible to obtain the best glass for lenses in connection with micro study. He was informed that at the present time we were still dependent upon German and Austrian lenses if the very best quality was to be used.

Mr. W. S. Chalmers said the most important difficulty in the manufacture of British lenses was the computation. Another difficulty was the supply of good transparent fluorspar, which was an essential constituent of most of the best and high class lenses. He believed that British manufacturers were now at work in directions which were not possible before the war, and even during the war; and provided there was sufficient demand for their products to justify the expenditure of the necessary large sums of money on plant, the British manufacturer could produce as good an objective as the foreigner, as had been the case during the war, when very large sums were so spent.

Professor C. H. Desch said his experience had been exactly that of Sir Robert Hadfield, but he would like to point out that in certain classes of optical work we had led the world. The range-finder was an instrument which was perfected in this country and had been manufactured here during the war. The optical work involved in the latest pattern of range-finder, including the 30ft. naval instrument, surpassed anything done in the works of Zeiss or Goerz. The degree of accuracy in these wonderful prisms had never been touched by the German firms, and the British firm which now manufactured them was responsible for its own optical glass, which was the finest he had ever seen. If we could have the same standard of skill reached in the manufacture of lenses he did not think it would be long before British lenses would be made equal to the foreign ones. The computation, as Mr. Chalmers had said, was perhaps the most difficult part of the work, but a tremendous amount had been done in that direction, and certain publications—mostly translations from German works—recently made would greatly facilitate work on all kinds of objectives in the future.

METALLURGY DURING THE WAR.

In a paper on Wednesday (September 10), Dr. C. H. Desch briefly outlined some of the developments in the countries of the belligerents in regard to metallurgical matters. Having discussed the position with regard to iron and steel in Germany, he said that the shortage of copper was a much more serious problem for our enemies. For supplies of this metal Germany was principally dependent upon the United States, and our blockade was undoubtedly successful in preventing the metal from entering. The German production of copper from the Mansfield mines was previously small, and although it had been increased to the utmost it was only able to replace a small part of the large requirements of the country for munition and electrical purposes. There were large stocks in hand at the outbreak of war, and Serbia and

Asia Minor, both of which possessed important deposits of copper ores, furnished a certain quantity, but the shortage was undoubtedly severely felt. Much was done, however, to make use of substitutes. Aluminium, iron, and zinc were employed for the winding of dynamos and motors, with successful results, and it was claimed that aluminium was cheaper than copper for winding transformers, and that some manufacturers intended to continue to use it commercially. So far as copper was concerned, however, the Allies were in a far stronger position than the Central Empires in regard to future supplies.

The position of zinc was a remarkable one. The United States used to be the largest producers of the metal, followed by Germany and Belgium. Belgium, however, made use of imported ores, her own deposits being no longer of great importance. Speaking with regard to the Australian zinc ores, Dr. Desch said that these were complex and difficult to smelt, and the Germans, having obtained control of them, devoted much attention to the problem of their treatment. It was not correct to attribute the loss of this important industry to this country to the apathy of Governments or to unfavourable fiscal conditions, and a share of the blame must rest on the mine-owners and smelters who had failed to devote to their industry the necessary scientific investigation which would have solved the admittedly difficult problems presented by the concentrates. Smelting works had now been set up both in Australia and at home, and it was to be hoped that the British zinc industry would once more occupy a foremost place. For this to happen, however, it was essential that close scientific control should be exercised and that steps be taken to improve the metallurgical methods, which had lagged behind the practice of other countries. In this connection it was disappointing to observe, in the reports of the alkali inspectors, that in the new works for the smelting of zinc which had been erected here, the sulphur dioxide produced by the roasting process was allowed to escape into the air. Such a practice was harmful in every way, the destructive action of the gas being very serious, whilst the waste involved resulted in most uneconomical working. A large proportion of the sulphuric acid manufactured in Germany obtained its sulphur from the roasting of zinc ores, and one of the lessons most forcibly brought home to us by a comparison between German and British methods in the chemical industry was the absolute necessity of the utilisation of all by-products if success was to be obtained.

Mr. ROBERT MOND, in the course of the discussion, said the world's production of non-ferrous metals before the war was 3,000,000 tons per annum. Great Britain's consumption was 450,000 tons and her actual production was 150,000 tons per annum, whilst her production of metal from her native ores was only 15,000 tons per annum. This demonstrated that Germany's idea that it was only possible to build up a trade or industry by politically possessing the sources of raw materials was one of the most fundamentally false ideas that ever crossed the human mind. The best policy was to obtain our raw materials wherever they could be obtained and then to develop the best methods for dealing with them. The history of British industry during the last 40 or 50 years was that although we had access to most raw materials, and had been the possessors of them in most cases, scientific manufacture in our industries had always been behind, although cases could always be brought forward in which we were ahead of other nations. That, however, only applied to one or two firms in any industry. The cause of that was the prevalence of the idea that what was good enough for our forefathers was good enough for us. During the war, with unlimited means at our disposal, we had brought many an inefficient manufacturer to the level of the efficient, and if that were possible under war conditions it should be equally possible in ordinary commercial conditions.

Dr. Walter Rosenhain said that our war experience with cupro-nickel was an instance which showed very clearly how deficient we were in a good deal of our fundamental knowledge. In this and in all these light alloys, what was wanted was better backing for research by manufacturers. Thanks largely to research by Mr. Hartley, of Sheffield, all the difficulties of rolling cupro-nickel were overcome, and it was seen that their was no real difficulty in rolling this material once a sound ingot was obtained. That, of course, was true of all metals. Another important development during recent years was the use of light aluminium alloys for aircraft purposes, and its undoubted value for aircraft engines had been proved.

Mr. Cosmo Johns said that as the result of visits which he had paid to the left bank of the Rhine since the armistice he was convinced that the Germans had made practically no metallurgical progress during the war. Her manufacturers had suffered from too many difficulties, and it was astonishing that they had been able to struggle on as long as they did. There was a great scarcity of copper and aluminium, whilst tin was practically unobtainable owing to the blockade. The chief substitute for tin was zinc, a most unsuitable metal, but it had to be used for the most extraordinary purposes. The lack of essential metals and the breakdown of transport through lack of good bearing metal and lubricating oils were the chief things which brought Germany to the end of her resources.

BACTERIOLOGY: ITS PRACTICAL APPLICATION AND ITS IMPORTANCE OUTSIDE MEDICINE

was the subject of a paper read by Dr. A. C. Thaysen on Thursday (September 11). Since the days of Pasteur, Robert Koch, and Lister, said the author, bacteriology has been recognised as a special branch of science devoted to the study of the microscopic unicellular organisms commonly known as bacteria. However, in spite of official recognition, bacteriology is by no means yet an independent science. It still remains allocated to quite a number of arts and sciences with which it was associated in its earlier history, and it is still taught and studied in relation to them. There can be no doubt that sooner or later an attempt will have to be made to co-ordinate the various branches of bacteriology already existing, and to centralise and standardise the teaching of this science. In the hope of being able to increase in some small degree the interest taken in these other branches of bacteriology, a brief account was given of some of the various spheres of activity of the non-pathogenic bacteria.

By far the best known application of micro-organisms to industry is the conversion of sugar into ethyl-alcohol, mostly in the form of wines and beer. The brewing of beer and the making of wines are industries as old as history itself, but it is only within the last 30 years that they and the responsible micro-organisms have been brought under scientific control. Much work, both theoretical and practical, is still needed in this field, which to-day has attained added interest through the application of yeast for the manufacture of glycerine and fuel for internal-combustion engines. Closely related, both industrially and historically, to the production of beer and wine is vinegar manufacture. Here the conversion is brought about by a true *schizomycet*, which oxidises ethyl alcohol to the corresponding aldehyde, and thence to acetic acid, or, in the presence of oxygen, to carbon dioxide. Pasteur's, Hansen's, Buchner's, and Brown's subsequent researches have cleared the way to the right interpretation of this reaction, but, unfortunately, the actual manufacture of vinegar is still far from satisfactory. Far too little attention is being paid to the value of the introduction of pure cultures and the consequent improvement in the control of the degree of oxidation. As a side issue, it would be of interest to investigate further the property of some of the acetic bacteria to oxidise higher alcohols—for instance, butyl alcohol—to the corresponding acids. It might perhaps in this way be possible to manufacture butyric acid at a lower price than by chemical oxidation of butyl alcohol or by direct fermentation of carbohydrates.

The manufacture of butyl alcohol and acetone attracted considerable attention both in this country and abroad during the war. The enormous demand for one of the products obtained necessitated the construction of gigantic plants. In a factory erected by the Admiralty for the production of acetone, a weekly output of this chemical of 30 tons was planned. The fermentation tanks had a capacity of 150,000 gals. each, making it possible to convert 35 tons of raw material during one fermentation. The conversion of the carbohydrates used took 34-36 hours to complete, so that with two fermentations proceeding simultaneously two tons of raw material could be dealt with hourly. For the successful conversion of the carbo-hydrate it was essential that foreign micro-organisms should not gain access to the vats, either before or during the fermentation—a somewhat difficult problem to solve on such an immense scale. Eventually success was met with, and from that time onward the conversion of the carbo-hydrates into acetone could be most successfully completed, and considerably more than 99 per cent. of all the fermentation were free from serious infections with foreign bacteria. The investigation of the theory of this fermentation led to a rather interesting discovery. On

examining the fermenting liquid, it was found that appreciable quantities of acetic acid were formed as an intermediate product, and again mostly disappeared toward the end of the fermentation. On increasing the acid content of the fermenting liquid by the addition of acetic acid in concentrated or dilute form, it was found that 80 per cent. of the acid added had been converted into acetone at the end of the fermentation. A far more efficient method than the old dry distillation of calcium acetate had thus been formed for the conversion of acetic acid into acetone. The addition of acetic acid on a large scale up to 100,000 gals. of fermenting liquid has been tried, and found as successful as the laboratory. Other fermentations which might be technically applied were the conversion of carbohydrates into lactic acid and the production of citric acid.

Time after time, in reviewing the development of bacteriology, there is evidence of lack of co-ordination which for far too long had been allowed to exist, and which, unless treated seriously, is liable to remain one of the greatest obstacles to progress.

FUEL ECONOMY.

A discussion took place on the report of the Fuel Economy Committee presented to Section B (Chemistry) on Friday (September 12). In the absence of the chairman of the Committee, Professor W. A. Bone, F.R.S., the report was presented by Mr. Robert Mond, Secretary of the Committee:

In its first report the Committee drew attention to the vital importance of relatively cheap coal to the nation's industrial prosperity, and stated that, for some years before the war, the average price of coal at the pithead had been decidedly on the up-grade, a tendency which might be expected to continue at an accelerated rate. As the result of circumstances created by, or arising out of, the war, the average pithead price of coal has already almost trebled since the year 1913, and is likely to rise still higher, a matter of most serious concern to the whole nation.

How basic is the necessity of relatively cheap coal to the recovery of our pre-war prosperity will at once be apparent when it is realised how absolutely dependent are all our principal manufacturing industries upon imported raw materials. Our own natural resources do not enable us to provide ourselves, in quantity sufficient for the needs of a modern industrial community, with a great variety of raw materials; nor can we grow sufficient food for our present population. But our ships can bring abundance of raw materials from all parts of the world to our coal. Without the impelling power of relatively cheap coal we should neither be able to attract the raw materials, nor yet to build or maintain the ships in which to convey them. Relatively cheap coal is, in fact, a fundamental necessity to the maintenance, not only of our great iron, steel, engineering, ship-building, and textile industries, but of our shipping trade and sea power.

Outputs of Coal and Average Pithead Prices in Great Britain.

Year.	Total Output Million Tons.	Annual Output per person employed Tons.	Average Pithead Price per Ton.
			s. d.
1913	287.4	260	10 1
1914	265.6	238	10 0
1915	253.2	270	12 6
1916	256.3	260	15 7
1917	248.0	247	16 9
1918	227.7	232	(24 0) ¹

¹ Estimated.

Prices per ton paid by Consumers in Great Britain.

Year.	In London for Best House Coal delivered.	For Gas Coal by the South Metropolitan Gas Co.		For Durham Coking Coal at a Cleveland Ironworks. ²
		f.o.b. at N.E. Coast.	Cost into Works.	
	s. d.	s. d.	s. d.	s. d.
1914	29 0	11 2	14 6	13 0
1915	34 3	15 5	22 11	16 2
1916	37 0	16 5	26 4	22 3
1917	38 0	16 8	32 5	22 10
1918	44 0	20 11	34 4	24 5

² The corresponding pithead prices would be about 3s. 6½d. less than these. The average price (at the works) during the first six months of 1919 has been 26s. 6d. per ton.

The great need of the moment is that the true facts of the situation shall be brought home to all sections of the community. The Committee, therefore, desires to draw

attention to the accompanying comparative data concerning the movement of coal prices in Great Britain and the United States during the war-period. In converting the American prices into their English equivalents a dollar has been taken as 50 pence.

The upward tendency of prices has continued since the close of 1918, and, according to a recent declaration made on behalf of the Government in the House of Commons, consumers will have to face an all-round increase on the foregoing prices of 6s. per ton during the coming winter.

The Committee views with concern the recent rapid decline of the annual outputs per worker employed in British mines. During the thirty years preceding the war the returns had shown a steady decline, as follows:—

Decade.	Average Annual Output per Worker Tons.
1883-92	320
1893-02	295
1903-12	280

That this downward tendency was peculiar to British mines is shown by the following comparative figures:—

Comparative Annual Outputs per Worker employed in the Mines in

Triennial Period.	Great Britain.	Germany.	United States.
	Tons.	Tons.	Tons.
1905-7	289	248	589
1908-10	265	239	591
1911-13	254	263	651

During the war the British outputs have continued to fall at an alarming rate, until in 1918 they reached the low level of 232 tons per worker employed. In marked contrast to this, the American figures have continued to rise at an accelerated rate until in 1916 they reached 732, and in 1917 the phenomenal record of 768, tons per worker employed. It would thus appear that in the year 1917 the American output per worker employed was more than three times that realised in British mines.

The following figures may be given, as showing how the wholesale prices of typical classes of American fuels have moved during the war:—

Average Wholesale Prices of Coal and Coke per Long Ton in the United States for each Year since 1913.

	Stove Anthracite at New York.	Semi- bituminous Pocahontas f.o.b. Norfolk, Va.	Bituminous Pittsburg, Run of Mine, f.o.b. Cincinnati.	Connellsville Coke.
	s. d.	s. d.	s. d.	s. d.
1914	21 1	12 6	10 3	8 5
1915	21 0	11 10	10 3	8 4
1916	22 9	15 6	12 6	15 2
1917	23 5	22 8	21 5	38 6
1918	27 1	18 8	18 1	28 0

From the examination of the monthly returns it appears that, with the exception of those of anthracite, American wholesale coal and coke prices rose sharply during the latter half of 1916, and reached a maximum about the middle of 1917. Thus Pocahontas reached a maximum of 29s. 2d. (f.o.b. Norfolk, Va.) in May-June, 1917, and bituminous one of 28s. per ton (f.o.b. Cincinnati) at the same period. Connells-ville coke, which is that used in the Pittsburgh blast furnaces, touched a maximum of 57s. 2d. per ton in 1917. After that period prices fell "under control." Thus Pocahontas fell to a minimum of 16s. 3d. in August-October, 1917, since which time they have steadily risen until in April, 1919, they were at 20s. 5d. per ton. Bituminous fell to 14s. in September-October, 1917, but have since risen to 18s. 8d. per ton (f.o.b. Cincinnati) in April, 1919. Connells-ville coke kept at 28s. for a period of fifteen months, from October, 1917, to December, 1918 (both inclusive), since which it has steadily declined, month by month, until in April, 1919, it stood at 18s. 2d. per ton. In the same month the price of Durham coke at the ovens was 33s. per ton *plus* a subsidy (paid by the Government) of 5s. 7d. per ton. It thus appears that already American fuel prices have fallen to a level considerably below those ruling in this country, a circumstance which gives American manufacturers a great initial advantage over our own.

Research on the Chemistry of Coal.

Since the previous report, Professor Bone has continued to direct the research work upon the Chemistry of Coal at

the Imperial College of Science and Technology, London, which he originally undertook in 1916 at the instance of the Committee. In conjunction with Mr. R. J. Sarjant he has recently published, in the "Proceedings of the Royal Society," the results of a series of experiments upon the so-called solvent action of pyridine upon coal, to which Bedson first drew attention in the year 1899. Since that time it has been investigated by a number of other chemists as a possible means of discriminating between the chief types of constituents of the coal substance. Wheeler and his co-workers have employed it extensively in their researches, claiming that if the portion of the coal removed by pyridine be subsequently extracted with chloroform, a complete separation of the resinic from the cellulosic constituents may be effected. On the other hand, the independent work of Harger, Wahl, Vignon, and others raised the question whether the action of pyridine, and other similar basic solvents, is really one of ordinary solution, and much of the evidence obtained by them suggested that it is chiefly a depolymerising one. Professor Bone's recent experiments support this latter view, and point to the conclusion that the action in question affects the coal substance as a whole, and is by no means confined to any one constituent of it. The action is retarded, in a degree which may vary considerably according to the character of the coal, by the presence either of water in the solvent or of oxygen in the atmosphere in which the extraction is carried out. In order to obtain comparable results with a series of different coals it is, therefore, necessary to operate with a carefully dried solvent, and in an atmosphere from which oxygen is excluded. Suitable means and apparatus have been devised for carrying out extractions under such precautions. It has also been shown that the action of pyridine at its boiling point (under atmospheric pressure) upon a particular coal approaches in time a practical limit which, however, may be considerably exceeded if the extraction is carried out at higher temperatures (*e.g.*, in sealed tubes under pressure). Professor Bone and his co-workers have also devised a method for extracting in a pure condition the resinic constituents of coal, particulars of which will shortly be published.

In connection with the question of the organisation of systematic investigations upon the chemical characters of the principal British coal seams, this Committee desires to reiterate the opinion expressed in its first report—namely, that "the resources, both of existing laboratories which have been established in this country for the special investigation of fuel problems, and of other laboratories where the technique of the subject has been developed, might be utilised more than they are in this connection, and that the time is ripe for the organisation of a scheme of systematic co-operative research aided by national funds in which all such laboratories may participate."

The Committee regrets to say, however, that, notwithstanding the establishment of the Fuel Research Board, with large funds at its disposal, no attempt has apparently yet been made to organise any such comprehensive scheme as was recommended in 1916; and it wishes again to impress upon both the public and the Department of Scientific and Industrial Research the danger of sterilising fuel research by a policy of over-centralisation. On the contrary, it is of the opinion that what is most needed is a broadly-planned policy which will aim at stimulating and assisting experimental work on the chemistry of coal, fuel economy, and cognate subjects everywhere throughout the whole kingdom.

Mr. Mond, in presenting the report, said that copies of the Committee's first report were laid before the Fuel Research Board in the hope that some of the recommendations made in that report would be carried out. The Board, however, had done nothing to carry out a systematic research upon all coals in this country in the same way that had been done in America. If all the coals in this country were analysed and classified it would be possible to put them to their best uses. One large chemical firm with which he was connected, tested and classified all the coals they used, and the results were given to the Government, and had been found extremely useful, but that was not the way to deal with this problem. Being anxious that there should be a survey of the coalfields of this country, the Committee had approached the Fuel Research Board with a view to a certain sum being set aside for this purpose, as it was beyond the means of the Committee to do this work. The British Association Committee, said Mr. Mond, had not, in the present report, devoted much attention to artificial fuel; that would be dealt with in the next report.

Sir Robert Hadfield, F.R.S., said there was no doubt that this country had been very wasteful in the use of coal in the past, but it did not apply to this country only. In America the waste was prodigious, and steps would have to be taken there also to deal with the problem. Indeed, a report would shortly be issued by the Mineral Resources Bureau of Washington. On this important matter they should pool their knowledge and researches; moreover, it was time that the Fuel Research Board threw a little light on the work it was doing. A good deal of money was being spent by it, and he was sure that some information would be welcomed and would be of advantage to the country at large.

Mr. C. E. Stromeyer said that some very wild statements had been made as to the consumption of coal in this country per indicated horse-power. He believed that a Cabinet Minister had stated that it was 7lb. The actual figure, however, was about 2½ or 3lb. In some cases it was more like 2lb. It was from statements of this kind that he believed the country had been misled into hoping to get far greater economies from power schemes than they were likely to get.

Mr. T. Goulden agreed that a survey of the coal fields of the country would be of enormous importance, because it would enable special coals to be used for the best purpose to which they were adapted. Gas manufacturers were great economisers of fuel. They conducted processes which gave an efficiency of not less than 70 per cent., and might reach well over 85 per cent. They not only made the best use of it from the thermal point of view, but they produced sulphate of ammonia and a large number of by-products which were essential to the industries of the country generally. If the percentage of inerts suggested in the Fuel Research Board's report was imposed it would mean that the gas industry would have to carbonise a further 10 per cent. of coal, or 2,000,000 tons, in order to achieve the same result.

Sir Charles Parsons (President of the Association) said that the view of Sir George Beilby, Chairman of the Fuel Research Board, was that the carbonisation of coal had not been successfully attacked on scientific lines. He thought it was far too soon to judge the Fuel Research Board. It was working hard, and he believed that in about a year's time good results would be achieved.

Professor W. H. Watkinson said the country should have some further information as to why the output of coal in this country had decreased and not so in America. He could not believe that it was because of the greater decreased effort of our workmen and the lesser decreased effort of the men of the United States. There must be some other factor upon which we had not been enlightened. He felt that greater economies might be effected by super-gas stations than by super-electric stations, because he believed that the energy required throughout the country could be distributed as economically by gas as by electricity.

Professor H. E. Armstrong, F.R.S., said the subject was such an important one that he regretted that Sir Charles Parsons had not brought it into greater prominence in his presidential address to the Association. They all had the greatest respect for Sir George Beilby, the head of the Fuel Research Board, but there was a strong feeling among chemists that Sir George was keeping the research to himself. It must, however, be made an open one. Sir George Beilby should bring them all together time after time to discuss every issue in this important question so that it could be dealt with properly, and he challenged him to do that. He would also offer that challenge elsewhere. The Fuel Research Board had taken on the research and had then warned everybody else off. That was absolutely unsound. Ideas were not centred in one individual or in one centre. Imagination was needed, and it was never known where it would be found. Coal was a thing of which enormous quantities were required. Lord Fisher had said that the Navy would have to be worked with oil. Where was it to come from? America said that 25 years hence she would have none. We should not find any in this country, but a good deal could be obtained from coal if we were careful. If Lord Fisher's programme was to be carried out it would be necessary to obtain oil from coal in this country, but it could not be done with present methods. The gas industry could not survive as a gas industry producing its own gas, and they knew it. That was why they required a reduced standard. Until the gas industry was combined with a power-producing industry they could not solve the problem of using gas for heating. Nobody would use gas for lighting in the future if they could help it. The gas industry must be combined with an industry that was producing gas as a by-product. Only within the past few months he had seen an experiment carried out with a ton

of coal which gave a most magnificent heating fuel, and, in addition, 18 gallons of tar, 15lb. of sulphate of ammonia, and 8,000 or 9,000ft. of gas. The smokeless fuel amounted to 72 per cent. of the original fuel. A coal of that kind was most valuable, and all that the gas companies would require. There was a great deal of knowledge and experience in this country on this matter, and a great many people were thinking about it. What was needed was to bring competent people together to deal with it. At the present moment it was being done in the very human way of keeping things to themselves. Sir George Beilby was a very reticent type of man, and they had got to force him to be less shy.

The discussion then closed.

CONTINUATION OF RESEARCH WORK.

Before the discussion of the report of the Fuel Economy Committee was commenced on Friday (September 12), the President (Professor Bedson) announced that the committee of the Chemistry Section had passed a resolution suggesting the desirability of continuing the researches on explosives, chemical warfare, and physical and engineering problems bearing on military work.

Sir William Pope said that the present attempt to economise in public expenditure seemed likely to have the effect of abolishing all that had been done during the past five years in the directions indicated.

Professor A. Gray, President of Section A (Mathematical and Physical Science) expressed regret at the closing down of the Inventions Board, and thought it might have been continued on a smaller scale.

The resolution was put to the Section and carried with a few dissentients.

EXPORTS OF CHEMICALS FROM NORWAY.

THE following figures, taken from the Official Statistical Bulletin of Norway of December, 1918, show the exports of chemicals from that country during 1918, in comparison with 1917:

Chemicals.	1917.	1918.
	Kilos.	Kilos.
Nitric acid	1,621,170	836,686
Oxalic acid	334,089	206,028
Sulphate of ammonia	50,000	—
Nitrate of ammonia	63,578,120	49,587,663
Sodium nitrate	22,711,200	2,636,553
Sodium nitrite	3,536,090	2,097,811
Norwegian saltpetre	35,932,400	53,625,250
Cyanamide	2,312,910	10,490
Calcium carbide	46,066,630	41,771,876
Iodine	1,180	5,373

Exports of matches were given as 5,014,918 kilos. in 1918, as compared with 4,044,680 kilos. in 1917; ferrosilicon, 29,449,710 kilos., against 16,861,278; and gunpowder and other explosives 1,130 kilos., against 11,667.

THE INSTITUTE OF METALS.

AN important addition has just been made to the list of papers that are to be presented at the annual autumn meeting of the Institute of Metals, in Sheffield, on Wednesday and Thursday, September 24 and 25. As originally published, the list included nine papers; there are now ten, the latest communication being a note by an American metallurgical engineer, Dr. Zay Jeffries, of Cleveland, Ohio, on "The Micro-Mechanism of the Ageing of Duralumin," a subject of great practical interest to all concerned with the working or use of an aluminium alloy that has played a vastly important part in aeronautical engineering during the war. Dr. Jeffries has come over to this country in order to be able to present his communication in person to the Institute at its Sheffield meeting, at which a record attendance of home and overseas members is assured. Copies of the note are now in the press, and will be forwarded to all members and applicants for membership upon application being made to Mr. G. Shaw Scott, M.Sc., Secretary, Institute of Metals, 36, Victoria Street, S.W.1, from whom also there can be obtained membership forms providing (in the event of success in the forthcoming ballot) for election in time for participation in the whole round of unique technical and social functions at Sheffield.

SCIENTIFIC AND INDUSTRIAL RESEARCH.

PRIVY COUNCIL COMMITTEE'S ANNUAL REPORT.

(Concluded from page 280.)

The Abrasives and Polishing Powders Research Committee.

Important progress has been made during the year in the work carried out under the direction of this committee. An extensive investigation has been made of the polishing of glass by means of ferric oxide, a material selected as the starting point of the research, because it is most commonly used in polishing work, and so most likely to yield results of immediate practical value. Preparations of the oxide have been made by several different methods, and these preparations have been compared as regards their physical properties and polishing powers. In this way much information has been accumulated correlating the methods of preparation, the physical condition, and the polishing effect of the different samples. The practical outcome of the work has been the production, under standardised conditions, of a rouge found by trials on a technical scale to be quicker in action and more satisfactory in general effects than existing commercial rouges.

The investigation having reached a stage at which results of technical value are being obtained, the Advisory Council have thought the time opportune for the transference of the research and the accumulated results and experience to the British Scientific Instrument Research Association. This transference has been effected, and, in continuing the research, the Research Association is employing the services of the investigator who hitherto has had most to do with the practical side of the work. Continuity and full utilisation of the experience so far gained are thus ensured, and it should be possible for the past and future results to be promptly available for the industry primarily concerned.

Copper and Zinc.

There is a large field for research into the metallurgy of copper and zinc, and this is work which will fall to the Non-ferrous Metals Research Association when it comes into being. In the meantime, on the recommendation of the Copper and Zinc Inquiry Committee, the expenditure of £450, to enable survey work to be undertaken has been approved. Information is being collected relating to certain aspects of copper smelting and copper refining, the special requirements to which copper products must conform under working conditions, and the extent to which these requirements have been met by existing products. A reference list is also in preparation of the qualities of copper and copper alloys of industrial importance.

Aided Researches.

Research on refractory materials undertaken by the Institute of Gas Engineers with the aid of a grant from the Department has been continued during the year. Experiments have recently been carried out with conspicuous success on the manufacture of gas retorts, and the results obtained are likely to mark a great advance in this branch of the refractory materials industry. Demonstrations of a new method of casting 5ft. gas retorts have been given before the Institute of Gas Engineers, and a careful examination by the Research Committee of this Institute of the retort produced proved satisfactorily that the process used for its manufacture was thoroughly practicable. This important industrial result has been produced at the cost of a few hundred pounds. In addition, the behaviour of firebricks under conditions similar to those experienced in practice has been investigated, experiments having been carried out on the corrosive action of flue-dust, the refractoriness of fire-bricks under load, and the deterioration of fire-bricks in prolonged use. Researches have also been undertaken on the relation of grain size and different proportions of grog in fire-bricks to such properties as the crushing strength, the contraction, and the thermal conductivity at high temperatures. Other work in progress or in prospect includes the study of binding materials for siliceous bricks and retorts, the specific heat of silica materials at high temperatures, the thermal radiation of refractories, and the study of the effect of reducing atmospheres.

Patents.

The holding of patents by the Government on any large scale undoubtedly raises many difficult questions, particularly if it is sought to protect inventions abroad.

The question of how best to deal with foreign patents is peculiarly difficult. It is a problem in which the Department is as directly interested as the Research Associations. Indeed the question of patenting abroad is a more embarrassing one for the Government than for private or semi-official corporations, for if the Government was itself to hold foreign patents it might easily become involved, if the discovery were a valuable one, in international controversy. The Council gather that the usual practice, in cases where secrecy has not been essential, has hitherto been to allow inventors in the service of the British Government to take out foreign patents in their own names and for their own interest, and to include this right as part of the reward for their discovery, while the British patents may either be vested in the Minister responsible for the Department concerned or otherwise dealt with according to circumstances. But this is obviously not an altogether satisfactory method, for it might well happen under peace conditions that a discovery made in this country would be most advantageously, or indeed exclusively, produced in a foreign land. The difficult question as to the wisdom of calling the attention of foreign countries to a British discovery by applying for a patent having been answered affirmatively, the important question of finance still remains to be faced, for the successful maintenance of a foreign patent may involve the expenditure of large sums of money.

Accordingly, some device seems to be called for, both in the case of Government and of research associations, which would enable foreign patents to be taken out in a wider interest than that of the discoverer, but which would avoid the special difficulties referred to. It may be that different procedures will be necessary for the two cases, but if an organisation could be devised which would deal with both it would undoubtedly be preferable. But it is by no means easy to determine the best procedure in the case of discoveries made with the aid of Parliamentary funds, even when patenting abroad is left out of consideration.

In this country, as in America, there is no central authority entrusted with the duty of holding and administering patents taken out under Government and no agreed uniformity of practice. No worker under this Department may patent a discovery except with the leave of the Committee of Council, and where leave is given the patent is taken in the joint-name of the inventor and the Imperial Trust for the Encouragement of Scientific and Industrial Research. The Department reserves to itself complete discretion in the administration of the patent rights after consultation with the inventor. When a worker, engaged in research under a committee or board of the Department or in receipt of grant from the Department, desires to take a patent he must do so in conjunction with the Imperial Trust, but in these cases the Trust reserves the right to refuse to be a party to the patent. So far the procedure is simple, and it might possibly be extended to other Departments. But at this stage the real difficulties begin. Apart from the embarrassments inherent in foreign patents, a number of special considerations arise before a decision can be reached on the advisability of patenting, for the Government cannot proceed with the single eye to financial advantage which commercial undertakings rightly use.

So far the Advisory Council have provisionally decided that patents should not be taken for (a) inventions of value for the preservation of health or of life, or (b) inventions the use of which can be enforced by a Government Department. In these cases steps are taken to secure full and complete publication with a view to preventing others from securing a patent for the invention. The strong professional tradition of the medical profession in this country has led the Council to refuse patent rights in the first class of case, and there are obvious reasons of expediency for refusal in the second. But they are aware that reasons can be urged for a different practice, and they think they should receive full consideration. American and Canadian opinion leans to the view that the refusal to patent has serious disadvantages, since in the absence of a patent a manufacturing firm has no incentive to work the invention. And there is little doubt that this is true in those cases where the invention needs further development before it can be placed effectively on the market, and in these cases where no effective demand for the invention exists in the absence of an active commercial campaign. Where, on the other hand, a powerful profession can push a new discovery, or where a Government Department can enforce its use, these considerations lose much, but by no means all, of their weight. The whole question needs careful watching and discussion by those best able to form a judgment.

GERMAN DYE FACTORIES IN WAR-TIME.

THOUGH publication of the report of the British Mission which recently visited German chemical factories in the occupied zone has not yet been made here, we learn from *Metallurgical and Chemical Engineering* (New York) that it was introduced at the dyestuffs hearing before the House of Representatives Committee on Ways and Means, in order to emphasise the military value of a well-developed chemical industry. The following data have been taken from this report. In some cases difficulty was experienced in obtaining accurate details of manufacture, especially as regards substances which have a peace value, and the information must be accepted with some reserve on this account, although it was checked by cross-examination of the officials concerned and by a careful examination of the plant admittedly employed for war purposes.

Some years before the war a combination was formed by the Bayer, Badische and A. G. F. A. companies, and somewhat later a second group was formed which included Meister, Lucius and Bruning, Casella and Kalle. During the war these two groups amalgamated, and the Griesheim Elektron, Weiler-ter-Meer, Leonhardt and other smaller companies entered the combination, which is known as the I. G. (Interessengemeinschaft). It was largely owing to the efforts of this combination that Germany was enabled to continue the war in spite of the blockade. The I. G. works produced the bulk of the synthetic ammonia and nitric acid needed for the production of fertilisers and explosives, all the poison gas (with the exception of some chlorine and phosgene), and a large proportion of the high explosives.

The following are the more important works of the I. G. which were not visited, as they are outside the occupied zone: Factories of the Aktien Gesellschaft für Anilin-fabrikation; factories of the Griesheim Elektron Gesellschaft; factory of the Bayer Co. at Elberfeld; factory of the Badische Co. at Merseburg; factory of Casella and Co., Mainkur, near Frankfurt; factory of Leonhardt and Co., Mulheim, near Frankfurt.

A summary of the information obtained as to the war production of the factories visited is given under the headings of "Initial Products," "Explosives and Poison Gases."

TABLE I.—AMMONIA (METRIC TONS NH_3 PER DAY).

	1914.	1918.
Oppau	25 ..	250
Merseburg	Nil ..	400
Total	25 ..	650

TABLE II.—NITRIC ACID (METRIC TONS 100 PER CENT. ACID PER DAY).

	1914.	1918.
Leverkusen	56 ..	180
Hochst	150 ..	375
Oppau*	?	100
Ludwigshafen	(?) 40 ..	40
Weiler-ter-Meer	12 ..	24
Total	258 ..	719

* Oppau has the power to produce now 500 tons HNO_3 daily, still retaining sufficient ammonia to supply the output at Hochst.

TABLE III.—SULPHURIC ACID (METRIC TONS 100 PER CENT. ACID PER DAY).

	1914.	1918.
Leverkusen	340 ..	470
Hochst	224 ..	280
Ludwigshafen	275 ..	410
Weiler-ter-Meer	48 ..	60
Total	887 ..	1,220

Meister, Lucius & Bruning have also erected a large new plant at Hochst, which has not yet started, and was not examined.

The Bayer Co. has erected at Dormagen a large vitriol plant equal to 250 tons per day.

TABLE IV.—CHLORINE (METRIC TONS PER DAY).

	1914.	1918.
Leverkusen	7 ..	20
Hochst	4 ..	8
Ludwigshafen	13 ..	35
Total	24 ..	63

The principal materials concerned are ammonia, nitric acid, sulphuric acid and chlorine, and it was on the output of these that the war production of chemical munitions depended. The expansion of output by the factories of the I. G. combination during the war is shown by Tables I-IV.

Explosives. No arrangements appear to have been made prior to the outbreak of war to utilise the resources of any of the dye factories for war purposes, and on mobilisation their chemists were called up for military service. After the battle of the Marne the Government realised the need for expanding the output of explosives and most of the chemical

works were producing small quantities by the end of 1914. The demands made on them increased during 1915, but it was not until 1916 that plant was laid down to assist in the enormous production of explosives required by the Hindenburg programme. Most of the big extensions of the synthetic ammonia and of the nitric and sulphuric acid plants date from this time, many chemists being released from the army and the scientific staff of some of the works being augmented. Standardised plant used for the manufacture of dyes was converted for the production of explosives with remarkable speed; for instance, at Leverkusen a TNT plant producing 250 tons per month was put into operation in six weeks.

Tables V. and VI. show the amounts produced in the factories visited.

TABLE V.—HIGH EXPLOSIVES AND INTERMEDIATES.

Quantities of intermediates are shown only where these were not converted to finished explosives in the producing works.

(Metric tons per week.)

Factory.	Ammonium Nitrate	Dinitrobenzene	Dinitrotoluene	Trinitrotoluene	Mononitro-naphthalene	Dinitroamph-thalene	Dinitrochlor-benzene	Dinitrophenol	Picric Acid	* Trinitroisole	Dinitrodiphenyl-amine	Hexanitro-diphenylamine
Leverkusen	—	250	—	250	—	150	40	—	—	—	—	—
Dormagen	—	—	—	—	—	—	—	—	600	—	—	—
Urdingen	—	60	—	75	(†)	—	—	—	—	—	—	—
Hochst	500	140	—	200	—	—	—	—	—	30	—	* 1½
Ludwigshafen	—	25	50	—	—	15	300	35	—	—	—	—
Oppau	200	—	—	—	—	—	—	—	—	—	—	—
Merseburg	(?)	—	—	—	—	—	—	—	—	—	—	—
Wiesdorf	—	120	—	—	—	—	—	—	—	—	—	—
Schleibusch	100	—	150	—	—	—	—	—	—	—	—	—

* For 3 months only. † Small. ‡ For 1 year.

Other intermediates—Ludwigshafen, sodium benzene sulphonate, 100 tons per week.

Other explosives—Schleibusch, hexanitrodiphenylsulphide, 15 tons per week.

TABLE VI. PROPELLANT EXPLOSIVES, DETONATING SUBSTANCES, ETC.

Factory.	Nitro-cellulose Powder.	Diethyl diphe-nylamine.	Diphe-nylamine.	Nitro-glycer-ine.	Cordite	Tetryl.	Fulmi-nate.	Lead Azide.
Urdingen	—	35	7	—	—	—	—	—
Kuppersteg	—	—	—	—	—	—	—	0.7
Troisdorf	250	—	—	21	40	6	7	0.7
Schleibusch	—	—	—	—	—	—	—	—
Opladen	—	—	—	35	75	—	—	—
Wiesdorf	—	—	—	(?) 50	40	—	—	—

Poison Gas. At first chlorine and phosgene were the main requirements, but afterward a variety of organic substances were employed, all of which were made by the factories of the I. G. combination. Many of these substances were new and difficult to prepare, and rapid production was only possible

TABLE VII.—OUTPUT OF FINISHED POISON GASES FROM VARIOUS WORKS.

	Factory.	Monthly (Metric Tons) Average.	Output (Metric Tons) Maximum.	Total Production (if known) Tons.	Date of Com-mencement.
1. Chlorine	Leverkusen	600	—	—	Prior to war
	Hochst	240	—	—	Prior to war
	Ludwigshafen	860	1,261	38,600	Prior to war
2. Phosgene	Leverkusen	—	30	—	Prior to war
	Ludwigshafen	288	621	10,682	Prior to war
3. Diphosgene	Leverkusen	—	300	—	June, 1915
	Hochst	139	266	3,616	Sept., 1916
	Leverkusen	—	200	—	July, 1916
4. Chlorpierin	Hochst	45	101	1,127	Aug., 1916
5. Xylol bromide ..	Leverkusen	—	60	—	March, 1915
6. Bromacetone ..	Leverkusen	—	20	—	July, 1916
7. Bromacetone, bromethyl-methylketone ..	Hochst	19	45	685	April, 1915
8. Phenylcarbamylamine chloride ..	Hochst	65	124	721	March, 1917
9. Mustard gas	Leverkusen	—	300	* 4,500	Before July, 1917
10. Diphenylchlorarsine	Hochst	150	300	3,000	May, 1917
Diphenylcyano-arsine ..	Hochst	—	—	—	Feb., 1918
11. Ethyldichlorarsine	Hochst	78	150	1,092	Aug., 1917
12. Dichloromethyl ..	Hochst	26	51	233	Sept., 1917
13. Dibrommethylether	Hochst	7	29	69	April, 1917

* Estimated from capacity of plant. Probably the same quantity was produced at some other factory, as the output of thiodiglycol from Ludwigshafen would make for this.

owing to the speed with which the peace organisation of the dye factories could be utilised for this purpose. When the Government wished to introduce a new gas, a conference of the various firms was held at Berlin to determine how the manufacture should be sub-divided in order to use existing

plants to the best advantage. For instance, the initial stages of the manufacture of mustard gas were carried out at Ludwigshafen and the final stage at Leverkusen.

Tables VII. and VIII. show the production of gas and the intermediate products in the various factories visited.

TABLE VIII. OUTPUT OF INTERMEDIATE PRODUCTS FOR POISON GAS MANUFACTURE.

Finished Gas.	Intermediate Products.	Total Output (Metric Tons.)	Place of Production.	Destination of Intermediate Products.
Phenylcarbylamine ..	Phenyl mustard oil ..	(*)	Kalle	Hochst
Mustard gas	Thiodiethylol ..	7,026	Ludwigshafen ..	Leverkusen and 1 other factory
Diphenylchlorarsine ..	Phenylarsenic acid ..	1,600	Ludwigshafen ..	Unknown
		1,200	Kalle	Unknown
	Diphenylarsenic acid	4,800	Leverkusen	Probably A., G. F. A., Berlin
Ethylchlorarsine ..	Ethylarsenious oxide	840	Ludwigshafen ..	Hochst

* Not obtained.

Note. In addition Hochst produced 3,000 tons of diphenylchlor- and cyanog-arsines from own intermediates.

These figures for the output of explosives and gas show the great military value of the factories of the I. G. combination. Although no arrangement had been made to mobilise them at the outbreak of hostilities they were rapidly converted to war purposes, thanks to their highly trained personnel and the great technical resources of their peace organisation. In the future it is clear that every chemical factory must be regarded as a potential arsenal, and other nations cannot therefore submit to the domination of certain sections of chemical industry which Germany exercised before the war. For military security it is essential that each country should have its chemical industry firmly established, and this must be secured as one of the conditions of peace, as otherwise we are leaving Germany in possession of a weapon which will be a permanent menace to the peace of the world.

The key to Germany's war production of explosives was the Haber process for the production of ammonia from atmospheric nitrogen. It is significant that large-scale production by this process only began at the end of 1912, and that in the early part of 1914 great pressure was put on the Badische Co. to increase its output. During the war, owing to the extension of the Haber plants at Oppau and Merseburg, Germany has become independent of foreign countries for her supplies of ammonia and nitric acid, substances indispensable for the manufacture not only of high explosives but also of fertilisers for food production. Without such a process Germany could not have made the nitric acid required for her explosives programme, nor obtained fertilisers for food production after the supply of Chili saltpetre had been stopped by the blockade, and it is probable that she could not have continued the war after 1916. In the event of another war we might be cut off from supplies of saltpetre.

The resources of the German dye industry are of no less military importance. Most of the gases employed toward the end of the war were complex organic substances, none of which had been made previously except in small quantities, and some of which were prepared for the first time during the war. Gas warfare will undoubtedly continue to develop in this direction, and in the future organic substances will be employed which we do not know to-day. The use of gas will always offer great opportunities for surprise in military operations, and the experiences of the present war have shown that rapid production of a new gas is essential if the surprise is to be effective. Any country without a well-developed organic chemical industry will be severely handicapped in this respect.

ELECTRICAL PURIFICATION OF CLAYS.

THE phenomena known as electrical endosmose and cataphoresis, whereby matter in a very finely divided or colloidal state is capable of being influenced by an electrical potential, have been extensively investigated. For instance, when a colloidal solution of arsenic sulphide is placed in a cell and a direct current at a potential of 100 volts passed from suitable electrodes through the solution, the colloidal particles tend after a time to collect round the positive pole, leaving a clear zone round the negative pole.

It is found that nearly all substances if in a sufficiently fine state of division, are attracted either to one pole or the

other. It has also been observed that aggregates of certain fine particles can be dispersed and separated by adding to the fluid in which they are suspended minute quantities of alkali in the case of those particles attracted to the positive pole, and of acid to those which are attracted to the negative pole. Moreover, if the particles are not sufficiently susceptible to the dispersive effect of the added electrolyte, they can be made so by being allowed to absorb some colloid, such as colloidal silicic acid.

This latter discovery has a most important bearing on the clay industry. China clay and ball clay are examples of such aggregates of fine particles, and if a thick slip is made up of the clay and water the addition of small amounts of alkali causes the clay particles to disperse, and the slip, as a consequence, to become much thinner and more mobile, the clay particles remaining in suspension a considerable time and exhibiting vigorous Brownian movement. On passing a current of electricity through such a suspension, the clay particles collect and adhere closely to the anode plate, the water collecting in a zone substantially free from clay, round the cathode. Impurities in the original clay, such as mica, quartz, felspar, and iron compounds, are either unaffected by the electrical potential and settle out, or attracted to the cathode. A means of purifying clay on a commercial scale can thus be evolved from a consideration of the above phenomena, as was shown by the exhibit of raw and purified clays of the Osmosis Co., Ltd., at the recent British Scientific Products Exhibition.

The commercial equipment for such a process consists of a blunger, settling tanks to allow the coarse impurities to settle out of the suspension, and an Osmosis machine composed of a rectangular trough in which is arranged horizontally a cylindrical metal anode surrounded beneath the surface of the slip and at a short distance away from it by a cathode through which, by paddles or other means of circulation, the clay slip is driven. The cylinder is made to revolve slowly, and by means of a scraper the dried purified clay, containing 20-30 per cent. of water, is collected.

The machine not merely collects the suspended clay and frees it from water, but subjects the suspension to an electrical purification as well, for should there still be in suspension with the clay minute particles of mica, iron, and silica that have not had time to settle out in the tank, these are not attracted to the anode, but for the most part remain in the effluent leaving the trough. Consequently, electrically osmosed clay is a purer product than can be obtained by any method of settling or centrifuging.

The improvements effected by the process are:—(1) Pyritic and other forms of uncombined iron are removed. (2) The sintering temperature of the clay is lowered so that a lower kiln-temperature can be employed, with consequent saving of fuel. (3) Clay can be graded into different degrees of fineness. (4) Fireclays can be rendered more plastic and more refractory by this treatment.

Another very important application of cataphoresis is the electrical filter-press. In this press the electrical potential is utilised as a means of driving out the water from suspensions of fine particles; thus, instead of needing pressures running up to 20 atmospheres in some cases where ordinary filtration is used, a head of 14ft. is ample for the purpose in the electrical filter-press. As an instance of the efficiency and speed with which filtering can be accomplished by such a press, a cake of china clay 4½ in. thick containing 25 per cent. of water can be made in less than two hours.

The applications of electrical endosmose or electrical dialysis in various industries is of importance. Gelatine can be freed from all inorganic mineral matter, so that an ashless gelatine can be obtained of a purity which should be suitable for photographic purposes. There is a clear experimental evidence that pure colloidal silicic acid can be prepared from sodium silicate and alumina from sodium aluminate by subjecting their solutions to an electrical potential in cells with suitable diaphragms through which the alkali can migrate. These are a few examples of useful developments, but it is evident that an increasing number of important commercial processes may be expected to arise out of the application of the principles underlying the above phenomena.—*Nature*.

AMERICAN IMPORTS OF POTASH.—The United States War Trade Board Section of the Department of State has issued a further ruling, dated August 7, the effect of which is that potash may now be imported into the United States under licence "P.B.F., No. 37," from all countries except Hungary and Bolshevik Russia.

ITEMS OF INTEREST.

ZINC AND ZINC DUST PRICES.—Australian high-grade zinc dust (88.92 per cent. metallic zinc) remains at £68.£70. per ton, c.i.f., U.K. Australian electrolytic zinc (99.95 per cent purity) is unchanged at £42. per ton, f.o.b. Australia, for direct shipment to New Zealand, India, South Africa and the Far East.

STOCKS OF NON-FERROUS MATERIALS.—The following particulars are published of the stocks (exclusive of old metal and scrap) in this country in possession of the Minister of Munitions on September 1:—Copper, 28,049 tons; spelter, G.O.B., 20,041 tons; spelter (refined), 10,963 tons; aluminium, 10,232 tons; soft pig-lead, 84,057 tons; nickel, 2,374 tons; antimony regulus, 3,386 tons. A proportion of the above stocks is already sold to the trade for forward delivery.

RESEARCH ASSOCIATIONS.—The Glass Research Association, established in accordance with the Government's scheme for encouraging industrial research, has been licensed by the Board of Trade as a company not trading for profit. The secretary is Mr. E. Meigh, 7, Seamore Place, W.1. The Department of Scientific and Industrial Research have approved the Memorandum and Articles of the British Refractories Research Association, which are now under consideration by the Board of Trade. Mr. A. C. Rann, 14, Great George-street, Westminster, S.W.1., will act as secretary of the Association.

GERMAN PRODUCTION OF FERTILISERS.—According to the *Deutsche Allgemeine Zeitung*, the production of certain fertilisers in Germany during 1913-14, 1917-18, and 1918-19, was:

Articles.	1913-14.	1917-18.	1918-19.
	Tons.	Tons.	Tons.
Nitrogen	210,000	92,334	80,000
Phosphoric acid	530,000	325,000	220,000
Potash	557,350	779,400	520,000

FEDERATION OF TECHNICAL AND SCIENTIFIC PROFESSIONAL ASSOCIATIONS.—A meeting of the Federation of Technical and Scientific Associations was held in London on September 6, to which kindred associations had been invited to send representatives. Fourteen associations were present, representing the interests of about 50,000 professional officers and servants. The meeting was presided over by Mr. A. C. J. Charlier, the President of the Federation. The draft proposals for the constitution of the Federation were considered, and many useful suggestions agreed to. It was agreed that all duly qualified bodies as shall accept the constitution and adhere to the Federation by the date of the next meeting, viz., October 18, shall be considered original members of the Federation. It was also decided to form Group Committees for each professional interest represented to advise the Federal Council. At the conclusion of the meeting the representatives of the British Association of Chemists announced their intention to join the Federation, and Mr. N. Wyld intimated that the Society of Technical Engineers would probably become members.

ALLEGED THEFT OF SCRAP LEAD.—At Bow-street Police Court on Tuesday, before Mr. Graham Campbell, Albert Evan Whatcott, 29, general dealer, of Pyrland-road, Canonbury, was charged on remand with stealing 40 tons of scrap lead, valued at £1,291., the property of the Ministry of Munitions. Mr. Travers Humphreys, who prosecuted, said that at the time this matter arose the defendant occupied a high position at the Ministry of Munitions. From September, 1917, the Ministry took possession of all the lead in the country and allocated it to firms engaged on Government contracts, or on work in respect of which a priority certificate had been obtained. The defendant was virtually the head of the department dealing with that matter. After the armistice he proceeded, by an ingenious trick, to obtain a large quantity of lead for himself without payment. He invented a firm which he called the Premier Metal Foundry (Limited), and in that name put forward a requisition for 40 tons of lead, representing that it was required for the use of printers. He passed the requisition to one of his clerks, instructing him to allocate the full amount. The lead was duly delivered to an address in Verulam-street, Gray's Inn-road, and was afterwards sold by the defendant to a Mr. Elias Barnett for about £1,300. A further remand was ordered, the defendant being allowed bail as before in £400.

DYESTUFFS STANDARDS FOR CHINA.—Practical dye men and Hong Kong importers of dyes report that the chief factor in the future of the sale of dyes in China is the standardisation of colour shades. One of the chief elements of the success of German dyes in this field was that certain shades popular among the Chinese could be relied upon. The matter of colour is very important among the Chinese, aside from the comparative beauty. Many of the colours have special significance of a ceremonial sort as well as being regarded as more or less lucky or unlucky. There are large interests in China, especially in Amoy, Swatow, Chuchow, and various South China coast cities, where imported shirtings and sheetings are dyed for sale to the Chinese. The basis of this entire business is the quality of colour in the cloths thus handled, which depends on the uniformity of colour and the quality of the dyes.—*Board of Trade Journal*.

RADIUM AND ATOMIC ENERGY.—At the second day of the James Watt centenary commemoration at Birmingham on Wednesday Sir Oliver Lodge said that, in view of the fact that the sources of molecular energy are beginning to show signs of exhaustion, he ventured to assume that if James Watt were living to-day he would be directing his attention to discovering whether there are other stores of energy at present almost unsuspected. The fact was that contained in the properties of matter there was an immense source of energy so far inaccessible, but which he saw no reason why the progress of discovery should not make available. He referred to atomic energy which, if it could be utilised on an extensive scale, would, he believed, greatly ameliorate the conditions of factory life. Sir Oliver explained that the secret of this power began to be given away when radio-activity was discovered, and said that at present we were hardly at the beginning of its utilisation.

SHALE-OIL WORKERS AND THE SANKEY AWARD.—A conference of the Federation of Shale-Oil Workers was held in Edinburgh on Wednesday to consider the position created by the refusal of the Anglo-Persian Oil Company to apply the terms of the Sankey Award to the workers in the Scottish oil industry. The representatives who met the company in London last week reported on the negotiations which had taken place. The company's representatives proposed that a profit-sharing scheme should be inaugurated, provided the workers were prepared to forgo the Sankey Award, which granted a 2s. a day increase to them. This proposal was refused, and then the company proposed that the present conditions should continue until the end of this year, when a whole review of the question should be given. The company also suggested that the Government might come to their assistance with a subsidy, or a tariff, on imported oils. The Government had not accepted either. The conditions applying to coal workers and miners have for many years past applied to Scottish oil-workers, and so it was unanimously decided to lodge notices to cease work. They take effect in the cases of oil-workers and miners on Saturday week, and with enginemen and boilermen on October 2.

AMERICAN PHOSPHATE ROCK.—On another page appears the announcement of the formation of an Association of American Phosphate Rock Miners for the purpose of developing the European market for American phosphate rock of the grades 70 per cent., 68 per cent. and 68-66 per cent. By means of this Association it is hoped to familiarise buyers with the advantages of the American product, steady the prices, so that the buyer will not need to fear that his competitor will be able to undersell him, minimise as far as possible the excessive costs of competitive selling, and thus assist the buyers in large part to accomplish that which they are already seeking to achieve in the formation of their various Fertiliser Associations. It is desired particularly to point out that there is no thought on the part of the Associated Miners to use their combined power to force up prices. On the contrary, it is their express purpose to fix a price that is fair both to producer and consumer, and such as will lead to the greatest possible consumption of American pebble phosphate. The Association, which has chosen the title of "Florida Pebble-Phosphate Export Association," will negotiate all orders for the product of the member companies, who include all miners of importance in the Florida pebble territory, their output amounting to over 1,500,000 tons in pre-war years. The head office of the Association is at No. 1, Wall-street, New York City, and correspondence is invited. American pebble phosphate, analysing as high as 79 per cent., is now being mined in large quantities, and it is confidently expected that in the near future largely increasing shipments of this grade will also be made to European consumers.

HOLTON HEATH CORDITE FACTORY.

VISIT OF BRITISH ASSOCIATION MEMBERS.

THE members of the Chemistry Section of the British Association visited the Holton Heath Royal Naval Cordite Factory, which occupies some 500 acres of ground between Poole and Wareham, on Thursday (September 11), and the Engineering Section also went there on the following day. It was impossible during such a visit, although it occupied some four hours, to gather the full technical details of the processes in operation at the factory, and we doubt very much if the Admiralty would allow them to be published, or indeed to give facilities for complete description. Nevertheless, some interesting information is available, although it is of a more or less general character. The first point is that the existence of the factory to the general public has been more or less unknown, and certainly it has never been open to visitors before in the way that it was on this occasion. Captain Desborough, the superintendent of the factory, and Mr. W. T. Thomson, the manager, received the party, which was split up into several sections, each of which commenced its tour from a different point, the programme being so arranged that four sections of the factory were visited before tea, and four afterwards.

The Admiralty took over the land in April, 1915, and was producing cordite by the following December. According to figures given during the visit, the number of employees during the war was about 4,000, in equal proportions of men and women, and the output was about 150 tons per week. For a while, after the armistice it was reduced to 35 tons, but is now 50 tons per week. It is contemplated to reduce this, however, and it may be that industrial alcohol will be produced. Dr. Thaysen, whose paper on Bacteriology is referred to elsewhere, is the resident bacteriologist at the factory, and he has been experimenting in this direction. He expressed the view that with adequate organisation the manufacture of power alcohol from mangolds could be achieved at a competitive price from carbohydrates obtainable in this country. Experiments carried out on reclaimed heath land at the factory, and the experience of neighbouring farmers, had convinced him that the land reclaimed would yield an average crop of 24 tons of mangolds, equal to 240 gallons of 95 per cent alcohol. Taking into account the feeding value of fermented mangolds, the prices in his opinion would be about 1s. 8d. per gallon, but if the average crop could be increased to 40 tons per acre, a proposition which he considered feasible, the alcohol could be produced for 11½d. per gallon. For a yearly production of 1,000,000 gallons of 95 per cent. power alcohol it would be necessary to bring 7,000 acres of heath under cultivation.

The Holton Heath factory has been laid out on a circular plan and is divided into (1) acids department; (2) guncotton department; (3) engineering department; (4) acetone recovery department; (5) nitroglycerine department; (6) acetone recovery department; (7) cordite department; and (8) laboratories. Pyrites and nitrate of soda are taken direct from the railway into the acid department, where sulphuric acid is made by the contact process, and nitric acid by a modified silica coil system; sulphuric acid is concentrated by the Kessler system, and sulphuric acid fume is condensed by Cottrell electrostatic precipitation plant. In the guncotton department the visitors were shown cotton bale breaking, tearing, and drying, as well as nitration by the displacement process, whilst the vat house, and pulping, moulding, and pressing, were also in operation. In order to obtain a more stable cordite, the practice of using cheap cotton waste, as at Gretna, is not adopted at Holton Heath, but a form of half-manufactured cotton, and this has necessarily added to the cost of manufacture. The advantages are a matter of controversy, but at Holton the extra cost is regarded in the light of an insurance premium. The engineering department calls for no special comment, although the labour-saving devices attracted much attention.

The acetone department, laid out for the manufacture of acetone and butyl alcohol by a fermentation process from maize, rice, etc., with six fermentation tanks each having a capacity of 150,000 gallons, was standing idle, but it would come into useful operation if the scheme mentioned above of producing power alcohol from mangolds ever materialises. In the nitroglycerine department, of course, were drying stoves. Nitration is carried out by a displacement process, but the nitroglycerine compressor process, the tetryl nitration process, and the tetryl purification process were not in

operation. The recovery of acetone from cordite stoves is carried out by the bisulphite process, and the recovery has reached as much as 60 per cent. We next passed to an inspection of the incorporating and pressing processes in the cordite department, had a view of the men's changing room and women's messroom, and finally visited the laboratories. There are four—viz., the main laboratory, divided into general and heat test laboratories, with a meteorological station; and the acetone laboratory, containing bacteriological and chemical laboratories. Included in the itinerary of the engineers' visit was the service reservoir, which, constructed with brick and concrete, has a capacity of 3,600,000 gallons.

OUR BOOK SHELF.

A TREATISE ON BRITISH MINERAL OIL.—Edited by J. Arthur Greene. London: Charles Griffin and Co., Ltd., 21s. net. (Postage extra).

Well known names are found amongst the contributors to this book, notably, Cunningham-Craig, Ormandy, Mollwo, Perkin, Andrew Campbell, Danstan, and Sealbrooke, etc., whilst the late Sir Boverton Redwood, Bart., supplied a foreword. It will be found that these practical scientists have produced a technical book which will render the greatest possible assistance in the establishment of a new industry of national importance. Although efforts are still being made to locate and develop mineral oil in various parts of the country, it is considered that the cannellaid resources of the country afford the best and most easily utilisable source of supply. The book is confined therefore to extraction from shales and bituminous materials. In the first 63 pages, a very lucid account is given of the characteristics, composition, and location of raw material, the author being distinctly in favour of the canals in their various forms—parrots, torbanites and intermediate deposits. Section 2 contains adequate description of processes and plant involved in the retorting operation according to the latest developments in gas retorts, coke ovens and low-temperature plants. Section 3 is of particular interest and importance dealing as it does with the products of low temperature carbonisation and their chemical nature. Valuable chapters in this section refer to the thermal decomposition of coal, yields from various raw materials, such as lignites, cannel, shale (Norfolk and Kimmeridge, etc.), and peat, a short chapter on their utilisation being included. Section 4 consists of a very practical description of refining processes. The book is liberally provided with important diagrams and illustrations of plant and machinery suitable for large scale work, which combined with its exceedingly valuable text make it a volume of great importance.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

(SPECIALLY CONTRIBUTED.)

The position is worse rather than better this week. The threat of an ironfounders' strike has had an adverse effect upon the Cumberland hematite pig-iron trade, and demand for ordinary mixed numbers has fallen off. Flat and stagnation in the steel-rail industry have compelled the damping down of a furnace at Maryport, and it is extremely problematical whether it will be lighted again this year. None of the Cumberland coke is used farther south on the North-West Coast than Millem, and as several of the fourteen furnaces in blast are on low phosphorus brands of iron, it is quite evident that the entire output of the 380 by-product ovens, even if they are working at only two-thirds their capacity, cannot be fully absorbed. Stocks are already accumulating in works yards, and unless there is a decided improvement in the iron trade within a week or two, it is clear that a reduction of coking activity will be inevitable. East Coast coke supplies to the blast furnaces are also low this week. To the Furness district they are 14,000 tons, and to West Cumberland 8,000 tons. The make of by-products is naturally being diminished, and the acid plants of the chemical works on the coast are affected. For benzene and sulphate of ammonia there continues to be a lively demand, and pitch likewise remains a strong trade.

CORRESPONDENCE.

*. We do not hold ourselves responsible for the opinions expressed by our correspondents.

Chemists at Gretna Factory.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—I have every sympathy with your correspondent "Muldoon N. 5. W." But why put all the blame on the Ministry of Munitions? Why as a steelworks chemist did he accept a position at £175. per annum? And why, being a chemist, did he work at an unskilled labourer's job? Why bring in the leadburners' large wages as a comparison? I never found them large, and had to keep myself in a hostel and support my wife and family at home, and had no banking account to draw on. The sole reason that the leadburners had larger wages than hillmen and chemists was that the leadburners were for the greater part trained skilled tradesmen who were all organised and members of the plumbers' trade union, and who made it a point of honour to see that the Ministry or any others did not take advantage of their less skilled fellow-tradesmen.

As a workman who has always been interested in the scientific fundamentals of industry—and, though handicapped with a very elementary education, have always striven to know the reason of things,—I would respectfully point out to "Muldoon" and his friends that the chemists at the Gretna Factory had only themselves to thank for the state of affairs there. For the most part they suffered from swelled-headed snobbery, and to such an extent as to bring their profession into ridicule, and to make the very name "chemist" a by-word in the factory. Even the comedians at the local music-halls and concerts played off jokes about the "Gretna chemists." The chemists of Gretna carried this snobbery to such a length as even to affect the same style of dress—viz., soft hat, sports coat, breeches, and leggings. To a man who knows and honours the value of the true chemist, it was a pathetic spectacle.

I place great value on chemistry, and believe it to be the science which will one day explain everything. But this affectation and exclusive snobbery of many present-day chemists wants a hard knock on the head. A chemist, after all, is only a skilled worker. It takes as much study and time to learn to be a good plumber and leadburner as it takes to be a good chemist. Snobbery is ruining our chances of advancement as a nation; it holds back progress, and only creates distrust between class and class, profession and trade. The mandarin of two buttons won't speak on a level with him of one button. Let the chemists show that they are followers of science, get rid of professional snobbery, form a trade union, and demand and get wages adequate for their skilled service; and then they will have no reason to make foolish comparisons.—Yours, etc.,

MORRISON.

(Late of Canada House, Easttriggs).

Leith, September 14, 1919.

LEGAL INTELLIGENCE.**Customs Seizure of Pyrogallol Acid.**

In the Vacation Court on Wednesday the case of Brown v. Buskley was mentioned to Mr. Justice Greer, on an *ex-parte* application for leave to serve notice of motion with the writ for Wednesday next.

Mr. R. A. Wright, K.C., declared that the action was of great importance, both to the plaintiff and to traders generally. The plaintiff carried on business as a chemical manufacturer, and had imported a quantity of pyrogallol acid. It was now lying at the port of Manchester, where it had been seized by the defendant, who was a collector of Customs.

The plaintiff's case was that this seizure was entirely unjustified by law, and was, in fact, an act of trespass. The defendant was acting under a Government proclamation which prohibited the import of a number of goods except by license from the Board of Trade. That proclamation purported to have been made under a section of the Customs Law Consolidation Act, 1876, under which the importation of "arms, gunpowder, ammunition, or any other goods" might be prohibited by proclamation or Order in Council.

The point the plaintiff took was that the section was limited to arms, gunpowder, ammunition, and "similar" goods, and did not apply to pyrogallol acid, which was an ordinary article of commerce.

His Lordship said it was obviously desirable that there should be an early trial, and gave leave to serve notice of motion for Wednesday next.

SIR JOHN CASS TECHNICAL INSTITUTE.

THE new session of the Sir John Cass Technical Institute, Jewry Street, Aldgate, E.C., will commence on Thursday, September 25. The courses of instruction provided are especially directed to the technical training of those engaged in chemical, metallurgical, and electrical industries, and in trades associated therewith. Full facilities are provided for those wishing to carry out work associated with the industries in which they are engaged, or to undertake special investigations and research. The chemistry, metallurgy and physics laboratories are open both in the afternoons and evenings for work of this character. The instruction in experimental science also provides systematic courses in chemistry, physics, and in pure and applied mathematics for the examinations of London University, and in chemistry and metallurgy for the examinations of the Institute of Chemistry. Special courses of higher technological instruction form a distinctive feature of the work of the Institute. Full details of the courses are given in the syllabus of the Institute, which can be had on application at the office or by letter to the Principal.

LEAD-NITRATE HYPOPHOSPHITE DETONATORS.

THOUGH phosphorus has been utilised in various ways in warfare, attempts to use phosphorus and its compounds in the manufacture of explosives have been little successful. The *Chemische Zentralblatt* recently noticed a paper contributed by Edmund von Herz to the *Zeitschrift für das Gesamte Sprengstoffwesen* in 1916. By mixing lead nitrate and lead hypophosphite Herz obtained a highly-explosive complex lead salt, a nitrate and hypophosphite. To prepare this compound a hot saturated solution of lead nitrate containing 331 grammes of this salt is added to a boiling saturated solution of calcium hypophosphite (170 grammes); the mixture is rapidly cooled while being vigorously stirred; white crystals, of a greasy lustre, of lead hypophosphite are then obtained. These crystals are redissolved and 250 grammes of the solution are mixed with a boiling solution of 500 grammes of lead nitrate in 1.5 litre of water; again the mixture is rapidly cooled. When the preparation is successful the double salt $Pb(NO_3)_2 \cdot Pb(H_2PO_3)_2$ is obtained as a granular crystalline powder which is dried at a temperature of 40° or 50° C.; when the salt separates in needles or as a felted voluminous mass, it is less suitable as a detonator. As regards the rate of detonation the proper lead nitrate-hypophosphite comes up to lead azide and surpasses mercury fulminate. Its decomposition liberates a comparatively small volume of gas, 117 litres per kilogramme, whilst lead azide yields 230 litres and mercury fulminate 314 litres of gas, the new compound is therefore not a very efficient primary explosive. But it offers considerable advantages as a material for percussion fuses, being both sensitive and stable and yielding a flame of high temperature. The lead nitrate acts as oxygen carrier in this compound.—*Engineering*.

DYE IMPORTS INTO INDIA PROHIBITED.

THE Government of India have prohibited, with effect from September 6, the import into India, except under licence, of all derivatives of coal tar, generally known as intermediate products, capable of being used or adapted for use as dyestuffs, or of being modified or further manufactured into dyestuffs; all direct cotton colours, all union colours, all acid wool colours, all chrome and mordant colours, all alizarine colours, all basic colours, all subhide colours, all vat colours (including synthetic indigo), all oil, spirit and wax colours, all lake colours, and any other synthetic colours, dyes, stains, colour acids, colour bases, colour lakes, leuco acids, leuco bases, whether in paste, powder, solution or any other form. Consignments shipped on or before September 6 will be freely admitted. Applications for import licences should be addressed to the Collector of Customs at the port through which it is desired to import the goods. It is understood that licences will always be obtainable for dyestuffs and intermediate products manufactured in the United Kingdom.

FERTILISER NEWS.

(SPECIALLY CONTRIBUTED.)

Nitrate of Soda.—The August shipments from Chili showed an increase not "of" 56,000 tons, as stated through a printer's error in our last issue, but "at" that figure, the official details being: 5,530 tons to Europe, 38,530 to the United States, and 12,030 to "other parts"; total, 56,140 tons, against 20,380 tons in July. The output having been 108,030 tons, there was an addition of 51,890 tons to the stocks on the West Coast, these amounting on the 1st inst. to no less than 1,652,540 tons, compared with 736,330 tons at the corresponding date in 1913 under normal conditions before the war. Tonnage was then plentiful, ensuring the usual large autumn exports, while it is now so scarce that 240s. per ton is offering for steamers to Europe, and only 22,000 tons were "loading" on September 1. The supply of tonnage will no doubt gradually increase, but there can be no material alleviation of the statistical position before next year, and in the meantime some ten millions sterling worth of nitrate are eating off their head at high rates of interest. The outlook is as serious for the Chilean Government as for the producers, the decrease in the revenue from the export duty being about £4,000,000. in the eight months compared with the corresponding period last year; hence the decline in Chilean bonds, the payment of the coupons on which requires large remittances to Europe. The only redeeming feature in connection with nitrate of soda is the enhancement of the selling prices of sulphate of ammonia, to which we will refer next week.

Continental Fertiliser Notes.—At the meeting of the Chemical Manures Factory, Fribourg, the net profit for the 1918 working year was shown to be 120,334 francs. A dividend of 15 francs per share, or about 10 per cent., was agreed on.

The German potash industry, like so many others, has suffered very severely from shortage of wagons. The Potash Syndicate calculates its losses through this cause alone at 44,000,000 marks. Of course, the loss of Alsace-Lorraine has broken up the potash monopoly, although the syndicate derives considerable satisfaction from the retention of the preponderance in the world market. It is held that it would be to the interest of the Alsatian concerns to adhere to the Potash Syndicate instead of competing with it. Referring to the coal question, it is feared that many works will have to stand idle through the winter if fuel is not supplied in sufficient quantity. The director of the Hohenfels and Bergmannsseggen Potash Works observes that a considerable extension of the potash deposits has been discovered southwards of these works, measuring several thousand metres. The quality of the salts is good. Besides Kainit, other salts of varying richness come under consideration. This works alone has developed pure potassium oxide showing 6,500,000 double zentner.

Algerian Phosphate Enterprise Extension.—A report on the mineral reserves of Algeria states that a number of fresh deposits of phosphate of lime will shortly be put up to auction. It is observed in connection with this notice that the Djebel-Ouk deposits are estimated to amount to 800,000,000 tons. One of the beds is 30 metres thick, and a significant statement is made that large quantities of the product when extracted will be used on the spot.

Sulphate of Ammonia to be Scarce in the East Indies.—It is stated that the importation of sulphate of ammonia from Europe, Australia, and Japan into the Dutch Indies is about to be stopped, the result of which will be a scarcity of manures for the Java sugar cultivation in the year 1920.

Sulphate of Ammonia.—Prices here are now fixed for some time ahead, and the only variation that can mature, apparently, is in connection with the export situation. About £25. f.o.b. appears to be the outside limit at present for export quantities. Furthermore, it does not seem that there will be much to export. Demand from farmers here for sulphate of ammonia is now strong and regular, and this has, of course, become a matter of more interest to manufacturers now that home prices are fixed upon a more remunerative level. In America sales of 7,000 tons have been reported recently for export. The export demand there is greater at this time, considering the season, than it has ever been before. The only thing that is checking it at all is lack of sufficient supplies. As has already been reported in these columns, most of the large producers are sold out to the end of September, but second hands appear to be fairly well

equipped to handle a goodly portion of the business, and are filling a number of large orders for spot material.

Basic Slag and Superphosphates.—Basic slag is still good business at unchanged prices. Quotations appear to be certain to go higher shortly, and the demand shows every evidence of outstripping supply. There are also doubts being expressed as to whether there will be a sufficient supply of superphosphate for the next season. At present superphosphate makers will only sell for this month's deliveries, owing to the uncertainty of supplies of raw materials and the increasing cost of manufacture.

Potash.—Some news comes through from time to time about the potash possibilities of Lake Chad, in Central Africa. It is declared that the district is very rich in potash constituents, and that quite large quantities of these are used in the locality so far as the primitive methods of transport will allow. With regard to the American situation, latest reports show that something of a conflict is proceeding. On the one side we have attempts to stimulate public interest in new potash flotations by the publishing of extraordinary stories of big potash profits. In fact, potash appears to have become a sort of counter on the industrial side of Wall Street. To show how far the promotion side of the business is getting away from the real production side, the story is told of the latest potash promotion, with headquarters 2,000 miles away from the scene of its proposed operations, and with none of its organisers having any connection with either the fertiliser or the chemical industry.

Other Fertilisers.—Bone meals are still scarce, especially East Indian. Arrivals from India are waited for, but are not maturing. Prices vary from £15. 15s. per ton downwards. Some dissolved bone compound is said to have been offered at as low as £8. Dried blood and tankage are also being asked for, but cannot be secured in any quantities. Fish guanos of miscellaneous sorts are pretty generally eagerly snapped up wherever they are offered, but prices con- being 3,400 tons to Bordeaux and 3,000 tons to Algiers. A shipment of 4,566 tons left Newport for Bono.

SOUTH WALES NOTES.

(SPECIALLY CONTRIBUTED.)

Some additional mills have been restarted this week, and the output of tinplates in this district is steadily growing. At Llanelly there is a shortage of water, and as this will not be remedied for a few weeks under ordinary circumstances, several manufacturers are introducing sea-water into their factories in order to scour the plates. This experiment is being watched with much interest by members of the trade, and if successful will solve the difficulties always more or less encountered during the summer months at the majority of the works. The export trade is getting back to normal. There were shipped from Swansea 106,856 boxes, and the receipts from the works were 96,839 boxes, leaving the stocks at 193,060 boxes, compared with 18,169 twelve months ago.

The purchase of Messrs. Lysaght's undertakings by a new syndicate is of absorbing interest owing to the fact that the new directors are interested in so many industrial concerns. Mr. Seymour Berry is one of the financial managers of the Anglo-Continental Guano Works, Gibbs Fertilisers, Ltd., and the Avon Manure Company, Ltd., and he takes more than ordinary interest in by-product plants. Mr. Llewellyn is largely concerned in the patent-fuel trade, and is determined to develop this industry on entirely new lines.

All the patent fuel and briquette factories are fully operating, and there is a very pressing demand for the outputs. The foreign trade is providing fresh markets week by week. Continental customers are pleased with the smaller kind of briquettes, and in consequence the supplies are not equal to the requirements. Swansea manufacturers have despatched over twenty cargoes to different ports, the most important being 3,400 to Bordeaux and 3,000 tons to Algiers. A shipment of 4,566 tons left Newport for Bono.

TRADE CATALOGUES.

Messrs. The Aluminium Plant and Vessel Company, Ltd., send their illustrated loose-leaf Catalogue No. 1, which, quite apart from advertising their plant specialities for the chemical industry, contains a vast fund of information of a technical nature. Chemical engineers will find it particularly useful and, in view of the amount of research and pioneer work done by this firm, highly reliable.

IMPORTS OF CHEMICALS AND ALLIED PRODUCTS.

THE following returns, which are taken from the import statistics of the United Kingdom, give the amount and value of chemicals and allied products imported during the month ending August 31, 1919, as compared with August, 1918.

ARTICLES.	QUANTITIES.		VALUE.		ARTICLES.	QUANTITIES.		VALUE.	
	Month ended August 31st.		Month ended August 31st.			Month ended August 31st.		Month ended August 31st.	
	1919.	1918.	1919.	1918.		1919.	1918.	1919.	1918.
CHEMICALS :			£	£	MANURES :			£	£
ACETIC ACID other than for table use cwt.	5,224	9,375	14,743	49,106	Basic Slag..... tons	—	—	—	—
Bleaching Materials,, Boracite, Borate of Lime, Borate of Magnesium, and Borax	26,239	23,303	31,839	27,938	Bones for Manure (whether burnt or not)	472	658	6,676	16,741
Brimstone	10,565	85,050	11,545	69,587	Guano	—	—	—	—
Carbide of Calcium ..	—	64,808	—	99,140	Nitrate of Soda (Cubic Nitre) ..	—	—	—	—
Coal Products, not Dyes	8,813	72	2,280	1,225	Phosphate of Lime and Rock Phosphate	19,341	58,014	72,248	253,132
Cream of Tartar ..	1,651	6,423	16,257	101,257	OIL SEEDS :				
Glycerine: Crude ..	4	2,095	30	7,695	Castor	3,095	152,972	4,701	249,970
Distilled	106	139	511	4,545	Cotton				
Potash Compounds:—					From Egypt .. tons	5	1,801	122	33,595
Saltpetre (Nitrate of Potash) ..	66	53,926	169	123,002	„ British India ..	22,986	—	607,592	—
Other Sorts ... val. £	—	—	32,815	43,728	„ Oth'r C'tries ..	3,402	42	89,150	756
Soda Compounds cwt.	5,519	3,239	16,763	26,659	Total	26,393	1,843	696,864	34,351
Tartaric Acid ..	1,415	300	22,095	4,688					
Unenumerated, including Acetate of Lime, Acetone, Muriate of Ammonia, and Sulphuric Acid .. val. £	—	—	275,269	2,324,318	Flax or Linseed :				
DRUGS & MEDICINES :					From Russia .. Qrs	—	—	—	—
Bark, Peruvian . cwt.	1,160	4,343	8,532	41,133	„ U.S.A.	23	—	478	—
Quinine and Quinine Salts oz.	496,656	75,264	50,402	10,260	„ Argentine Republic ..	130,506	88,795	1,100,728	520,615
Unenumerated .. val. £	—	—	351,003	285,023	„ British East Indies	174,375	93,371	1,513,404	523,145
DYESTUFFS (other than DYE WOODS) and SUBSTANCES used in Tanning or Dyeing :					„ Canada ...	18	—	335	—
Cutch	2,874	5,825	5,283	16,597	„ Oth'r C'tries ..	3,198	—	29,712	—
Dyes and Dye-stuffs obtained from Coal Tar :					Total	308,120	182,166	2,644,657	1,043,700
Alizarine and Anthracene ...	—	2	—	80	Rape :				
Aniline and Naphthalene ..	3,734	3,792	104,657	119,875	From Russia .. Qrs,	—	—	—	—
Synthetic Indigo ..	278	—	2,340	—	„ British East Indies	38,189	42,638	302,530	237,886
Other Coal Tar Dyestuffs	1	—	64	—	„ Oth'r C'tries ..	2,669	—	24,725	—
E'tets for D'ing val. £	—	—	78,576	99,492	Total	40,858	42,638	327,255	237,886
Indigo	413	1,165	18,750	59,901	Sesame (or Sesamum, Benni, Gingelly, or Teel) :				
Unenumerated ..	15,512	17,587	54,118	74,350	From China ... Qrs.	—	—	—	—
Tanning Substances :					„ Oth'r C'tries ..	—	—	—	—
B'k for Tanning cwt.	35,509	68,618	25,762	63,056	Total	—	—	—	—
Ex'ts for .. val. £	—	—	146,580	292,716	Soya Beans :				
Gambier	5,892	7,330	16,950	24,099	From Russia .. tons	—	—	—	—
Myrobalans ...	29,185	65,841	19,095	76,628	„ China	—	—	—	—
Sumach	14,901	31,990	15,988	34,818	„ Japan	10,326	—	271,264	—
Valonia	13,383	19,900	14,902	45,000	„ Oth'r C'tries ..	—	—	—	—
Unenumerated ..	387	5,600	702	12,580	Total	10,326	—	271,264	—
PAINTERS' COLOURS AND PIGMENTS :					Unenumerated .. Qrs.	2,737	1,441	20,890	12,169
Barytes	34,492	3,000	18,904	2,000	NUTS and KERNELS for expressing Oil therefrom :				
Nickel Oxide ...	2,000	—	12,052	—	Copra	7,871	273	448,378	13,249
Red Lead	285	—	626	—	Ground Nuts (or Arachide Nuts, Monkey Nuts, or Pea Nuts)..	11,265	10,970	506,519	382,797
White Lead	16,574	—	43,580	—	Palm Kernels ..	17,178	25,241	757,960	653,418
Zinc Oxide	44,933	11,481	124,981	33,878	Other Sorts	2,956	1,278	146,564	58,319
Unenumerated ..	64,388	19,246	139,352	45,930	Total	39,270	37,762	1,859,421	1,107,783
Total	162,672	33,727	339,495	81,808					

(To be concluded.)

EXPORTS OF CHEMICALS AND ALLIED PRODUCTS.

THE following returns, which are taken from the export statistics of the United Kingdom, give the amount and value of chemicals and allied products exported during the month ending August 31st, 1919, as compared with August, 1918.

ARTICLES.	QUANTITIES.		VALUE.		ARTICLES.	QUANTITIES.		VALUE.	
	Month ended August 31st.		Month ended August 31st.			Month ended August 31st.		Month ended August 31st.	
	1919.	1918.	1919.	1918.		1919.	1918.	1919.	1918.
BLEACHING POWDER: To U.S.A. cwt.	—	—	£	£	MEDICINES, comprising			£	£
„ Other					DRUGS and MEDICINAL				
Countries ..	21,962	2,392	16,515	2,020	PREPARATIONS:				
Total	21,962	2,392	16,515	2,020	Opium, dried and				
COAL PRODUCTS, NOT					powdered in the				
DYES:					United Kingdom lbs.	311	4,440	987	16,842
Aniline Oil and					Quinine and Qui-				
Toluidine lbs.	13,904	459,432	1,233	27,717	nine Salts ozs.	144,323	17,777	29,694	3,355
Anthracene..... „	127,902	—	644	—	Other Sortsval. £	—	—	354,906	266,194
Benzol and Toluol gals.	86,475	746,868	9,714	50,405	Total	—	—	385,587	286,391
Carbolic Acid .. cwt.	11,245	8,986	22,727	25,537	MURIATE OF				
Coal Tar, Crude ..	1,389	—	549	—	AMMONIA cwt.	10,843	1,756	32,416	5,164
Refined and					PAINTERS' COLOURS AND				
Varnish gals.	180,983	30,318	7,503	1,445	MATERIALS:				
Naphtha	45,483	408	5,889	105	Barytes cwt.	152	—	132	—
Naphthalene ... cwt.	1,943	21,562	3,201	31,585	White Lead „	10,935	2,529	33,535	7,363
Pitch	156,964	238,543	24,651	31,370	Zinc Oxide „	1,829	276	6,819	1,338
Tar Oil, Creosote,					Unenumerated .. „	98,429	23,210	387,181	84,004
&c. gals.	330,439	107,451	15,883	2,322	Total	111,345	26,015	427,667	92,705
Other Sorts cwt.	29,741	26,579	26,911	36,481	POTASH COMPOUNDS:				
Total Value £	—	—	118,905	206,967	Saltpetre (Nitrate				
COPPER, Sulphate					of Potash) British				
of tons	161	2,495	8,828	160,497	prepared cwt.	5,734	475	16,576	1,623
DYE STUFFS:					Chromate and Bi-				
Products of Coal					chromate of Pot-				
Tar cwt.	11,870	7,724	139,923	126,306	ash „	1,799	785	15,853	8,721
Other Sorts „	9,017	880	25,540	6,424	Other Sortsval. £	—	—	10,086	2,368
Total	20,887	8,604	165,463	132,730	Total	—	—	42,515	12,712
GLYCERINE:					SODA COMPOUNDS:				
Crude cwt.	305	1,830	1,007	6,100	Soda Ash cwt.	319,401	399,443	96,918	130,084
Distilled „	4,346	1,800	26,571	9,851	„ Bicarbonate ..	37,802	35,439	17,278	21,798
Total	4,651	3,630	27,578	15,951	„ Caustic	124,710	85,346	133,245	131,849
MANURES:					„ Chromate and				
Sulphate of Ammonia:					Bichromate	9,294	4,448	24,109	19,702
To France..... tons	1,600	2,032	41,928	38,046	„ Crystals	17,188	386	5,725	113
„ Spain and					„ Sulphate (Salt-				
Canaries „	379	—	11,715	—	cake)	15,416	50,034	3,165	9,138
„ Italy „	218	—	6,557	—	„ Other Sorts	44,067	46,787	51,628	64,355
„ Dutch East					Total	567,878	621,883	332,068	377,039
Indies „	3,841	—	97,953	—	SULPHURIC ACID - cwt.	14,028	3,944	9,164	2,498
„ Japan „	9,502	—	184,484	—	TARTARIC ACID .. „	608	181	10,041	3,243
„ U.S.A.	—	—	—	—	CHEMICALS, other				
„ British West					sortsval. £	—	—	410,291	633,361
India Islands					SALT, Rock and White				
(including Ba-					(except Table Salt):				
hamas) and					To Belgium tons	950	—	3,301	—
British Guiana ..	46	2,283	989	74,248	„ U.S.A.	700	475	2,742	1,514
Other					„ British East				
Countries	1,754	811	42,512	24,703	Indies	11,512	3,604	30,014	8,109
Total	17,340	5,126	386,138	136,997	„ Australia	160	100	500	303
Superphosphates ..	451	370	4,075	2,467	„ New Zealand	170	930	636	4,166
Basic Slag..... „	3,411	—	11,829	—	„ Canada	6,685	2,624	21,802	8,036
Unenumerated	5,765	2,479	68,555	26,439	Other				
Total of Manures ..	26,967	7,975	470,597	165,903	Countries	18,018	11,372	68,299	38,143
					Total	38,195	19,105	126,574	60,271
					GREASE & UNREFINED				
					TALLOW & ANIMAL				
					FAT cwt.	87,797	2,204	337,103	5,267

(To be concluded.)

REPORTS OF COMPANIES.

Major and Co., Ltd.

The ordinary general meeting of the company was held at Hull on Friday (September 12), Mr. I. L. Major, chairman, presiding. The Chairman moved the adoption of the report, which stated that, including the amount brought forward, which was practically the same as that for 1917, the profit for the year 1918 was £32,100., an improvement of £4,200. Out of this available sum dividends have been paid on the new six per cent. cumulative preference shares, and 8½ and 10 per cent. on the preferred and deferred ordinary shares respectively, the same as last year. An appropriation has also been made for the reserve for depreciation of £3,500., and of £5,000. for general reserve (making £15,000.), similar to 1917, leaving a carry-forward of £11,800., which the directors estimate is more than sufficient to cover the still unsettled assessment for excess-profits duty. In the course of his remarks the chairman said: I should like to mention a few of the things we are doing. Obviously, my remarks must be guarded. Our solignum wood preserving stain continues to be of world-wide application, and we are entering upon a considerable programme for its development. We are also makers of road material in one of our subsidiary companies. This company has not yet contributed to the profit of Major and Co., but has a very big future. At the other end of the scale we are developing more refined specialities. Our "Pyramid" benzole has a very good name as a motor fuel. We are confining our sales, as far as possible, to a radius of 50 miles from our factories. We are members of the National Benzole Association, which is doing good work in popularising the use of benzole as a motor fuel. I should also like to mention to you that we have been spending considerable sums in research, and have just brought to success in the factory, thanks to the ability and enthusiasm of our chemists, after repeated failures, the production of an article which is required in this country, and which has not hitherto been satisfactorily produced. I should like to take the opportunity of thanking all my associates in the business, both in office and works, for the good work they have put in under very difficult circumstances. We have no complaint to make in our own works of the slackness which one hears so much about in different parts of the country.

Colonel Wellsted seconded the motion, which was carried unanimously.

Magadi Soda Company, Ltd.

The report for the year to December 31, 1918, states that the accounts show a debit balance of £48,954. The sales of the company's products increased at the beginning of the year under review, but the cessation of hostilities and consequent release of soda ash for commercial purposes seriously affected the company's sales of granular soda. Native wages increased to an unprecedented extent, as also did the cost of all material, and this made the hand-winning of the soda uneconomical. It was therefore decided about the middle of this year to discontinue production and devote all the company's energies to the completion of the mechanical winning and transporting plant. The caustic soda plant was brought to the production stage at the end of the year, after delays owing to the difficulty of securing materials and the illness of the manager. Caustic soda of the highest quality is now being produced. The company's claim against the Government for compensation for the use of its railway and water supply by the military authorities in East Africa has been repudiated, and at present remains unsettled. The military authorities are still in occupation of the Irlam works, near Manchester, but no payment of rent has yet been made to the company. In the early part of this year an issue of £500,000. convertible registered debentures was made, and holders of the company's shares on the register were given preferential allotment.

British Portland Cement Manufacturers, Ltd.

Report for the year ended April 30 last states that, including £87,722. brought forward, revenue for year amounted to £345,374. Against this has been charged directors' and trustees' fees, £5,950.; debenture stock interest, £59,506.; debenture stock redemption account, £16,722.; general depreciation reserve account, £75,000.; barge and rolling stock depreciation account and barge insurance, £3,000.; leaving a balance of £185,196. Preference dividend for year absorbed £70,800. Directors recommend dividend on ordinary at rate of 8 per cent. per annum for year, leaving to

be carried forward £91,509. First mortgage debenture stock to amount of £17,970. was redeemed and cancelled during year, making total redemption of this stock to December 31 last £92,322. The desirability of closer working of the company with the Associated Portland Cement Manufacturers (1900), Ltd. (which holds a controlling interest in the ordinary share capital of the British Company), has been recognised by the boards of both companies, who have adopted a scheme of joint management. Reorganisation of the management has been facilitated by arrangements which have been made with the following gentlemen to retire from the board as at July 31 last: Messrs. J. Bazley-White, Robert Brearley, E. S. Curwen, Arthur Durose, A. J. Jack, G. M. R. Layton, Edwin Robson, Leslie G. Shadbolt, Halley Stewart, and C. H. Watson. Messrs. Alfred Brooks and Anthony White, who are managing directors of the Associated Company, have been appointed managing directors of this company; and, on the other hand, Messrs. A. C. Davis and P. M. Stewart have been appointed managing directors of the Associated Company, so that the managing directors of both companies are now identical. A resolution will be proposed at the annual meeting dividing the £10. preference shares into 10 £1. shares.

Yorkshire Dyeware and Chemical Company, Ltd.

The annual meeting was held on September 12, at Leeds, the chairman, Mr. George Bedford, presiding. The report and statement of accounts were approved, and the retiring directors were re-elected. Later, an extraordinary meeting of shareholders took place to pass the resolutions necessary towards increasing the share capital of the company from £75,000. to £150,000., the board's recommendation being that this should be effected by the capitalisation of £75,000. of the reserve fund, and that one new 15s. share be added to every similar share now held. Notices calling a meeting to confirm the proposal will be issued in due course.

American Cyanamid Company, Ltd.

Net profits for the year ended June 30 were \$1,048,752., after providing for war taxes and other charges, and \$1,391,285. was brought forward. Arrears of dividends on the preferred stock up to June 30, 1918, have been paid, leaving \$1,723,529. to carry forward.

Lawes' Chemical Manure Company, Ltd.

The report to June 30 last states that a settlement with the Inland Revenue authorities in respect of the two years ended June 30, 1917 and 1918, respectively, having been reached, the customary accounts for those years are now submitted. Interim dividends of 7 per cent. on the preference shares and 7s. 6d. per share on the ordinary shares have been declared and paid for 1917, and 7 per cent. on the preference shares and 10s. per share on the ordinary shares for 1918, all subject to tax. The accounts for the year to June 30 last show an available sum (including balance from previous year) of £30,930. The directors recommend payment of a dividend of 7 per cent. on the preference shares, less tax, £5,372.; dividend of 10s. per share and a bonus of 2s. 6d. per share on the ordinary shares, both less tax, £15,746.; to reserve for bad debts and doubtful debts, £300.; carried forward, £9,512. A sum of £6,700. for depreciation has been written off in the accounts for the year. Owing to the general scarcity of materials, it has been possible to effect only such temporary repairs to buildings, plant, and machinery at works as would enable manufacturing operations to be carried on, more thorough repairs being performed deferred. Substantial sums have been set aside for this purpose.

United Indigo and Chemical Company, Ltd.

The accounts for the year to June 30 show a net profit of £50,272., and £29,054. was brought in, making £79,326. Further dividend of 15 per cent. on both the preference and ordinary shares, making the usual 20 per cent. for the year; setting aside £14,000. for excess profits duty, and carrying forward £43,324.

DIVIDENDS.

BRITISH ALUMINIUM COMPANY, LTD.—Directors have declared dividend at rate of 8 per cent. per annum, less tax, on ordinary for six months ended June 30, 1919, and dividend at rate of 6 per cent. per annum, less tax, on preference for six months ended June 30, 1919, both payable October 1.

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 4, Queen Anne's Gate Buildings, London, S.W. 1, whence, unless otherwise stated, further information may be obtained:—

Canada.

A firm of manufacturers' agents in Toronto are desirous of obtaining agencies for United Kingdom manufacturers of glues, enamels, paints, dyes, etc., for the Province of Ontario. (Reference No. 595.)

Mauritius.

Two inquirers from Port Louis, who are at present in this country, desire to commence an agency business, in partnership, on their return to Mauritius, and they wish to get into touch with United Kingdom manufacturers of motor spirit, lubricating oils, paints, etc. (Reference No. 604.)

Italy.

A produce broker and commission agent in Genoa, established for 30 years, and having extensive connections in the trade, desires to obtain agencies for United Kingdom exporters of cinnamon bark and palm oil. (Reference No. 615.)

Spain.

A Spanish merchant of Saragosa desires to get into touch with United Kingdom firms supplying asbestos, lubricators, paints, and varnish. (Reference No. 620.)

A British merchant of Cartagena is desirous of securing an agency in that city for the sale of tinplates. (Reference No. 621.)

Switzerland.

A firm at Bâle wishes to secure the sole representation in Switzerland of United Kingdom manufacturers and exporters of metals and chemicals. (Reference No. 625.)

Holland.

The Ver. Bureau voor Handelsinlichtingen (Office for Foreign Relations), Amsterdam, states that a Dutch manufacturer of paints wishes to represent an English manufacturer of white lead, lead minium, and zinc white. The Bureau will be pleased to place readers interested in touch with the firm in question.

GAZETTE NEWS.

LIMITED COMPANIES. — Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions, Orders, and Official and Other Notices.

Aber-lynn Zinc Mines, Ltd.—Resolved August 19, confirmed September 2: That on account of the sale of the assets of the company to Aber-lynn, Ltd., the Aber-lynn Zinc Mines, Ltd., be wound up. H. Boot, 7, Victoria Street, S.W., liquidator. Meeting of creditors at liquidator's, September 23, at 3 p.m. All claims must be sent in on or before that date.

Aladdin Cobalt, Ltd.—Resolved August 20, confirmed September 5: (1) That the scheme referred to in the directors' circular, dated August 11, 1919, and submitted to this meeting, be and the same is hereby approved; (2) that with a view to carrying same into effect the Aladdin Cobalt, Ltd., be wound up. F. F. Fuller, 638, Salisbury House, E.C., chartered secretary, and another, liquidators; (3) that said liquidators be and are hereby authorised to consent to the registration of a new company, to be named the Kirkland Lake Proprietary, Ltd., or some other suitable name.

Baku Russian Petroleum Company (1909), Ltd.—Resolved August 8, confirmed September 1: That it is desirable to wind up the company, and, accordingly, that the company be wound up. J. W. Creasser, 48, Cannon Street, E.C., liquidator. Meeting of creditors at liquidator's September 17.

Copal Varnish Company, Ltd.—Resolved August 18, confirmed September 3: That the company be wound up. J. S. Walker, 41, Jermyn Street, S.W., chartered accountant, liquidator.

Premier Oil and Pipe Line Company, Ltd.—Resolved August 11, confirmed August 27: That it is desirable to reconstruct the company, and that the scheme of arrangement sanctioned by the Court on July 22, 1919, be carried into effect, and, accordingly, that the company be wound up. H. J. de C. Moore, liquidator, who is authorised to consent to the registration under the said scheme of a new company, to be named the Premier Oil Company, or some other similar name.

African Oilfields Syndicate, Ltd.—Meeting of creditors, 10, Coleman Street, E.C., September 15.

Bibi Eibat Oil Company, Ltd.—Resolved August 12, confirmed September 1: That it is desirable to wind up the company, and, accordingly, that the company be wound up. H. W. West, Worcester House, Walbrook, E.C., liquidator. Meeting of creditors at liquidator's, September 18.

European Oilfields Corporation, Ltd.—Resolved August 11, confirmed September 1: That it is desirable to wind up the company, and, accordingly, that the company be wound up. H. W. West, Worcester House, Walbrook, E.C., liquidator. Meeting of creditors at registered office, Worcester House, Walbrook, E.C., September 18.

San Salvador Spanish Iron Ore Company, Ltd., London, E.C.—Resolved August 8, confirmed August 29: That it is desirable to reconstruct the company, and, accordingly, that the company be wound up. E. Wakefield, 89, Bishopsgate, E.C., liquidator, who is authorised to consent to the registration of a new company, to be named the San Salvador Spanish Iron Ore Company (1919), Ltd.; and that the draft agreement submitted to this meeting and expressed to be made between this company and its liquidator is hereby approved, and that the liquidator is hereby authorised, pursuant to Section 192 of the Companies (Consolidation) Act, 1908, to carry the same into effect with such (if any) modifications as liquidator may think expedient.

NEW COMPANIES.

Scottish Oils, Ltd.—Public company. Capital £4,000,000., £1 shares. Objects: To acquire all or any of the ordinary shares of the Pumphreston Oil Company, Ltd., the Broxburn Oil Company, Ltd., the Oakbank Oil Company, Ltd., Young's Paraffin Light and Mineral Oil Company, Ltd., and James Ross and Company, Philpstown Oil Works, Ltd.; to acquire the goodwill, so far as they relate to Scotland, of the businesses of the British Petroleum Company, Ltd., and the Homelight Oil Company, Ltd., and certain of the assets in Scotland of the last-mentioned two companies; and to undertake all or any of the liabilities in connection with the businesses in Scotland, and generally to carry on the business of dealers in and producers, importers, exporters, miners, distillers, refiners, and distributors of petroleum and other mineral oils, oil shale, natural gas, asphalt, bitumen, naphtha, ozokerite and minerals, etc.. Solicitor: William Craig, 190, St. Vincent Street, Glasgow. No notice of situation of registered office was filed at the time of incorporation. The number of the Edinburgh file is 10,612.

Victoria Industrial Laboratory, Ltd.—Private company. Capital £1,000., £1. shares. Analytical, consulting, and manufacturing chemists, dealers in chemicals, drugs and apparatus, utilisers of waste, etc. Registered office: 36, High Street, Chorlton-on-Medlock, Manchester.

Henry Hematite Iron Ore Company, Ltd.—Private company. Capital £25,000., £1. shares. Miners, metallurgists, treaters of by-products, etc. Registered office: Old Bank Chambers, Pontypriid.

Apex Trinidad Oil Fields, Ltd.—Capital £200,000., £1. shares. Agreement with the Anglo-French Exploration Company, Ltd., and the British Borneo Petroleum Syndicate, Ltd. Solicitors: Holmes, Son and Pott, Capel House, E.C.

Spitzbergen Minerals, Ltd.—Capital £60,000., 5s. shares. Registered office: 4, Tokenhouse Buildings, E.C.

Domestic Science Wares, Ltd.—Private company. Capital £1,000., £1. shares. Object: To acquire the business carried on at 91, Duncan Street, Bradford, as "Galloway and Pullan," and to carry on the business of manufacturers of and dealers in soap, polish, paint, oil, varnish, inks, gums, etc.

Houghton, Winterbotham and Co., Ltd.—Private company. Capital £10,000., £1. shares. Coal merchants and exporters, colliery agents and proprietors, ironmasters, steel-makers and converters, manufacturers of and dealers in coal by-products, chemical manufacturers, etc. Registered office: 40, High Street, Tonbridge, Kent.

Pendleton Oil and Chemical Company, Ltd.—Private company. Capital £3,000., £1. shares. Registered office: 5, Lower Gold Street, Pendleton, Salford.

Peall, Roy and Co., Ltd.—Private company. Capital £20,000., £10. shares (500 preference). Object: To take over the business of gun merchants, washers, grinders, and cleaners now carried on by J. W. Roy at 5 and 6, Barb Court, St. Mary Axe, E.C., and Ashgrove Works, Middlesex, as "Peall, Roy and Co."

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

The specifications of the following applications are not printed by the Patent Office until the complete specifications have been accepted.

September 8th to 13th (inclusive).

- Filter-bag Cleaning-devices. Beth, W. F. L. 22,128.
Alloys of Copper. Boever, A. 22,296.
Catalysing-material. British Thomson-Houston Co. (General Electric Co.). 22,076.
Reducing Viscosity of Cellulosic Solutions. Carlsson, O.; and Thall, E. 22,187.
Cyanide Derivatives of Alpha-halogenated Acids. Carpmael, W. (Farbenfabriken vorm. F. Bayer and Co.). 22,467.
Production of Dialkylbromoacetylureas. Carpmael, W. (Farbenfabriken vorm. F. Bayer and Co.). 22,468.
Preventing Loss of Gas when Feeding Solids into Liquids for Generation of Gas. Chapman, P. L. 22,224.
Converting Blue Billy into High-grade Iron. Coles, S. O. Cowper. 22,598.
Complete Extraction of Naphthalene from Gas. Deguide, C.; and Marbais, D. 22,544.
Polymerised Compounds from Unsaturated Hydrocarbons. Dunham, H. V.; and Hall Motor Fuel Co. 22,095.
Recovering Ammonium-aluminium Sulphate from Aluminium-sulphate Solutions Containing Ferric Oxide. Gans, R. 22,079.
Manufacturing Soap. Gans, R. 22,080.
Treating Peat, Brown Coal, etc. Goskar, T. A.; and Thomas, G. E. 22,054.
Desulphurising Sulphur-bearing Hydrocarbons. Hall Motor Fuel, Ltd.; and McCrae, T. A. 22,094.
Apparatus for Drying Peat. Hamilton, R. 22,018.
Electrolytic Cells for Deposition of Metal from Solution. Harris, W. E.; Williams, T. M.; and Metals Extraction Corporation. 22,541.
Purification of Sulphur. Hood, J. J. 22,082.
Manufacture of Acetic Acid. Matheson, H. W. 22,166.
Apparatus for Froth-floatation Process. Minerals Separation, Ltd.; and Wood, L. A. 22,370.
Apparatus for Precipitation of Copper. Nicholson and Sons, J.; and Wyld, W. 22,134.
Electrodes for Electric Furnaces, etc. Norske Aktieselskab for Elektrokemisk Industri Norsk Industri-Hypotekbank. 22,068.
Measuring Predetermined Quantities of Liquids. Reinhard, R. 22,102.
Catalytic Processes for Preparing Acetic Acid from Acetylene. Soc. des Acières et Forges de Firminy. 22,462.
Removal of Free Fatty Acids, Deodorising and Refining Oils and Fats. Vakil, K. H. 22,159.
Purifying Beeswax. Willis, L. H. 22,455.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 6d. in stamps to the Comptroller, Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane, W.O.

1917.

- Alkali Percarbonates. Wade, H. (Deutsche Gold- and Silber-Scheideanstalt vorm. Roessler). 11,954. 131,930

1918.

- Recovery of Volatile Solvents Used in Manufacture. Biegeat, J. H. 5,240. 131,938
Oxidation of Ammonia. Partington, J. R.; and Rideal, E. K. 6,112. 131,942
Removal of Sodium Sulphate from Solution. Freeth, F. A.; and Cocksedge, H. E. 8,986. 131,956
Salts of Amido Organic Substances. Morris and Co., H. N.; and Morris, H. N. 9,257. 131,957
Production of Cyanides. Testrup, N.; and Techno-Chemical Laboratories. 10,931. 131,964
Sulphonic Acids. Gibbs, H. D.; Ambler, J. A.; and Selden Co. 11,196. 131,970
Aromatic Nitro-compounds. Gros et Bouchardy, F.; and Perruche, L. J. J. 12,454. 131,982
Treatment of Zinc Solutions Preparatory to the Recovery of Zinc by Electro-deposition. Electrolytic Zinc Co. of Australasia Proprietary. 13,368. 131,998
Smelting-furnace. Dehn, F. B. (National Lead Co.). 14,246. 132,023
Platinised Asbestos. Erabetti, G. 14,325. 132,051
Continuous Process for the Preparation of Monochloro-acetic Acid Starting from Trichlorethylene. Compagnie des Produits Chimiques d'Alais et de la Camargue. 14,513. 132,042
Washing Coal and Concentrating Ores. Chance, T.M. 14,645. 119,038
Apparatus for Enabling Extracts, Infusions, or Decoctions to be Obtained in a Continuous Manner. Kestner, P. 15,408. 132,075
Electric Resistance Furnaces for Heating Gases. Simon, J.; and Sarron, P. F. 15,542. 132,080
Apparatus for Catalytic Reactions. Calvert, G. 18,632. 132,120
Production of Alumina from Clay. Norske Aktieselskab for Elektrokemisk Industri Norsk Industri-Hypotekbank. 19,427. 122,623

1919

- Carbonaceous Materials Suitable for Use as Filtering-media. Wetter, J. (Weinrich, M.). 2,437. 132,164
Separation of Extracted Liquor and Remelted Syrup in Direct Remelting Centrifugal Machines. Lemoine, J. L. 12,344. 132,212
Insecticides. Speyer, E. R. 12,556. 132,214

COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

1919.

- Manufacture of Resin. Koppers Co. 15,680. 132,229
Electric Furnace. Piquerez, E. 18,004. 132,232
Substituting Halogens for the Amino Groups in Amines and Salts of Amino Acids. Chemische Fabrik Flora. 20,863. 132,245
Process of Evaporating Liquids. Krause, G. A. 21,553. 132,256
Flotation Separation of Mineral Substances. Palmer, T. H.; Seale, H. V.; and Nevette, R. D. 21,608. 132,260

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Azides. W. R. Hodgkinson, Woolwich. British Patent, 129,152, of 1918.

An insoluble azide is produced by diazotising a hydrazine salt in practically neutral solution and in presence of a salt, such as silver nitrate, adapted to produce the insoluble azide. The azide is then treated with a solution of a salt such as sodium chloride to obtain the desired azide and an insoluble silver salt. From the sodium azide, other azides, such as lead azide, may be obtained by double decomposition in the known manner.

Dyes. G. B. Ellis, London. (A communication from Chemical Works, formerly Sandoz, Basle, Switzerland.) British Patent, 129,182, of 1918.

Sulphuretted dyes are obtained by heating with alkali polysulphides mixtures of *p*-amino-*p*'-oxydiphenylamine or its homologues or derivatives or the corresponding indophenols with non-hydroxylated *p*-nitroamino benzene compounds. Examples are given of the preparation of dyes from mixtures of phenyl-*p*-amino-*p*'-oxydiphenylamine and *p*-nitraniline, *p*-oxy-*p*'-amino-*m*'-methyldiphenylamine and *p*-nitraniline, phenyl-*p*-amino-*p*'-oxy-*m*'-methyldiphenylamine and 2 : 6-dichloro-4-nitraniline, dimethyl-*p*-amino-*p*'-oxydiphenylamine and *p*-nitraniline; *m*-nitro-*o*-tolidine, *p*-nitrodiethylaniline, and *p*-nitraniline-*o*-sulphonic acid are also specified as parent nitroamines. The products dye cotton blue shades from alkali sulphide baths.

Recovering Volatile Solvents. R. A. Craig, Sir R. Robertson, J. I. O. Masson, and A. A. Drummond, Research Department, Royal Arsenal, Woolwich. British Patent, 129,024, of 1917.

To recover ether vapour from air which has been used in such operations as drying smokeless powders, the air is saturated with alcohol vapour, and the whole of the vapour condensed by bringing the air in contact with liquid alcohol. The vapour-laden air may be passed through a packed tower such as is described in Specification 25993/01, down which flows alcohol cooled to 0° C.: the remaining alcohol vapour may be condensed by cold water, acid, or brine in a second tower. A series of towers may be used, in which case the alcohol need not be cooled.

Thermo-aluminic Mixtures. C. Vautin and Thermalloy, Ltd., London. British Patent, 129,046, of 1918.

Thermo-aluminic mixtures are prepared in the form of a solid body containing free sulphur. A mixture may be made by heating sulphur to not more than 200° C. and stirring in a finely divided metal such as aluminium, or by heating a mixture of sulphur and metal until it becomes plastic, and casting the product. Instead of sulphur, there may be used a mixture of sulphur and a sulphide, preferably pyrites, which mixture has been heated until plastic, cooled, and powdered. Other mixtures consist of an ordinary aluminic mixture of aluminium and iron oxide, together with a mixture of aluminium and sulphur. In each case the aluminium may be pure, or with the usual zinc adulteration.

Nitric Acid and Ammonium Sulphate. A. T. Cocking and Kynoch, Ltd., Witton, Birmingham. British Patent, 129,305, of 1917.

Ammonium nitrate is heated under reduced pressure with excess of sulphuric acid, preferably waste nitration acid, to obtain nitric acid and ammonium sulphate. The latter remains as acid crystals or in solution in the excess of acid according to the quantity of acid employed. The process may be continuous. The excess of acid may be neutralised by ammonia if neutral sulphate is required; or, if a large excess of acid has been used, the solution may be used to treat phosphates for the production of fertilisers.

GLASGOW CORPORATION.—At a recent meeting of the Glasgow Corporation Gas Committee there was submitted correspondence which had taken place between the general manager and the United Alkali Company, Limited, regarding the Corporation's production of spent oxide and the proposed

erection by the department of a sulphuric acid plant, and requesting the Committee to receive a deputation of representatives from the Glasgow and District Sulphuric Acid Makers relative to this matter. It was agreed to receive such a deputation.

MARKET REPORTS.

FRENCH CHEMICAL MARKET. PARIS, Sept. 13.

Business has been quite active since the holidays in the middle of August and the demand in most chemicals is steady. The home industry is still hampered seriously on account of railways and port congestion, lack of coal, etc. The situation of labour has, however, improved to a great extent, and as soon as transport can be resumed on a normal scale industry will be busy and prosperous. In regard to transactions with England, the question of exchange is still all important, and it is most important for both sides to cope with the actual unfavourable situation, so as to render normal business possible. Market conditions have become more settled, as Government and private owned stocks are gradually diminishing, and war time industries are turning again towards normal purposes. Mineral acids are in good demand as previously. Sulphuric acid is freely to hand in as far as transport is possible, but hydrochloric acid is quite scarce. Available lots have been sold at high prices. Phosphoric acid is also scarce, whereas stocks of nitric acid are still extensive. Amongst organic acids, there has been a fair inquiry for oxalic, lactic, and formic acids. Alum is scarce and very firm, though import of Italian potash alum has largely supplied the lack of ammonia alum. Sulphate of alumina has met also with a good demand, and the previously existing stocks are now greatly reduced. Prices remain unchanged. Ammonia and its compounds (carbonate, muriate, and lump salarmoniac) are in fair request, prices are stiffening. Chloride of barium is rather dull, and further reductions in prices are anticipated. Natural carbonate of baryta is at a total standstill, as French sulphate of baryta is freely to hand. Nitrate of baryta is also very quiet, as well as most other barium and strontium salts. The previous large demand for borax and boric acid has somewhat slackened, and the abnormally high prices are likely to drop in the near future. Copper sulphate is active, with the start of the season, but until now prices kept at a low level—viz., 115 frs. per 100 kilos., c.i.f., Atlantic port, equal to £33. per ton. Bleaching powder remains scarce and very active at the unchanged prices of 50 frs. per 100 kilos., delivered free buyer's station, about equal to £12. per ton, c.i.f. Channel port, but rather important quantities have been imported from England and Belgium, even at higher figures. Chloride of calcium has been also imported from Belgium at exceptionally low prices, but business has remained quiet. The home production of precipitated carbonate of lime has been steadily increased and is now in a position to cope with the inland requirements; the price is to-day 75 frs. per 100 kilos., delivered Paris, equal to £17. per ton, c.i.f. channel port. Business has been normal in green copperas, which is valued at 17 frs. per 100 kilos., on rail works. Magnesia compounds (sulphate, carbonate, chloride) have been fairly active, the demand being very good in commercial epsom salts. Notwithstanding the scarcity, import from England has been checked on account of the high rate of exchange. Mercury is freely to hand, and stocks are large. Price is unchanged and remains at 23.50 frs. to 24 frs. per kilo, spot Paris. Phosphate of soda is quiet and the demand for phosphate of ammonia is weakening. White sugar of lead is also quiet at unchanged prices. Minium and litharge are in fair request and white lead is again in strong demand, at high prices. All potash salts are scarce and in great demand, mostly metabisulphite, chloride, carbonate, permanganate of potash, etc. The situation remains, however, as uncertain as before. Soda ash is freely to hand, whereas bicarbonate of soda is scarce. Some quantities have been imported from England, notwithstanding the high rate of exchange, but there is only demand for bicarbonate packed in kegs and no buyers are to be found for bags. Sulphur is again active at unchanged prices. Zinc compounds are somewhat firmer. Chloride has met with some request and sulphate of zinc has become rather scarce. Home manufacturers are very busy, as the actual rate of exchange does not allow free import from England.

TAR AND AMMONIA PRODUCTS.

WEDNESDAY.

Benzole: London 90%, 1s. 10d. to 2s.; North, 1s. 8d. to 1s. 9d.; 50%, 1s. 10d.; North, 1s. 8d. to 1s. 9d. naked. Carbolic acid, crude, 60%, East and West Coast, nominally 1s. 7d. to 1s. 8d.; crystals, 39-40%, 9d. to 9½d., f.o.b. Crude tar, London, 45s. to 50s.; Midlands, 44s. to 46s.; North, 45s. per ton, ex works. Pitch, 77s. 6d. to 80s.; East Coast, 67s. 6d. to 75s., f.o.b.; West Coast, 60s. to 65s., f.a.s. Solvent naphtha, naked, London, 90-190%, 2s. 5d.; North, 2s. 3d. to 2s. 4d.; 90-160%, naked, London, 2s. 5d.; North, 2s. 2d. to 2s. 3d. Crude naphtha naked, 30%, 9d.; North, 8d. to 8½d. Refined naphthaline, £16. to £18.; salts, £6. to £7. Toluol, naked, London, 2s. 6d.; North, 2s. 5d. Creosote, naked, London, 6½d.; North, 5½d. to 6d.; heavy oil, 6½d. Anthracene, 40-45%, 7d. per unit. Cresylic acid, 95%, 2s. 5d. to 2s. 6d.; 97-99%, 2s. 7d. to 2s. 8d., ex works, London, and f.o.b., other ports. Sulphate of ammonia; home trade, September, £19. 10s. per ton; October, £20. 10s. basis 24½%. Nitrate of soda, £22. to £22. 10s.

FERTILISER MATERIALS.

LIVERPOOL, THURSDAY.

Nitrate of soda is firmer, and to-day's quotation for 95-96% quality is £21. 2s. 6d. per ton, net cash, f.o.r. Liverpool, prompt delivery. East Indian bone meal: Owing to rise in the silver exchange with India, the value of this material has considerably advanced, and the quotation for October-December shipment is now £17. 10s. per ton, net cash, ex ship Liverpool, for 4½% ammonia and 52% phosphate of lime. On spot, Liverpool, holders ask £16. per ton, net cash, for 4½% and 45% quality. Mineral phosphates are without alteration, and values at present are only nominal. Dried blood is scarce, the value being about 30s. per unit of ammonia per ton.

LONDON METAL MARKET.

THURSDAY.

Copper: Standard brands, £101. to £101. 5s. cash; £101. 15s. to £102. three months; electrolytic, £110. to £123. Tin: Standard, £289. to £289. 10s. cash; £279. 5s. to £279s. 10s. three months; Straits, £289.; English, £284. Lead: Soft foreign, £25. 15s.; English, £26. 15s. Spelter, £41. 10s.; hard, £28. to £30. Antimony, English regulus, 90%, £45. Aluminium £150. Nickel £205. delivered, packages extra. Quicksilver £23. 10s. to £24. Bismuth 12s. 6d. Platinum 442s. per oz. Wolfram 32s. 6d. per unit.

MANCHESTER CHEMICAL MARKET.

THURSDAY.

There is considerable activity in almost all branches of the chemical trade, both for home and export, and values all round are steady. Quotations for caustic soda are unaltered at recent rates, and refined bicarbonate of soda is firm at £7. 10s., in bags; 58% alkali is easy at £6. 15s. per ton, ex store, for spot resale parcels. Bleaching powder dull and unchanged at £15. per ton, softwoods, f.o.r., and £14. for hardwoods, f.o.b. Chlorate of soda is in more request at 6½d. per lb. Potash slow at 1s. per lb. Makers' quotations for bichromates remain as for some time past. Roasted salt-cake firm at 60s. per ton, carriage paid. Recovered rock sulphur £17., in bulk, on rails. Sulphate of copper continues inactive, and quotations nominal for export at £42. f.o.b. Commercial hyposulphite of soda dull at £16. 10s. on rails. Phosphate of soda steady at £26. per ton. Concentrated sulphide of sodium, 60-65%, firmer at £20. per ton in casks. White powdered arsenic still in short supply, and £60. quoted for small spot lots. Yellow prussiate of potash steady at 1s. 9d. per lb.; imports are still prohibited. Soda scarce and dearer at 9d. per lb. Lead salts are in fair demand. English white acetate at £83. and brown £69. per ton. Nitrate slow of sale at £56. per ton. Acetic acid and acetate of soda are unchanged. Brown acetate of lime firm at £11. per ton; grey, £17. per ton; miscible wood naphtha, quiet at 10s. per gallon. Nitrate of soda is firm on the spot at £60. per ton. Green copperas is only moving off slowly, and price easy. Oxalic acid in moderate request at 1s. 2½d. per lb. delivered.

SWANSEA MARKET REPORT.

THURSDAY.

Timplate prices keep firm and are between 36s. and 37s. per standard box f.o.b. Copper transactions are not so brisk, and prices are somewhat irregular. Prompt delivery £100. 5s., and three months £100. 15s. Tin is selling more freely, with an upward tendency owing to reduction of stocks, at £285. 10s. per ton prompt and £280. at three months. Lead prices very steady, with fair sales at £25. 5s. per ton prompt for Spanish, with extra 10s. per ton at three months; English, £26. 10s. Spelter prices have hardened, spot being £40. 15s., and forward £41. 15s. Zinc sheets, English, £64. 5s. per ton; and American £65. f.o.b. at New York. Silver 61½d. per ounce. Aluminium £150. per ton. Antimony remains nominal, with English regulus 90% at £45. Nickel £205. with free delivery to London or equal. Quicksilver, £23. 12s. 6d. per bottle. Pitch remains scarce on strong demand, and prices have further advanced to 60s. per ton f.o.b. Arsenic quiet, with white powdered at £54. 10s. per ton in bags f.o.b. Oxalic acid in better demand at 1s. 2½d. per lb. Sulphate of copper quiet at £42. to £43. per ton in casks f.o.b. less 5 per cent. Sulphate of ammonia steady at £19. 10s. prompt and £20. 10s. forward. Nitrate of soda quiet and steady at 21s. 6d. per cwt. in bags. Turpentine 129s. per cwt. Green copperas quiet, and price further reduced to £3. 17s. 6d. per ton.

LIVERPOOL CHEMICAL MARKET.

THURSDAY.

The demand for the heavier chemicals has been well maintained, and a very fair inquiry for some of the lighter products has been experienced. Inquiries from abroad have come in more freely, and have been taken as indicating a more settled state of things. Bleaching powder has been in moderate request and is now readily obtainable. The price is higher. It is £17. per ton, free on rail or conveyance, in buyers' packages. Chloride of calcium has again met with a fair inquiry, and is £8. to £11. per ton, in casks, f.o.r. Caustic soda has been well inquired for, on export and on home trade accounts. Values are: £24. per ton for 76%; £22. per ton for 70 to 72%; and £19. per ton for 60 to 62%. Nitrate of soda has been quiet, and the price is somewhat lower. It may be given as £20. 10s. to £21. 10s. per ton. Saltcake has been in good request, and is £6. 10s. per ton, in casks, f.o.b. Soda crystals have been more inquired for, and are £5. 10s. per ton, in 2cwt. bags, f.o.r. at works. Bicarbonate of soda has been steadily called for, and is £7. 5s. to £10. per ton, according to terms of delivery. Borax has been in rather active inquiry, and English is still scarce. American has been offered, but the prices quoted for it have been too high to induce much buying. Prices of English are: ordinary, £42. per ton; powdered, £44 per ton, in bags. Ammonia alkali has sold freely, and is £6. to £6. 5s. per ton, f.o.r., at works. Hyposulphite has been more inquired for, and is £17. per ton for ordinary, and £22. per ton for pea crystals, in 1cwt. kegs. Sulphite of sodium has been in limited demand, and is £10. per ton for ordinary, and £16. to £18. per ton for pea crystals, in 1cwt. kegs. Bichromate of soda has had a quietly steady sale, and is 9d. per lb. Phosphate of soda has been but little called for, and is £25. per ton. Sulphide of sodium has been quiet, and is £20. per ton in casks, and £22. per ton in drums. Chlorate of potash has been more in demand, and is 1s. to 1s. 2d. per lb. Permanganate of potash has had a quietly steady sale, and is 3s. 3d. to 3s. 6d. per lb. Sulphate of potash has been very quiet, and is £40. per ton. Carbonate of potash has been in fair demand, and is £90. to £95. per ton for 80 to 85%. Caustic potash has been in good request, and is £110. to £120. per ton. Nitrate of potash has been more inquired for, and is £55. to £60. per ton for refined, and £40. per ton for ordinary. Canadian potashes have been inactive. Montreal first quality are £210. to £220. per ton, and second quality, £190. to £210. per ton. Bichromate of potash has been in fair request, and is 1s. 6d. to 1s. 7d. per lb. Yellow prussiate of potash has been rather more inquired for, and is 1s. 9d. to 1s. 10d. per lb. Salammuniac has been in quietly steady demand, and is £80. per ton for lump, £75. per ton for seconds, and £5. per ton extra for ground. Sulphate of ammonia has been quiet, and is £19. 10s. per ton for September; £20. 10s. for October; £20. 15s. for November; £21. for December; £21. 7s. 6d. for January, 1920; £21. 15s. for February; and £22. per ton for March to May, 1920. Carbonate of ammonia has been rather more in request, and is 6½d. per lb. Muriate has been but little called for, and is £45. to £50. per ton, according to quality. Magnesia has

been in fair request. Carbonate is cheaper. The price may be given as £2. 10s. per cwt. Sulphate is £10. to £16. per ton, according to grade. Alum has been much inquired for, and is still scarce. It is £18. 10s. per ton for the home trade, and £18. 10s. to £19. 10s. per ton for export. Aluminoferric has been but little in request, and is £8. 10s. to £12. per ton, according to quality. Sulphate of alumina has been in quietly steady demand, and is £12. to £17. per ton according to grade. Sulphur has been well inquired for, and flowers are still in light supply. English kinds are: Flowers, £32. per ton; roll, £28. per ton; and rock, £22. per ton, in bags, f.o.r. Sicilian grades are: flowers, £28. per ton; roll, £22. 10s. per ton; and rock, £17. 15s. per ton. Cream of tartar has been in very fair request, and is £11. 10s. to £11. 15s. per cwt. Tartaric acid has been rather more in demand, and is 3s. 2d. to 3s. 3d. per lb. Boracic acid has been more in request, and is £72. per ton for crystals and £74. per ton for powdered. Oxalic acid has been in fair demand, and is 1s. 2d. to 1s. 3d. per lb., according to time of delivery. Citric acid has been in quietly steady request, and is 4s. 4d. per lb. White acetate of lead has been in moderate inquiry, and is £83. to £85. per ton. Arsenic has been very quiet, and the price has been irregular. It may be given as £58. to £60. per ton for white powdered. Sulphate of copper has been in moderate demand. The price is: £40. to £41. per ton for use in the United Kingdom.

TYNE CHEMICAL REPORT.

TUESDAY.

The demand for chemicals continues active for both home and export, both caustic soda and bleaching powder being in strong request. Sulphur is very scarce and firm at £23. per ton. The following prices are per ton net: bleaching powder, softs and hards, £17. per ton net; caustic soda 74/77%, £23. 5s.; do., 70%, £22.; do., 60%, £20.; recovered sulphur, 2cwt. bags, £23.; hyposulphite of soda 5/7cwt. casks, £19.; do., 1cwt. kegs, £25.; sulphite of soda, 5/7cwt. casks, £12.; do., 1cwt. kegs, £20.; silicate of soda, 75° Tw., £9. 12s. 6d.; do., 100° Tw., £10.; do., 140° Tw., £10. 10s.; soda crystals, 2cwt. bags, £5. 10s.; sulphate of soda (salt-cake), in bulk, £4.; pure white sulphate of alumina, £19. 10s.; blanc fixe, £22.; sulphide of sodium, crystals, £18.; do., refined concentrated solid, 60-62%, £25.; hydrate of barium, crystals, £56.

COALS.—Market is very firm and it is almost impossible to satisfy demands. The general output throughout both Northumberland and Durham is stated to be on an increasing scale, but is still far below current needs. Nominally prices are as under: best Northumbrian steam, 95s. to 100s. per ton; second qualities, 90s. to 95s.; Northumberland small coals, 75s. to 80s., seconds, 70s. to 75s.; best Durham gas coals, 80s. to 85s., seconds, 70s. to 75s. 6d.; Durham bunker coals, 70s. to 80s., seconds, 60s. to 70s.; foundry coke, 95s. to 100s.; gas coke, 95s. to 100s., f.o.b. Tyne or Dunston.

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Wednesday.

During the past week there has been a good amount of business passing among all classes of chemicals, and the tone of the market has been conspicuously brisk. Some big deals in different lines are reported, and, plus the numerous smaller transactions which are being put through, the market in this district may be said to be fairly active. There are no particular variations in prices worth recording, and the latest range of quotations may be said to be as follows. Arsenic, £56. per ton, net, Glasgow; bicarbonate of soda, £8. 15s. and £10. per ton, for 6-8 casks and 1cwt. kegs, Liverpool; boracic acid crystals, English refined, £72. for 2cwt. bags, and borax crystals, £39. for 2cwt. bags, carriage paid; caustic soda, white, 70-72%, £24. per ton, net, Glasgow; chlorate of potash, 1s. 1d. per lb., net, Glasgow; chlorate of soda, £3. 4s. per cwt. net, Glasgow; citric acid, 4s. 4d. per lb. 5% Glasgow; cream of tartar 98% £11. 5s. per cwt., net, Glasgow; paraffin wax U.K. deliveries 125°, 6½d. to 6½d.; 121-30°, 5½d. to 5½d.; 118-20°, 5½d.; 110-120°, 4d. to 4½d.; and 98-102°, 4d. to 4½d.; salammuniac, £80. and £75. per ton, net, any port, for first and second lump respectively; salammuniac crystals, £85. per ton, net, Glasgow; saltpetre, £3. 4s. net, Glasgow; tartaric acid, 3s. 1d. per lb., 5% Glasgow.

Among the sea oils there is also good inquiry for anything available, and as far as whale oils are concerned purchasers have been having the opportunity of getting three varieties.

Brown and black have both retained their quotations of 76s. and 74s.; pale, however, has eased in value from 102s. to 97s., at which it is still selling; but, as has been the case for the past few weeks, yellow has been off the market. Newfoundland cod is in good inquiry at its old figure of 79s., and the same comment is applicable to both pale seal at 96s. and Menhaden at 86s.

There is nothing new reportable as far as the coal trade is concerned, and the old comment still holds good that all classes of fuel are in fairly strong demand. Inquiries from works continue to be fairly heavy, and there is not so much doing as far as the domestic side is concerned. From the export standpoint, business is quiet, and most of the available output continues to be monopolised for home purposes.

IMPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

BRISTOL.

Publication of Official Returns Suspended.

GLASGOW.

Week ending September 13.

BARIUM SULPHATE—
Antwerp, 20 t.

BARYTES—
New Orleans, 400 brls.

BORATE—
New Orleans, 5,279 sks.

CARBON BLACK—
New Orleans, 228 cs.

DYESTUFFS—
Tanning Extract
New York, 67 brls.

FISH OIL—
New York, 1,550 brls.

LITHOPONE—
Baltimore, 100 brls.

OCHRE—
Newport News, 518 brls.

PARAFFIN WAX—
New York, 1,165 brls.

ROSIN—
Bordeaux, 1,006 cks.; New Orleans, 1,104 brls.

SOAP—
New Orleans, 77 brls.

TAR (PINE)—
New Orleans, 200 brls.

TARTAR—
Bordeaux, 60 cs.

GOOLE.

Week ending September 13.

CHEMICALS (otherwise undescribed)
Boulogne, 10 cks.

GLUE—
Antwerp, 40 bgs.

GRANGEMOUTH.

Week ending September 13.

NIL.

GRIMSBY.

Week ending September 13.

NIL.

HULL.

Week ending September 13.

ACETIC ACID—
New York, 217 brls.

CARBON BLACK—
New York, 1,206 cs.

COPPER SULPHATE—
Rotterdam, 51 brls.

FORMALDEHYDE—
New York, 84 brls.

LITHOPONE—
New York, 20 brls.; Rotterdam, 80 cks.

ROSIN—
Bilbao, 120 brls.; New York, 1 brl.

LEITH.

Week ending September 13.

COPPER SULPHATE—
Rotterdam, 11 t. 4 c., £520.

OXALIC ACID—
Rotterdam, 1 t. 19 c., £132.

SODA—
Helgenas, 271 t. 6 c., £6,368.;
Vestervick, 471 t. 4 c., £10,837.

ZINC OXIDE—
Rotterdam, 4 t. 4 c., £209.

LIVERPOOL.

Week ending September 13.

ACID—
Montreal, 730 brls.

BARIUM SULPHATE—
Cadiz, 1,000 sks.

BARYTES—
Baltimore, 210 brls.; Philadelphia, 430 brls.; Stavanger, 500 bgs.

BORIC ACID—
Marseilles, 100 bgs.

CARBON BLACK—
New York, 45 cs.; Savannah, 378 cs.

CREAM OF TARTAR—
New York, 10 kgs.

DEXTRENE—
New York, 1,264 bgs.

DYESTUFFS—
Bark Extract
Philadelphia, 1,626 brls.

Chestnut Extract
Marseilles, 971 brls.
Logwood Extract
New York, 200 brls.; Philadelphia, 450 bxs.

Sumac
Marseilles, 600 bgs.
Tanning Extract
Baltimore, 1,664 brls.; New York, 1,080 brls.; Newport News, 695 bgs.; Philadelphia, 867 brls.

Tartar
Marseilles, 42 cks.

FERRO VANADIUM—
New York, 100 kgs.

HEMATINE CRYSTALS—
New York, 40 brls.

IRON OXIDE—
Stavanger, 86 brls.

LITHOPONE—
Philadelphia, 276 brls.

MANGANESE ORE—
Calcutta, 1,000 t.

MINERAL WHITE—
Marseilles, 600 bgs.; Stavanger, 600 bgs.

PARAFFIN WAX—
Amsterdam, 800 bgs.; Baltimore, 480 brls.; New York, 200 brls.; Philadelphia, 150 brls.

ROSIN—
Mobile, 1,000 brls.; New Orleans, 7,955 brls.; Savannah, 3,300 brls.

SOAP—
Marseilles, 340 cs.; Newport News, 1,500 brls.; Philadelphia, 815 brls.; Stavanger, 300 cs.; Victoria, B.C., 12 cs.

STEARIC ACID—
New York, 168 bgs.

SULPHUR—
Marseilles, 454 bgs.

TALLOW—
New York, 350 brls.

TAR—
New Orleans, 250 brls.; Stavanger, 250 brls.

TARTARIC ACID—
Marseilles, 40 brls.

TURPENTINE—
Mobile, 1,000 brls.; New Orleans, 700 brls.

WAX—
New York, 216 bgs.; Philadelphia, 274 brls.

ZINC WHITE—
Antwerp, 100 brls.

LONDON.

Week ending September 13.

ALUMINA SULPHATE—
Switzerland, £142.

AMIDOPYRINE—
Switzerland, £225.

AMYL SALICYLATE—
Holland, £75.

ANTIMONY (CRUDE)—
China, 5 t.

ANTIPYRINE—
Switzerland, £140.

BARIUM CARBONATE—
U.S.A., £532.

BARYTES—
Spain, 3,600 bgs.

BEE'S WAX—
Cape, 107 pkgs., 100 bgs.; Anglo-Egypt Soudan, 102 pkgs.; Canada, 3 cs.; Morocco, 20 cs.; Nyasaland, 160 pkgs.; Portugal, 305 brls., 166 pkgs.

BENZYL ALCOHOL—
France, £30.

BORATE—
U.S.A., £10,920.

BORIC ACID—
Italy, £7,340.

CAMPHOR—
China, 325 cs.

CARBON BLACK—
U.S.A., 32 cs.

CARNAUBA WAX—
Argentine Republic, 1 bg.; U.S.A., 103 bgs.

CHEMICALS (otherwise undescribed)
U.S.A., £15.

CHLOROPHYLL—
Switzerland, £280.

CITRATE OF LIME—
British Guiana, 27 pkgs.

COAL PRODUCTS—
Creosote
Canada, £332.

DYESTUFFS—
Aniline Dye
Alsace, 4 pkgs.; Switzerland, 576 pkgs.; U.S.A., 86 pkgs.
Annatto
Switzerland, 537 pkgs.

Argols
Algeria, 258 pkgs.; Cape, 51 pkgs.; Italy, 61 pkgs.; Spain, 51 pkgs.

Cutch
India, 854 pkgs.

DYESTUFFS (otherwise undescribed)
Dye Extract
Switzerland, 1 pkg.; U.S.A., 2 t.

Gambier
Straits, 2,134 pkgs.

Gamboge
Siam, 11 cs.

Myrabolans
India, 616 brls., 1,816 pkgs.

Saffron
E. Turkey, 1 pkg.

Sumac
Italy, 56 pkgs.; Switzerland, 31 pkgs.

COAL PRODUCTS—

Tanner's Bark

Natal, 311 t.

Turmeric

India, 478 pkgs.

Valonia

Asiatic Turkey, 51 t.

FISH OIL—

Azores, 56 brls.; B.W.I., 7 cks.;

Japan, 1,455 cs.; Portugal, 146

pkgs.

GELATINE—

Belgium, £2,010.; France, £400.;

U.S.A., £225.

GLUE—

Belgium, £7,960.; France, £1,304.;

Sweden, £140.; U.S.A., £481.

GLUE STOCK—

Asiatic Turkey, 15 t.

HENAMINE—

U.S.A., £515.

JAPANESE WAX—

France, 200 cs.

KEISELGUHR—

Spain, £160.

LACTIC ACID—

Canada, £135.

LITHOPONE—

Spain, 50 brls.; U.S.A., 250 brls.

MANGANESE ORE—

British India, 1,280 t.; Japan, 5 t.

OCHRE—

Spain, 190 cks.

PARAFFIN SCALE—

U.S.A., 898 t. 19 c.

PARAFFIN WAX—

Holland, 115 t. 2 c.; Indian

Seas, 227 t. 5 c.; U.S.A., 278 t.

4 c.

PHENOLPHTHALEIN—

U.S.A., £395.

PITCH—

U.S.A., 712 bgs.

PLUMBAGO—

Japan, 120 cks.; U.S.A., 134

brls.

POTASSIUM BROMIDE—

France, £300.

POTASSIUM IODIDE—

Japan, 20 cs.

PYRAMIDEN—

Switzerland, £700.

QUININE ETHOL CARBONATE—

Switzerland, £840.

RESORCIN—

France, £50.

ROSIN—

Sweden, 6 brls.; U.S.A., 4,350

brls.

SILVER NUCLEINATE—

Switzerland, £173.

SOAP—

Belgium, £1,101.; Spain, £5,285.;

U.S.A., £14,934.

SODIUM CACODYLATE—

Sweden, £40.

STEARINE—

Argentine Republic, 158 bgs.;

120 brls.; Brazil, 10 cks.

TALLOW—

Brazil, 186 t. 15 c.; Argentine

Republic, 50 t. 1 c.; China, 399 t.

10 c.; N.S.W., 114 t.; N.Z.,

364 t. 11 c.; South Australia,

266 t. 13 c.; Victoria, 8 t.

TANNIC ACID—

Canada, £11.; Switzerland, £49.

TANNIC ACID—
U.S.A., £314.

TARTARIC ACID—
Italy, 212 pkgs.

TURPENTINE—
Belgium, 300 brls.

VEGETABLE WAX—
U.S.A., 760 bxs.

WAX—
British India, 30 cs.; Morocco, 20 bgs.

WHITE LEAD—
Belgium, 77 cks.

WOOD OIL—
China, £1,365.; Hong Kong, £3,450.

ZINC OXIDE—
U.S.A., 200 brls.

MANCHESTER.

Week ending September 13.

CAUSTIC SODA—
Montreal, 318 drms.

CITRIC ACID—
Palermo, 10 cks.

DYESTUFFS (otherwise undescribed)
New York, 2 cs. (pt.).

DYESTUFFS—
Sumac
Palermo, 400 bgs.

GALLIC ACID—
Montreal, 11 brls.

PARAFFIN SCALE—
New York, 1,400 brls.

PARAFFIN WAX—
New York, 280 brls.

PHOSPHORUS—
Montreal, 850 cs.

SOAP—
Alexandria, 417 cs.

SULPHUR OIL—
Palermo, 100 brls.

TANNIC ACID—
Montreal, 30 brls.

TARTARIC ACID—
Venice, 148 brls.

WAX—
New York, 200 brls.

MIDDLESBROUGH

Week ending September 13.

NIL.

NEWCASTLE-ON-TYNE

Week ending September 13.

NIL.

N. & S. SHIELDS.

Week ending September 13.

NIL.

STOCKTON-ON-TEES.

Week ending September 13.

NIL.

SWANSEA.

Week ending September 13.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

BRISTOL.

Publication of Official Returns Suspended.

GLASGOW.

Week ending September 13.

AMMONIUM SULPHATE—
Rouen, 2 t. 2 c.; Trinidad, 3 t.

BLEACHING POWDER—
Lisbon, 4 t. 13 c.

CARBON (RETORT)—
Barcelona, 41 t. 7 c.

CHEMICALS (otherwise undescribed)
Antwerp, 7 t. 8 c.; Bombay, 1 t. 10 c.; Calcutta, 2 t. 18 c.; Cape Town, 2 cs.; Gothenburg, 3 t.; Lisbon, 3 t. 1 c.; Montreal, 6 t.; Rouen, 1 t.; Valencia, 10 t.

COAL PRODUCTS (otherwise undescribed)
Cape Town, 698 brls.; Kilindini, 37 brls.; New York, 1,055 brls.

DEXTRINE—
Rouen, 5 t.

DISINFECTANTS (otherwise undescribed)
Lisbon, 1 t. 16 c.

DYESTUFFS (otherwise undescribed)
Antwerp, 9 t.

GLUE—
Montreal, 2 c.

MAGNESIUM SULPHATE—
Rouen, 40 t.

PARAFFIN SCALE—
Rouen, 9 t. 17 c.

PARAFFIN WAX—
Barcelona, 5 t.

POTASSIUM BICHROMATE—
Gothenburg, 8 c.

RED LEAD—
Bombay, 5 t.; Lisbon, 5 t.

ROSIN—
Kilindini, 1 t. 1 c.

SHEEP DIP—
Buenos Ayres, 70 t. 7 c.; East London, 6 t. 14 c.; Kilindini, 9 t. 8 c.

SOAP—
Cape Town, 4 bxs.; Antwerp, 300 bxs.; Kilindini, 52 bxs.; Montreal, 7 bxs.

SODA ASH—
Lisbon, 5 t.

SODIUM BICHROMATE—
Barcelona, 5 t. 4 c.; Pt. Elizabeth, 1 t. 19 c.; Rouen, 29 t. 19 c.

STEARINE—
Demerara, 2 t.

TALLOW—
Demerara, 4 c.; Trinidad, 6 c.

WAX—
Pt. Sudan, 6 c.

GOOLE.

Week ending September 13.

NIL.

GRANGEMOUTH.

Week ending September 13.

ALUM—
Christiania, 2 t. 3 c.

AMMONIUM CARBONATE—
Bergen and Stavanger, 5 t.; Stockholm, 10 kgs., 36 cks.

BORAX—
Stockholm, 3 t.

BORIC ACID—
Stockholm, 3 t. 6 c.

COAL PRODUCTS (otherwise undescribed)
Bergen and Stavanger, 20 brls.

CREAM OF TARTAR—
Bergen and Stavanger, 20 kgs.

PARAFFIN WAX—
Christiania, 10 t.; Stockholm, 8 c.

PHOSPHORIC ACID—
Christiania, 1 t. 6 c.

RED LEAD—
Bergen and Stavanger, 2 t.

ROSIN OIL—
Stockholm, 10 c.

TAR—
Christiania, 1,601 galls.

GRIMSBY.

Week ending September 13.

NIL.

HULL.

Week ending September 13.

AMMONIUM CARBONATE—
Marseilles, 20 cks.

AMMONIUM SULPHATE—
Palermo, 400 bgs.

BORAX—
Rotterdam, 50 sks.

CAUSTIC SODA—
Hango, 5 cks.

CHEMICALS (otherwise undescribed)
Abo, 100 cks., 90 bgs., 400 drms.; Batavia, 6 cks.; Constantinople, 1 chst.; Gothenburg, 10 cks.; Genoa, 49 bgs., 13 cks., 12 cs.; Marseilles, 90 bgs., 71 brls.; Rotterdam, 46 cks.

CHLOROFORM—
Genoa, 3 cs.

COAL PRODUCTS—
Pitch

Antwerp, 385 t.

DYESTUFFS (otherwise undescribed)
Calais, 2 drms., 3 cks.; Genoa, 10 kgs., 5 drms., 17 cks.

PARAFFIN WAX—
Marseilles, 70 bgs.

SOAP—
Constantinople, 5 brls.

SODA—
Calais, 96 c., 4 cks.

ZINC MURIATE—
Amsterdam, 40 brls.

LEITH.

Week ending September 13.

BORAX—
Rotterdam, 19 t. 2 c., £40.

BORIC ACID—
Rotterdam, 29 t. 2 c., £110.

CRESYLIC ACID—
New York, 9 t. 1 c., £250.

POTASSIUM BICHROMATE—
Rotterdam, 8 t., £63.

LIVERPOOL.

Week ending September 10.

ACETIC ACID—
Corinto, 2 c., £15.

ALUM—
Bombay, 1 t., £21.; Buenos Ayres, 6 t., £200.; Rangoon, 5 t., £75.; Salonica, 10 c., £720.; Samarang, 17 t. 16 c., £327.

ALUM (AMMONIA)—
Puerto Barrios, 2 c., £10.

ALUM (GROUND)—
Boston, 300 cks.

AMMONIA—
Buenos Ayres, 5 c., £45.; Medellin, 1 c., £4.; Monte Video, 17 c., £138.; Puerto Barrios, 1 c., £6.; Salvador, 1 c., £12.

AMMONIUM CARBONATE—
Buenos Ayres, 3 t. 19 c., £240.; Corinto, 1 c., £8.; Guayaquil, 5 c., £35.; Hong Kong, 2 t. 10 c., £80.; Karachi, £5.; Kobe, 10 t., £610.; Maceio, 7 c., £38.; Marseilles, 1 t. 19 c., £79.; Medellin, 1 c., £7.; Nantes, 10 c., £35.; Norrkopping, 1 t., £63.; Pernambuco, 18 c., £78.; Yokohama, 5 t. 18 c., £366.

AMMONIUM CHLORIDE—
Auckland, 10 c., £33.; Barcelona, 4 c., £7.

AMMONIUM MURIATE—
Barcelona, 18 c., £53.; Bombay, 2 t. 11 c., £139.; Lisbon, 3 t. 18 c., £222.; Marseilles, 18 c., £51.; Montreal, 5 t. 5 c., £230.; New York, 50 t. 1 c., £2,429.; Philadelphia, 50 t. 1 c., £2,273.; Stockholm, 12 c., £35.

ANTIMONY—
Bilbao, 5 t.

ANTIMONY SULPHIDE—
Barcelona, 6 c., £49.; Bordeaux, 2 t., £260.; Havre, 2 c., £12.; Yokohama, 1 t., £130.

ARSENIC—
Karachi, 3 t., £129.

BARIUM CHLORIDE—
Barcelona, 10 t., £240.

BLEACHING POWDER—
Barcelona, 14 t. 11 c., £228.; Bombay, 22 t. 19 c., £356.

BLEACHING POWDER—
Brisbane, 1 t., £18.; Christiania, 50 t. 10 c., £600.; Shanghai, 102 t., £1,698.; Smyrna, 3 t. 4 c., £64.; Valencia, 25 t. 16 c., £379.; Vera Cruz, 30 t., £480.

BORAX—
Antwerp, 8 t., £140.; Christiania, 4 t. 10 c., £179.; Havre, 20 t., £885.; Puerto Barrios, 1 c., £3.; Smyrna, 1 t., £40.

BORIC ACID—
Brisbane, 15 c., £54.; Calcutta, 1 c., £6.

CALCIUM CARBIDE—
Burutu, 5 c., £11.; Oran, 1 c., £3.

CALCIUM CARBONATE—
Barcelona, 8 c., £12.

CALCIUM CHLORATE—
Bombay, 62 drms.; Buenos Ayres, 60 drms.

CALCIUM CHLORIDE—
Buenos Ayres, 26 t. 5 c., £180.; Barcelona, 7 t. 8 c., £59.; Bilbao, 11 t. 19 c., £99.; Cartagena, 2 t. 12 c., £22.; Malta, 1 t. 1 c., £7.; Perth, 8 t. 9 c., £63.; Port Said, 5 t. 1 c., £38.; Popoff, 6 t. 3 c., £70.; Sydney, 5 t., £37.

CARBON DIOXIDE—
Port Said, 10 c., £176.

CARBONATE OF LIME—
Bilbao, 10 c., £3.; Boston, 9 t., £153.

CAUSTIC SODA—
Batavia, 50 drms.; Bombay, 491 drms.; Buenos Ayres, 105 drms.; Cheribon, 30 drms.; Constantinople, 1,317 drms.; Fremantle, 42 pkgs.; Karachi, 210 drms.; Kobe, 174 drms.; Larnaca, 30 pkgs.; Lisbon, 293 pkgs.; Padang, 6 pkgs.; Perth, 10 pkgs.; Secondee, 1 drn.; Smyrna, 17 drms.; Sourabaya, 50 drms.

CHEMICALS (otherwise undescribed)
Antwerp, 29 t., £1,262.; Brisbane, 5 c., £10.; Malmo, 1 t., £75.; Maranham, 2 c., £5.

CITRIC ACID—
Gothenburg, 2 c., £40.; La Guaira, 1 c., £24.

COAL PRODUCTS

Aniline Dye
Alexandria, 23 t. 4 c., £93.; Antwerp, 2 t., £448.; Barcelona, 4 c., £28.; Christiania, 19 c., £145.; Constantinople, 14 c., £110.; Lagos, 40 lbs., £38.; Lisbon, 1 c., £26.; Madras, 1 t. 10 c., £305.; Montreal, 15 c., £287.; Naarden, 1 c., £10.; Naples, 2 c., £36.; Santos, 36 lbs., £17.; Shanghai, 4 t. 16 c., £2,205.; St. Johns, 30 lbs., £15.

Carbolic Acid
Kobe, 15 t., £1,031.; Kobe, 5 t., £256.; Montreal, 2 t., £131.; Ostroff, 1 t. 19 c., £185.; Puerto Barrios, 1 c., £11.

COAL PRODUCTS—

Creosote
Kobe, 4 c., £15.
Creosote Salts
Rangoon, 10 c., £10.
Cresylic Acid
San Francisco, 13 t. 4 c., £365.
Dyes
Alexandria, 5 t. 1 c., £1,620.;
Genoa, 14 t. 15 c., £7,372.
Naphthalene
Puerto Barrios, 2 c., £11.;
Sierra Leone, 1 c., £3.
Tar
Bolama, 16 c., £8.; Bissau, 15
c., £7.; Burutu, 1 t. 4 c., £10.;
Colon, 5 c., £7.; Koko, 4 c., £3.;
Lagos, 5 t., £47.; Lisbon, 1,966
galls., £107.; Lome, 10 t., £50.;
Pt. Harcourt, 10 c., £10.;
Singapore, 31 t. 17 c., £336.

COPPER SULPHATE—

Monte Video, 6 t., £267.;
Nairobi, 5 ci, £13.; Secondee,
2 qrs., £5.

CREAM OF TARTAR—

Christiania, 15 c., £125.; Gothen-
burg, 5 c., £60.; Manta, £6.;
Puerto Barrios, 5 c., £65.;
Stockholm, 1 t., £272.; St.
Johns, 1 t., £272.

DISINFECTANTS (otherwise undcs.)

Barcelona, 4 c., £7.; Burutu,
1 c., £3.; Buluwayo, 3 c., £8.;
Buenos Ayres, 9 t. 14 c., £150.;
Corinto, 2 c., £7.; Havre, 18 c.,
£163.; Hsin Ho Wharf, 3 t. 14
c., £183.; Madras, 9 t. 2 c.,
£150.; Lagos, 13 c., £49.; Mel-
bourne, 5 t., £275.; Monte Video,
2 c., £10.; Nsawari, 11 c., £35.;
Pt. of Spain, 3 c., £12.; Sapele,
5 c., £15.; Sierra Leone, 1 c.,
£2.; St. Johns, 1 c., £4.; Trini-
dad, 1 c., £2.; Tientsin, 5 t. 19
c., £295.; Wellington, 4 t., £93.

DYESTUFFS (otherwise undescribed)

Petras, 4 c., £99.

FERRO MANGANESE—

New Orleans, 50 t.

GLUE, SIZE, AND GELATINE—

Durban, 2 pkgs.; Karachi, 20
pkgs.

LEAD CARBONATE—

Puerto Barrios, 3 c., £16.

MAGNESIA (CALCINED)—

Salvador, 1 c., £8.

MAGNESIUM CARBONATE—

Brisbane, 2 c., £14.

MAGNESIUM CHLORIDE—

Bombay, 9 t. 5 c., £159.; Ferrol,
10 t. 17 c., £177.

MAGNESIUM SULPHATE—

Addah, 5 c., £12.; Calcutta, 2 c.,
£3.; Christiania, 2 c., £4.;
Mantos, 1 c., £2.; Manas, 2 c.,
£2.; Monte Video, 5 c., £5.;
Puerto Barrios, 1 c., £1.

MAGNESITE—

Barcelona, 1 t. 13 c., £89.

MANGANESE PEROXIDE—

Syra, 1 t., £45.

MANGANESE SULPHATE—

New York, 5 t. 2 c., £260.

MURIATIC ACID—

Rotterdam, 19 c., £36.

NICKEL SULPHATE—

Antwerp, 40 t., £2,600.; Bar-
celona, 13 c., £41.; Bombay,
3 t. 10 c., £168.

OXALIC ACID—

Havre, 1 c., £10.; Hong Kong,
2 c., £14.

PHOSPHORIC ACID—

Brisbane, 1 c., £6.; Toronto,
10 c., £80.

PITCH—

Barcelona, 19 c., £32.; Sapele,
2 c., £1.

PITCH (STOCKHOLM)—

Acajutla, 10 c., £7.

POTASSIUM BICARBONATE—

Funchal, 1 c., £11.

POTASSIUM BICHRONATE—

Barcelona, 2 t., £317.; Dantzig,
5 t. 6 c., £842.; Havre, 4 c.,
£40.; Nantes, 1 t., £159.;
Smyrna, 1 t. 19 c., £312.

POTASSIUM CYANIDE—

Medellin, 3 c., £34.

POTASSIUM NITRATE—

Buenaventura, 1 c., £9.; Car-
tagena, 4 c., £19.

POTASSIUM PRUSSATE—

Barcelona, 7 c., £70.; Calcutta,
11 c., £20.

SALAMMONIAC—

Buenos Ayres, 2 t., £150.;
Monte Video, 9 c., £39.; Mon-
treuil, 1 t. 5 c., £90.; Rangoon,
3 t., £212.; Sydney, 5 c., £16.;
—Smyrna, 4 t. 1 c., £296.

SALT—

Sapele, 35 t.

SALTCAKE—

Opobo, 3 pkgs.

SALTPETRE—

Bogota, 10 c., £33.; Funchal,
6 c., £17.; Lagos, 5 c., £24.;
Puerto Barrios, 1 c., £4.

SHEEP DIP—

Bahia, 8 c., £43.; Bogota, 3 t.
10 c., £196.; Buenos Ayres,
182 t. 14 c., £7,765.; Cape Town,
6 t. 7 c., £135.; Halifax, 1 t. 4 c.,
£44.; La Guaira, 1 t. 10 c., £73.;
Manzales, 4 c., £20.; Savanilla,
3 c., £35.; Wellington, 4 c., £13.

SOAP—

Accra, 1 cs.; Algiers, 435 cs.,
1,590 bxs.; Amboina, 25 bxs.;
Amoerang, 100 bxs.; Amster-
dam, 1 cs.; Antigua, 2 cs., 55
bxs.; Antwerp, 1,135 pkgs.,
8,191 bxs., 350 kgs., 1,573 cs.,
250 bgs.; Athens, 25 cs.; Balik
Pappan, 50 bxs.; Bandjermassin,
100 cs.; Banjoewangie, 50 bxs.;
Barbados, 4,657 bxs.; Batavia,
810 bxs.; Barranquilla, 23 bxs.;
Beira, 20 bxs.; Benoa, 50 bxs.;
Bermuda, 356 bxs.; Boeleling,
100 bxs.; Bombay, 11,001 bxs.;
Bordeaux, 3,000 bxs.; Christ-
church, 13 bxs.; Buenos Ayres,
1,084 bxs.; Corfu, 1 cs.; Corinto,
500 bxs.; Curacao, 250 bxs.;
Dakar, 85 bxs.; Dixcove, 50
bxs.; Dongola, 150 bxs.; Fun-
chal, 10 cs.; Genoa, 50 bxs.;
Gorontalo, 200 bxs.; Guayaquil,
1 cs.; Hong Kong, 500 bxs.;
Kuala Lumpur, 800 kgs.; Lagos,
493 bxs., 72 cs.; Las Palmas,
848 bxs., 6 cs.; Larache, 275
bxs.; Larnaca, 30 bxs.; Leg-
horn, 20 bxs., 28 cs.; Limon,
100 cs.; Lisbon, 10 cs.; Livorno,
1,067 cs.; Lome, 125 bxs.; Macas-
sar, 900 bxs., 1,250 cs.; Madura,
36 cs.; Malta, 125 bxs.; Manta,
560 bxs.; Mauritius, 10 cs.;
Mazagan, 12 cs., 4 bxs.; Menado,
600 cs.; Messina, 40 cs.; Monte
Video, 4 cs., 50 bxs.; Mogador,
29 cs.; Mombasa, 10 cs.; Mon-
rovia, 50 cs.; Montreal, 118
bxs.; Padang, 37 lbs.; Palem-
bang, 400 pkgs.; Palermo, 60
bxs.; Penang, 23 bxs., 655
pkgs.; Paphos, 60 bxs.; Pointe-
a-Pitre, 350 bxs.; Patras, 25
bxs.; Pontianak, 400 bxs.; Pt.
Harcourt, 1,955 bxs.; Pt. Mad-
ryn, 32 pkgs.; Pt. Sudan, 54
bxs.; Port of Spain, 651 bxs.;
Puerto Barrios, 2 pkgs.; Port
Said, 236 bxs.; Puerto Colombia,
2 pkgs.; Rabat, 644 pkgs.;
Rangoon, 3,219 bxs.; Rhodes,
2 pkgs.; Rufisque, 20 pkgs.;
Rio de Janeiro, 7 bxs.; Saffi,
20 bxs.; Rosario, 241 bxs.;
Samarang, 100 pkgs.; Sandahan,
50 bxs.; Saltpond, 400 bxs.;
San Juan del Sur, 125 bxs.;
St. Kitts, 25 cs.; Secondee, 617
bxs.; Shanghai, 110 bxs.; Sierra
Leone, 120 bxs.; Sourabaya, 900
bxs.; Trinidad, 1,750 bxs.

SODA ASH—

Bombay, 3,400 bgs.; Brisbane,
25 cks.; Buenos Ayres, 104
pkgs.; Chefoo, 4,592 pkgs.;
Constantinople, 500 bgs.; Fre-
mantle, 3 pkgs.; Havana, 25
pkgs.; Karachi, 100 pkgs.;
Kobe, 233 pkgs.; Patras, 150
pkgs.; Smyrna, 200 pkgs.;
Sydney, 250 pkgs.; Tampico,
2,000 bgs.; Vera Cruz, 550 bgs.;
Yokohama, 1,108 bgs.

SODA CRYSTALS—

Constantinople, 160 pkgs.; Ka-
rachi, 49 pkgs.; Sao la Mar, 6
kgs.; Smyrna, 200 pkgs.

SODIUM BICARBONATE—

Bombay, 5,100 pkgs.; Buenos
Ayres, 206 pkgs.; Constanti-
nople, 710 pkgs.; Genoa, 450
pkgs.; Kobe, 1,144 pkgs.; Lar-
naca, 34 pkgs.; Malta, 100
pkgs.; Messina, 20 kgs.; Perth,
101 pkgs.; Port Said, 30 pkgs.;
Rangoon, 50 pkgs.; Shanghai,
67 pkgs.; Smyrna, 85 pkgs.;
Stamboul, 200 kgs.; Stockholm,
11 kgs.; Tientsin, 3,584 bgs.;
Yokohama, 700 bgs.

SODIUM SILICATE—

Buenos Ayres, 712 pkgs.; Ca-
tania, 130 pkgs.; Delagoa Bay,
6 pkgs.; Hong Kong, 20 pkgs.;
Lisbon, 500 pkgs.; Messina, 33
cks.; Monte Video, 100 pkgs.;
Osaka, 10 pkgs.; Para, 27 pkgs.;
Santos, 4 brls.; Shanghai, 297
pkgs.; Valencia, 1 pkg.; Vera
Cruz, 90 cks.

SODIUM SULPHATE—

Melbourne, 18 c., £38.

SULPHUR DIOXIDE—

Tientsin, 2 c., £8.

SULPHUR PRECIPITATE—

Corinto, 1 c., £8.

SULPHURIC ACID—

Monte Video, 16 c., £57.;
Tientsin, 1 t. 7 c., £36.

TALLOW—

Tripoli, 5 brls.

TANNIC ACID—

Christiania, 1 c., £15.

TARTARIC ACID—

Hong Kong, 2 c., £11.; Karachi,
10 c., £167.; La Guaira, 1 c.,
£18.; Puerto Barrios, 4 c., £55.

CHLORIDE OF TIN—

Lisbon, 2 c., £28.

TUNGSTIC ACID—

Rotterdam, 1 c., £50.

WOOD PRESERVATIVE—

Burutu, 1 c., £2.; Calicut, 1 c.,
£1.; Hsin Ho Wharf, 1 c., £2.;
Lome, 6 c., £10.; Oron, 3 c., £5.

ZINC SULPHATE—

Batavia, 10 t. 3 c., £270.;
Buenos Ayres, 1 c., £10.

LONDON.

Week ending September 10.

ACETIC ACID—

Alexandria, 33 cks., £451.; Ant-
werp (F.), 6 cks., £75.; Banga-
lore, 9 cs., £38.; Genoa (F.), 29
brls., £370.; Timaru, 12 cs.,
£36.

ACETO SALICYLIC ACID—

Beyrout, 11 cs. (pt.), £6.;
Constantinople, 2 cs., £72.;
Fiume, 3 cs. (pt.), £56.; Sydney,
2 cs., £42.

ACETONE—

Brussels, 1 dr., £28.; Antwerp,
14 drms., £498.

ALUM—

Brussels, 10 cs., £7.

ALUM (CHROME)—

Brussels, 2 t. 5 c., £217.

ALUMINA HYDRATE—

Genoa, 28 cks., £520

AMMONIA—

Alexandria, 27 pkgs., £62.;
Bombay, 24 cs., £153.; Cap-
town, 34 cs., £67.; Channel
Islands, 12 cs., £23.; Colombo,
4 cs., £6.; Delagoa Bay, 5 cs.,
£10.; Durban, 15 cs., £28.;
Gothenburg, 4 cs., £8.; Paris,
14 drms., £47.; Rio de Janeiro,
24 cs., £63.; Shanghai, 15 cs.,
£29.; Singapore, 7 cs., £19.;
Tientsin, 10 cs., £19.

AMMONIA ANHYDROUS—

Athens, 5 cys., £108.; Bombay,
10 cys., £105.; Calcutta, 1 cyl.,
£14.; Pt. Said, 20 cys., £264.;
Singapore, 10 cys., £81.

AMMONIUM CARBONATE—

Auckland, 10 c., £35.; Bahia,
2 t., £211.; Calcutta, 3 c., £13.;
Cape Town, 4 c., £20.; Cologne,
11 t. 16 c., £683.; Cyprus, 1 c.,
£7.; Genoa, 24 t. 12 c., £1,307.;
Gothenburg, 7 t. 10 c., £477.;
Leghorn, 1 t., £96.; Madras, 1 c.,
£8.; Penang, 13 c., £59.; Per-
nambuco, 12 c., £73.; Porto
Alegre, 2 c., £10.; Rangoon,
4 c., £17.; Rio de Janeiro, 2 t.
14 c., £275.; Santos, 18 c., £96.

AMMONIUM FLUORIDE—

Mauritius, 1 kg., £19.

AMMONIUM MOLYBDATE—

Sydney, 1 cs., £11.

AMMONIUM MURIATE—

Batoum, 1 t. 10 c., £150.
Bombay, 11 t. 12 c., £869.;
Cape Town, 5 c., £19.; Con-
stantinople, 2 t. 6 c., £187.;
Delagoa Bay, 2 c., £9.; Durban,
3 c., £12.; Lourenco Marques,
4 c., £12.; Naples, 4 cks., £64.;
Perth, 15 cks., £49.; Melbourne,
8 c., £33.

AMMONIUM PERCHLORATE—

Antwerp, 167 bxs., £209.

AMMONIUM PHOSPHATE—

Algiers (F.), 3 t. 18 c., £432.;
Italy, 6 c., £38.

AMMONIUM SULPHATE—

Durban, 242 t., £6,050.

AMMONIUM SULPHOCYANIDE—

Osaka, 1 ck., £18.

AMYL ACETATE—

Brussels, 1 dr., £84.; Alex-
andria, 1, 3 (pt.), £25.; Calcutta,
2 cs., £18.; Sydney, 2 cs., £16.

AMYL SALICYLATE—

Fiume, 1 cs. (pt.), £7.

ANTIMONY—

Lisbon, 5 t.

ANTIMONY REGULUS—

Rotterdam, 40 t. 17 c.

ANTIMONY SULPHIDE—

Antwerp, 16 pkgs., £458.; Bahia,
6 kgs., £36.; Bilbao, 3 cks., £60.;
Boston, 15 brls., £113.; Gothen-
burg, 10 cks., £170.; Rotterdam,
2 cks., £266.; Stockholm, 7 cks.,
£150.

ANTIMONY TARTRATE—

Copenhagen, 4 kgs., £73.

ARSENIC—

Pt. Elizabeth, 1 t., £38.; Pt.
Elizabeth (F.), 1 t., £69.;
Rouen, 10 t. 2 c., £600.

BARBITONE—

Sydney (F.), 5 cs. (pt.), £19.

BARIUM HYPOPHOSPHITE—

New York, 2 cs., £68.

BARIUM CHLORIDE—

Barcelona, 11 cks., £84.

BEES WAX—

Batoum, 4 c.

BENZOIC ACID—

Calcutta, 1 ck., £134.; Fiume,
2 cs. (pt.), £37.

BENZYL ACETATE—

Fiume, 1 cs. (pt.), £10.

BENZYL CHLORIDE—

Rotterdam, 1 ck., £11.

BISMUTH BICHLORIDE—

Calcutta, 1 ck. (pt.), £9.

BISMUTH CARBONATE—

Rotterdam, 1 cs. (pt.), £9.;
Stockholm, 1 cs. (pt.), £43.

BISMUTH CITRATE—

Pt. Elizabeth, 1 cs. (pt.), £5.

BISMUTH OXYDOGALLATE—

Rotterdam, 1 cs. (pt.), £19.

BISMUTH SALICYLATE—

Gothenburg, 2 cs., £154.; Pt.
Elizabeth, 1 cs. (pt.), £10.

BISMUTH SUBGALLATE—

Constantinople, 1 cs. (pt.), £42.;
Gothenburg, 1 cs. (pt.), £85.;
Rotterdam, 1 cs. (pt.), £84.;
Stockholm, 1 cs. (pt.), £42.

BISMUTH SUBNITRATE—

Calcutta, 1 ck. (pt.), £10.; Ant-
werp, 3 cs., £395.; Constanti-
nople, 1 cs., £156.; Copenhagen,
1 cs., £152.

BISMUTH SUBNITRATE—

Gottfenburg, 1 cs. (pt.), £76.; Rotterdam, 1 cs., £76.; Stockholm, 1 cs. (pt.), £76.

BISMUTH SUBSALICYLATE—

Copenhagen, 2 cs., £145.; Rotterdam, 1 cs. (pt.), £46.

BLEACHING POWDER—

Alexandria, 1 c., £12.

BORAX—

Alexandria, 10 c., £12.; Antwerp, 4 t. 16 c., £255.; Antwerp, Switzerland, *via*, 1 t., £46.; Copenhagen, 1 t., £40.; Durban, 3 c., £7.; East London, 5 c., £11.; Gibraltar, 10 c., £20.; Mauritius, 2 c., £5.; Rotterdam, 5 t. 4 c., £259.

BORIC ACID—

Aden, 1 c., £5.; Alexandria (F.), 10 c., £42.; Alexandria, 1 c., £6.; Canton, 1 c., £6.; Durban, 1 c., £6.; Madras, 1 c., £6.; Paris (F.), 4 t. 18 c., £364.; Patras, 1 c., £5.; Rotterdam, 4 c., £16.; Shanghai, 20 t., £1,480.; Singapore, 1 c., £6.; Swatow, 1 c., £5.; Tientsin, 1 c., £5.

CALCIUM & PHOSPHORIC ACID—

East London, 5 kgs., £22.

CALCIUM CARBIDE—

Penang, 19 c., £56.

CALCIUM CHLORIDE—

Alexandria, 1 t., £12.; Amsterdam, 5 c., £11.

CALCIUM GLYCEROPHOSPHATE—

Constantinople, 6 cs., £176.; Rotterdam, 1 cs. (pt.), £10.

CALCIUM HYPOPHOSPHITE—

Gothenburg, 1 cs. (pt.), £12.; Rotterdam, 1 cs. (pt.), £5.

CARBON DIOXIDE—

Ostend, £225.

CARNAUBA WAX—

Antwerp, 8 c.; Bergen, 4 c.; Paris, 4 c.

CAUSTIC POTASH—

Cape Town (F.), 1 cs. (pt.), £17.

CAUSTIC SODA—

Beira, 2 c., £5.; Bilbao, 4 t. 18 c., £100.; Libau, 10 t., £212.; Libau, 10 t. (F.), £20.

CERESINE WAX—

Antwerp, 10 c.; Arnheim, 5 c.; Bergen, 1 t. 3 c.; Paris, 10 t. 6 c.; Wellington, 1 t.

CHEMICALS (otherwise undescribed)

Adelaide, 4 cs., £102.; Antwerp, 1 cs., £15.; Brussels, 12 pkgs., £165.; Colombo, 9 cs. (pt.), £3.; Copenhagen, 1 cs., £8.; Durban, 2 cs. (pt.), £12.; East London, 2 cs., £11.; Kobe, 3 cs., £300.; Madras, 2 cs., £5.; Melbourne, 2 cs., £36.; Mombasa, 1 cs., £20.; New York, 10 cs., £130.; Pt. Swettenham, 8 cs. (pt.), £6.; Shanghai, 21 pkgs., £469.; Singapore, 3 cs., £69.; Smyrna, 4 pkgs., £14.; Sydney, 4 cs., £29.

CITRIC ACID—

Antwerp (F.), 5 c., £120.; Athens, 5 c., £140.; Bangkok, 2 c., £50.; Bilbao, 10 c., £230.; Durban, 5 c., £103.; Jaffa, 1 c., £25.; Maccio, 1 cs. (pt.), £12.; Montreal, 3 t. 10 c., £1,583.; New York (F.), 5 c., £2,220.; New York, 9 t., £4,019.; Singapore, 4 c., £114.; Trinidad (F.), 1 c., £20.

COAL PRODUCTS—

Alizarine
Barcelona, 1 ck., £13.

Aniline Dye

Adelaide, 1 cs., £22.; Barcelona, 6 kgs., £322.; Bilbao, 1 kg., £28.; Calcutta, 5 pkgs., £600.; Ghent, 6 pkgs., £100.; Havre, 4 kgs., £281.; Melbourne, 15 kgs., £516.; Metelin, 1 cs., £44.; Ostend, 1 kg., £10.; Paris, 59 kgs., £2,873.; Piraeus, 1 cs. (pt.), £6.; Pt. Elizabeth (F.), 1 cs., £33.; Pt. Elizabeth, 5 pkgs., £77.; Rotterdam, 1 kg., £10.; Rotterdam (F.), 1 dr., £9.; Tuticorin, 1 cs., £45.

COAL PRODUCTS—

Aniline Salt
Constantinople, 2 kgs., £21.

Bitumen

Bombay, 15 brls., £256.; Genoa, 55 brls., £102.

Carbolic Acid

Calcutta, 4 cs. (pt.), £19.; Iddo, 4 cs., £21.

Cresosote

Bilbao, 134 cks., £240.; Rotterdam, 25 cks., £91.

Cresosote Oil

Bombay, 50 drms., £44.; Loanda, 6 brls., £13.

Cresylic Acid

Accra, 60 drms., £50.; Seccondoo, 110 drms., £91.

Dimethylaniline

Antwerp (F.), 3 drms., £427.

Mirbane Oil

Bilbao, 3 drms., £36.; East London, 1 dr., £8.

Naphthalene

Aden, 4 kgs., £18.; Durban, 1 cs., £6.; Lourenco Marques, 1 ck., £6.; Rosario, 14 brls., £77.

Nigrosine

Barcelona, 1 kg., £20.; Boulogne, 1 kg., £63.; Genoa, 2 cks., £98.; Paris, 21 drms., £494.

Paranitraniline

Treport, 1 kg., £10.

Pitch

Antwerp, 318 t. 6 c., £1,075.; Ferrol, 20 firks., £13.

Tar

Beira, 50 drms., £21.; Delagoa Bay, 50 drms., £13.; Durban, 275 drms., £75.; Lourenco Marques (F.), 100 drms., £38.

Tar Oil

Gibraltar, 152 cks., £253.

Terebine

Cape Town, 2 cs., £17.

Xylol

Ghent, 1 dr., £10.

COBALT HYDROXIDE—

Copenhagen (F.), 1 cs., £15.

COBALT OXIDE—

Copenhagen, 2 cs., £165.

COBALT SULPHATE—

Melbourne, 2 cs. (pt.), £37.

COPPER SUBOXIDE—

Bergen, 3 cks., £156.; Copenhagen, 5 drms., £44.

COPPER SULPHATE—

Brussels, 2 c., £6.; Mollendo, 10 c., £28.; Salonica, 1 t., £40.

COPPER SULPHOCYANIDE—

Copenhagen, 15 drms., £113.

COPPERAS—

Delagoa Bay, 10 cs., £5.

CREAM OF TARTAR—

Bahia, 2 c., £12.; Bombay (F.), 1 c., £13.; Calcutta (F.), 2 c., £28.; Copenhagen, 4 t. 2 c., £940.; Delagoa Bay, 4 c., £61.; Durban, 5 c., £82.; Horsens, 18 c., £96.; Jaffa, 1 c., £9.; Madras, 2 c., £60.; Rio de Janeiro, 1 ck., £13.; Wellington (F.), 5 t., £1,038.

DISINFECTANTS (otherwise undes.)

Alexandria, 17 c., £66.; Antwerp, 4 t., £530.; Ascension, 12 c., £18.; Bangkok, 3 t. 3 c., £126.; Bombay, 1 c., £5.; Bergen (F.), 11 c., £70.; Belawan, 5 c., £5.; Buenos Ayres, 32 t. 9 c., £1,422.; Cape Town, 4 t. 7 c., £182.; Colombo, 1 c., £7.; Copenhagen, 4 c., £30.; Durban, 9 c., £40.; Gibraltar, 2 c., £5.; Gisborne, 4 c., £14.; Hong Kong, 1 c., £8.; Jamaica, 5 c., £15.; Madras, 1 t. 11 c., £33.; Malta, 7 c., £13.; Montreal, 2 c., £7.; Paris, 4 t. 13 c., £120.; Pernambuco, 1 t. 5 c., £150.; Port Said, 3 c., £12.; Pt. Swettenham, 15 c., £36.; Rosario, 5 c., £122.; Sandakan, 7 c., £16.; Sarawak, 1 t., £38.; Shanghai, 14 t. 6 c., £720.; Singapore, 2 t. 15 c., £125.; Sydney, 10 c., £28.; Trinidad, 3 t. 14 c., £133.; Trondhjem (F.), 11 c., £70.

ETHER ACETIC—

Canton, 1 cs., £10.

ETHER (SULPHURIC)—

Canton, 1 cs., £15.

FISH OIL—

Marseilles, 4 t. 3 c.; Nantes, 1 t. 14 c.

FLUORIC ACID—

Cape Town, 2 cs., £31.; Pt. Elizabeth, 3 cs., £56.; Sydney, 2 cs., £24.

FORMIC ACID—

Sydney (F.), 18 cs., £113.

FULLER'S EARTH—

Los Angeles, 50 t.; Marseilles, 100 t.; San Francisco, 50 t.; Tacoma, 50 t.; Vancouver, 20 t.

GALLIC ACID—

Madras, 1 cs. (pt.), £23.; Melbourne, 1 cs., £41.

GELATINE—

Rangoon, 1 c.

GLUE—

Pt. Swettenham, 3 c.

GLUE, SIZE, AND GELATINE—

Alexandria, 2 t. 2 c.; Adelaide, 2 c.; Antwerp, 7 t. 4 c.; Batoum, 15 c.; Bilbao, 6 t.; Boulogne, 1 t. 13 c.; Buenos Ayres, 3 c.; Calcutta, 1 t. 10 c.; Christchurch, 2 t. 2 c.; Colombo, 14 c.; Copenhagen, 2 t. 1 c.; Dunedin, 1 t. 5 c.; Durban, 1 c.; East London, 1 c.; Gibraltar, 10 c.; Karachi, 2 t. 5 c.; Kobe, 2 t.; Melbourne, 4 c.; Rotterdam, 11 c.; Sydney, 2 t.; Yokohama, 2 t. 10 c.

GLYCERINE—

Calcutta, 2 c., £14.; Canton, 1 c., £7.; Madras, 2 c., £14.; Piraeus, 2 c., £15.; Pt. Elizabeth, 1 c., £10.; Rouen, 1 t., £140.; Shanghai, 10 c., £55.; Swatow, 1 c., £8.

HEXAMETHYLENETETRAMINE

Athens (F.), 1 cs. (pt.), £18.

HYDROCYANIC ACID—

Aden, 1 c., £7.; Lourenco Marques, 2 c., £5.; Rio de Janeiro, 1 c., £5.

HYDROFLUORIC ACID—

Tokio, 5 cs., £17.

HYDROGEN PERCHLORIDE—

Rosario, 1 cs., £36.

HYDROGEN PEROXIDE—

Bergen, 14 cs., £60.; Durban, 2 cs., £6.

HYPOPHOSPHITE SALTS—

Montreal, 8 c., £231.

IODINE (RESUBLIMED)—

Copenhagen, 1 cs., £90.; Gothenburg, 2 cs., £202.; Rotterdam, 1 cs., £90.

IRON AND AMMONIUM CITRATE

Ghent, 2 cs., £63.; Rotterdam, 1 cs. (pt.), £16.

LACTIC ACID—

Calcutta, 1 ck. (pt.), £10.; Constantinople, 1 ck., £34.; Melbourne (F.), 5 cs., £90.

LEAD ACETATE—

Calcutta, 10 cks., £42.; Antwerp, 35 cks., £675.

LEAD ARSENATE—

Bordeaux, 20 drms., £112.

LEAD LINOLEATE—

Copenhagen, 2 brls., £53.

LEAD OXIDE—

Salonica, 1 ck., £21.

LITHIUM BENZOATE—

Athens, 1 cs. (pt.), £8.

MAGNESIA (CALCINED)—

Alexandria, 1 cs., £26.; Halmstead, 5 cks., £47.; Marmagao, 2 cs., £7.; Pernambuco, 1 cs., £14.

MAGNESIUM OXIDE—

Brussels, 4 cs., £38.; Halmstead, 5 cks., £23.

MAGNESIUM SULPHATE—

Aden, 4 c., £7.; Bombay, 2 c., £6.; Brussels, 3 c., £5.; Canton, 6 c., £10.; Cyprus, 3 c., £6.; Karachi, 8 c., £20.; Marmagao, 2 c., £6.; Pt. Elizabeth, 1 t., £45.; Porto Alegre, 1 t. 2 c., £52.; Rio Grande do Sol, 1 t., £52.; Singapore, 2 t., £70.;

MAGNESIUM SULPHATE—

Wellington, 1 t., £38.

MANGANESE BORATE—

Antwerp, 3 cks., £38.

MANGANESE HYPOPHOSPHITE—

Gothenburg, 1 cs. (pt.), £5.

MANGANESE LINOLEATE—

Copenhagen, 1 brl., £18.

MANGANESE PEROXIDE—

Naples, 2 cks., £75.

MANGANESE RESINATE—

Melbourne, 2 cs. (pt.), £7.

MERCURY BICHLORIDE—

Copenhagen, 1 cs., £70.

MERCURY CHLORATE—

Gothenburg, 1 cs. (pt.), £20.

MERCURY CHLORIDE—

Durban, 1 cs. (pt.), £9.

MERCURY PRECIPITATE—

Gothenburg, 1 cs. (pt.), £43.

MERCURY SALTS—

Gothenburg, 1 cs. (pt.), £37.

MERCURY SULPHOCYANIDE—

Bombay, 1 cs., £11.

METHYL SALICYLATE—

Fiume, 2 cs. (pt.), £11.

NAPHTHALENE SALICYLATE—

Buenos Ayres (F.), 2 cs. (pt.), £16.

NICKEL & AMMONIUM SULPHATE—

Canton, 2 cs., £20.

NICKEL OXIDE—

Antwerp, 1 ck., £11.

NICKEL SALTS—

Antwerp, 3 cs., £16.

NICKEL SULPHATE—

Brussels, 15 cs., £194.

NITRIC ACID—

Rio de Janeiro, 1 c., £8.

OXALIC ACID—

Athens, 9 pkgs. (pt.), £42.

PARAFFIN WAX—

Bergen, 2 c.; Bordeaux, 1 t.; Calais, 5 t.; Libau, 4 t.; Valencia, £300.

PEARL ASH—

Cape Town, 2 pkgs., £17.

PHOSPHATE OF LIME—

Paris, 3 cks., £15.

PHOSPHORIC ACID—

Auckland, 4 cs., £30.; Sydney, 89 cs., £374.; Toronto, 84 cbs., £570.

PHOSPHORUS (AMORPHOUS)—

Bombay, 1 cs., £14.

PHOSPHORUS SESQUISULPHIDE

Barcelona, 30 cs., £170.; Santander, 20 cs., £313.; Valencia, 60 cs., £879.

PITCH—

Ferrol, 1 t.

PLUMBAGO—

Boulogne, 4 c.; Ghent, 4 t., 11 c.

POTASSIUM ACETATE—

Freetown, 2 cs., £14.; Sydney, 4 cs., £60.

POTASSIUM BICARBONATE—

Bangkok, 1 kg., £11.

POTASSIUM BICROMATE—

Cologne, 53 brls., £2,950.; Paris, 1 ck., £60.

POTASSIUM BINOXALATE—

Santander, 6 kgs., £62.

POTASSIUM BROMIDE—

Buenos Ayres (F.), 2 cs. (pt.), £8.

POTASSIUM CARBONATE—

Athens, 1 ck., £25.

POTASSIUM CITRATE—

Colombo, 1 cs., £17.; Gothenburg, 1 cs. (pt.), £8.

POTASSIUM CYANIDE—

Brussels, 2 c., £29.; Buenos Ayres, 1 cs., £18.; Foochow, 1 cs. (pt.), £7.

POTASSIUM HYPOPHOSPHITE—

POTASSIUM IODIDE—

Antwerp, 1 cs., £39.; Bahia Blanca, 1 cs. (pt.), £38.; Buenos Ayres (F.), 2 cs. (pt.), £19.; Gothenburg, 3 cs., £420.; Copenhagen, 1 cs., £75.; Rotterdam, 1 cs., £76.

POTASSIUM METABISULPHITE—
Athens, 1 ck., £22.; Paris, 4 cs., 4 cks., £398.; Sydney, 2 cs., £26.

POTASSIUM PERMANGANATE—
Athens (F.), 1 cs., £10.

POTASSIUM PRUSSATE—
Brussels, 1 ck., £16.; Buenos Ayres, 1 cs., £35.; Ghent, 1 cs., £35.

POTASSIUM SULPHOGUAIACOLATE—
Athens (F.), 1 cs. (pt.), £48.; Osaka (F.), 4 cs., £347.

PRUSSIAN BLUE—
Genoa, 4 cks., £146.

PYROGALLIC ACID—
Melbourne (F.), 1 cs., £62.

QUININE—
Calcutta, 2,303 ozs.; Italy, 9,216 ozs.; Penang, 776 ozs.

SALACETOS—
Paris, 20 brls., £375.

SALICYLIC ACID—
Auckland, 3 kgs., £35.; Aalborg, 1 bx., £6.; Constantinople, 2 cs., £28.; Fiume, 2 cs. (pt.), £35.; Singapore, 3 cs., £30.

SALT—
Aden, 3 c.; Cape Town, 4 c.; Cyprus, 10 c.; Singapore, 8 c.

SALTPETRE—
Barcelona, 5 t., £260.; Delagoa Bay, 3 c., £9.; Durban, 2 t. 2 c., £143.; East London, 9 c., £26.; Lisbon, 2 t. 19 c., £146.; Mombasa, 5 c., £17.; New York, 150 t., £5,787.; Pernambuco, 5 t. 6 c., £423.; Pt. Elizabeth, 1 t. 4 c., £80.; Santos, 14 t. 14 c., £920.; Singapore, 1 c., £5.; Valencia, 2 t. 1 c., £108.

SHEEP DIP—
Buenos Ayres, 42 t. 14 c., £2,300.; Dunedin, 1 t. 7 c., £75.; Durban, 6 t. 9 c., £297.

SILVER NITRATE—
Rotterdam, 1 cs. (pt.), £55.

SOAP—
Alexandretta, 3 c.; Alexandria, 2 t. 1 c.; Antwerp, 167 t. 19 c.; Amsterdam, 1 t. 8 c.; Auckland, 1 t. 13 c.; Bahia, 3 c.; Bangkok, 1 t.; Barbados, 23 t. 11 c.; Beira, 2 c.; Bilbao, 7 c.; Bombay, 3 t. 13 c.; Brisbane, 2 c.; Boulogne, 53 t.; Buenos Ayres, 1 t. 2 c.; Callao, 3 c.; Calais, 2 t. 8 c.; Calcutta, 4 t. 15 c.; Cartagena, 2 c.; Channel Islands, 3 t. 3 c.; Colombo, 1 t. 16 c.; Constantinople, 7 c.; Copenhagen, 5 t. 11 c.; Delagoa Bay, 1 c.; Demerara, 15 t. 14 c.; Djibouti, 2 c.; Durban, 1 t. 3 c.; Dunedin, 2 c.; East London, 2 c.; Freetown, 1 c.; Genoa, 5 c.; Gothenburg, 12 t. 6 c.; Guayaquil, 1 c.; Halifax, 4 c.; Hong Kong, 1 t. 1 c.; Havre, 41 t. 5 c.; Italy, 3 c.; Jaffa, 9 c.; Gibuti, 1 c.; Karachi, 2 t. 12 c.; Kilindini, 4 c.; Kobe, 4 c.; Liban, 9 t. 15 c.; Lisbon, 1 c.; Lytleton, 3 c.; Madras, 3 c.; Loanda, 5 c.; Mauritius, 6 c.; Monte Video, 2 t. 1 c.; Messina, 1 t. 5 c.; Montreal, 10 c.; Melbourne, 4 c.; New Plymouth, 14 c.; New York, 1 t. 9 c.; Ostend, 11 c.; Orebri, 1 t. 5 c.; Paramaribo, 1 t. 2 c.; Paris, 1 t. 11 c.; Perth, 2 c.; Piraeus, 5 c.; Pt. Said, 16 c.; Punta Arenas, 1 c.; Raigoon, 3 c.; Rio de Janeiro, 8 c.; Rotterdam, 73 t. 5 c.; Santander, 1 c.; Santos, 2 c.; Seville, 5 c.; Shanghai, 5 c.; Singapore, 4 c.; Smyrna, 3 c.; Sourabaya, 3 c.; Talcahuano, 2 c.; Toronto, 2 c.; Treport, 9 c.; Trinidad, 15 t. 14 c.; Wellington, 7 c.

SODA—
Rosario, 2 t. 9 c., £25.

SODA ASH—
Genoa, 10 t., £100.; Liban, 30 t., £200.; Pernambuco, 10 c., £8.

SODIUM AND POTASSIUM TARTRATE—
Athens, 1 cs. (pt.), £11.

SODIUM ARSENITE—
Durban, 2 t. 1 c., £110.

SODIUM BICARBONATE—
Bangkok, 5 c., £30.; Calcutta, 5 c., £16.; Canton, 10 c., £15.; Cape Town, 3 c., £6.; Constantinople, 6 c., £31.; Hong Kong, 10 c., £13.; Lourenco Marques, 5 c., £10.; Montreal, 7 c., £15.; Santos, 5 c., £5.; Shanghai, 13 c., £20.; Smyrna, 5 c., £22.

SODIUM BISULPHATE—
Rouen, 15 c., £24.

SODIUM BISULPHITE—
Bangkok, 6 c., £8.; Antwerp, 5 t. 10 c., £139.; Rouen, 6 t. 17 c., £216.

SODIUM CARBONATE—
Brussels, 11 c., £12.; Kobe, 5 c., £13.

SODIUM CITRATE—
Gothenburg, 1 cs. (pt.), £26.

SODIUM HYDROSULPHITE—
Genoa, 1 t. 2 c., £364.

SODIUM HYPOPHOSPHITE—
Gothenburg, 1 cs. (pt.), £13.

SODIUM GLYCEROPHOSPHATE—
Copenhagen, 1 cs., £78.

SODIUM IODIDE—
Gothenburg, 1 cs., £90.; Rotterdam, 1 cs., £103.

SODIUM HYPOSULPHITE—
Antwerp, 2 t. 10 c., £53.; Busrah, 4 c., £8.

SODIUM METABISULPHITE—
Algiers, 6 t. 4 c., £176.

SODIUM PHOSPHATE—
Odense, 1 t., £50.

SODIUM PRUSSATE—
New York, 30 t., £1,890.

SODIUM SALICYLATE—
Calcutta, 2 cs., £14.; Colombo, 1 cs., £11.; Fiume, 1 cs. (pt.), £11.; Constantinople, 2 cs., £10.

SODIUM SILICATE—
Durban, 5 c., £13.

SODIUM SULPHIDE—
Brussels, 1 cs., £5.; Sydney, 3 cs. (pt.), £7.

SODIUM SULPHITE—
Adelaide, 2 c., £8.; Bergen, 10 t. 2 c., £158.; Brussels, 6 c., £8.; Bushire, 1 t. 12 c., £161.; Pt. Swettenham, 1 t., £35.

STRONTIUM NITRATE—
Bombay, 62 pkgs., £376.; Naples, 4 cks., £90.

SULPHATE OF QUININE—
Buenos Ayres, 540 ozs.; Calcutta, 8,000 ozs.

SULPHUR—
Brussels (F.), 1 t., £31.; Pernambuco, 6 t. 17 c., £170.

SULPHUR (ROLL)—
Paris, 5 t., £120.

SULPHUR PRECIPITATE—
Halmstead, 10 c., £39.

SULPHURIC ACID—
Alexandria, 7 t., £178.; Athens, 1 t., £25.; Beira, 2 t. 10 c., £88.; Channel Islands, 1 t. 13 c., £20.; Pt. Sudan, 3 t. 10 c., £140.; Rio de Janeiro, 4 c., £20.; Sierra Leone, 3 c., £15.; Smyrna, 2 c., £18.

SUPERPHOSPHATES (otherwise undescribed)—
Italy, 1 t.

TALLOW—
Antwerp, 8 c.; Paris, 30 c.

TANNIC ACID—
Amsterdam, 1 ck., £19.

TARTARIC ACID—

Aden (F.), 1 cs., £6.; Bombay (F.), 2 c., £29.; Calcutta (F.), 1 cs., £10.; Cape Town (F.), 3 c., £52.; Copenhagen, 10 c., £182.; Copenhagen (F.), 4 c., £79.; Delagoa Bay (F.), 4 c., £85.; Durban, 1 c., £27.; East London (F.), 1 c., £21.; Karachi (F.), 1 c., £11.; New York (F.), 6 t. 15 c., £2,330.; Pt. Elizabeth, 2 c., £48.; Pt. Elizabeth (F.), 2 c., £47.; Raigoon (F.), 2 c., £35.; Singapore, 5 c., £95.

TARTRATE—
Pt. Elizabeth, 10 kgs., £61.

TERPINE HYDRATE—
Stockholm, 2 kgs., £45.

TRIPHENYL PHOSPHATE—
Boston, 12 cs., £517.

VEGETABLE PITCH—
Calais, £64.

VEGETABLE WAX—
Rotterdam, 1 t.

WAX—
Genoa, 3 c.; Treport, 2 t.

WHITE ACID—
Sydney, 1 cs., £35.

WHITE LEAD—
Cochin, £12.; Naples, £250.; Oran, £60.; Paris, £1,136.; Pt. Elizabeth, £109.; Timaru, £58.

ZINC PERCHLORIDE—
Constantinople, 1 ck., £65.

ZINC SULPHIDE—
Halmstead, 1 ck., £11.; Melbourne, 1 ck., £6.

MANCHESTER

Week ending September 10.

ALUMINA SULPHATE—
Antwerp, 33 bgs.; Montreal, 25 bgs.

AMMONIUM MURIATE—
Montreal, 6 cs.

BLEACHING POWDER—
Montreal, 100 cs.

CAUSTIC SODA—
Montreal, 250 cs.

COAL PRODUCTS (otherwise undescribed)—
Antwerp, £58.; Bombay, £770.; Philadelphia, £280.

DEXTRENE—
Antwerp, 10 bgs.

DYE STUFFS—
Aniline Colours
Treport, 1 kg.

FERRIC MANGANESE—
Boston, 50 t.; Philadelphia, 1,000 t.

POTASSIUM PRUSSATE—
Montreal, 5 cks.

SALAMMONIAC—
Montreal, 10 cks.

SALT—
Montreal, 7,500 sks.; Quebec, 2,400 sks., 2,400 pkgs.; St. John, 50 t., 10,122 sks.

SOAP—
Antwerp, 50 pkgs., 411 cs.; Montreal, 24 cks.

SODA ASH—
St. Johns, 228 pkgs.

SODIUM CARBONATE—
St. Johns, 375 pkgs.

SODIUM PHOSPHATE—
Dunkirk, 230 bgs.

MIDDLESBROUGH.

Week ending September 13.

AMMONIUM SULPHATE—
Kobe, 1,937 t. 7 c., £37,616.; Yokohama, 1,746 t. 15 c., £33,694.

BARIUM SULPHIDE—
Karachi, 1 t., £23.

CAUSTIC SODA—
Calcutta, 60 t. 7 c., £1,207.

CHEMICALS (otherwise undescribed)
Calcutta, 42 t. 8 c., £615.; Singapore, 17 t. 15 c., £286.

COAL PRODUCTS—

Creosote Salts—
Cape Town, 6 c., £12.

Disinfectants—

Algoa Bay, 8 c., £15.; Cape Town, 10 t. 3 c., £333.; Calcutta, 4,784 galls., £587.; East London, 8 c., £15.; Natal, 10 t. 3 c., £333.

Naphthalene—

Algoa Bay, 1 t., £17.; East London, 1 t. 10 c., £26.; Tientsin, 15 t., £240.

Pitch—

Antwerp, 476 t. 8 c., £1,651.

DISINFECTANTS—

Algoa Bay, 6 c., £12.; Cape Town, 10 c., £22.; East London, 6 c., £12.; Natal, 6 c., £12.

MAGNESIA (CALCINED)—

Rouen, 1 t. 9 c., £177.

SALT—

Cape Town, 16 c., £34.; Delagoa Bay, 1 t. 1 c., £48.; East London, 2 t. 8 c., £102.; Shanghai, 6 c., £14.

SODIUM SILICATE—

Calcutta, 9 t. 17 c., £120.

NEWCASTLE-ON-TYNE

Week ending September 13.

ALUMINA SULPHATE—

Rotterdam, 10 t.

ANTIMONY—

Antwerp, 22 t.; Gothenburg, 15 t.; Rotterdam, 125 t. 10 c.

BARIUM CARBONATE—

Dunkirk, 6 t.

BLEACHING POWDER—

Gothenburg, 25 t.; Rotterdam, 4 t. 19 c.

CAUSTIC SODA—

Gothenburg, 40 t.; Narvik, 10 t.

COPPER OXIDE—

Bergen, 5 t. 5 c.; Copenhagen, 12 c.

PITCH—

Dunkirk, 7 t.

RED LEAD—

Bergen, 2 t. 1 c.; Helsingfors, 10 t.; Narvik, 1 t.; Rotterdam, 5 t. 17 c.

SOAP—

Copenhagen, 4 t. 15 c.

SODA CRYSTALS—

Rotterdam, 40 t.

SODIUM SULPHIDE—

Antwerp, 4 t. 5 c.

SODIUM SULPHITE—

Gothenburg, 19 c.

SULPHUR—

Gothenburg, 15 t.

SULPHUR (ROCK)—

Rotterdam, 10 t.

WHITE LEAD—

Antwerp, 17 t. 8 c.; Gothenburg, 5 t.

N. & S. SHIELDS.

Week ending September 13.

NIL.

STOCKTON-ON-TEES.

Week ending September 13.

NIL.

SWANSEA.

Week ending September 13.

COPPER SULPHATE—

Antwerp, 5 c., £12.; Santander, 15 t., £750.

NICKEL SALTS—

Santander, 1 t. 4 c., £25.

NICKEL SULPHATE—

Antwerp, 6 t. 8 c., £355.; Barcelona, 2 t. 19 c., £250.; Rotterdam, 9 t., £2,000.

PRICES CURRENT.

THURSDAY, Sept. 18, 1912.

PREPARED BY MESSRS. HIGGINBOTTOM AND CO., 21, SPRING GARDENS, MANCHESTER.

The values stated are F.O.R. at makers' works, or at usual ports of shipment in U.K., unless otherwise specified
The prices in different localities may vary

Acids:—

		£	s.	d.
*Acetic 40% and 60% ...	per cwt.	30/-	&	45/-
* " Glacial ...	per ton	85	0	0
* Arsenic, S.G. 2,000° ...	per ton	70	0	0
Boric, Crystals ...	"	72	0	0
*Fluoric ...	per lb.	0	0	7
*Muriatic (Tower Salts), 28° Tw. ...	per carboy	0	6	6
*Nitric, 80° Tw. ...	per ton	32	0	0
Oxalic ...	per lb.	0	1	2½
Phosphoric, 1,750° ...	"	0	1	9
*Sulphuric (fuming, 70%) ...	per ton	—	—	—
* " (Pyrites, 168°) ...	"	7	18	9
* " (" 140°) ...	"	4	10	0
* " (free from arsenic, 144°) ...	"	5	7	4
Tannic (commercial) ...	per lb.	0	2	6
Tartaric (crystals) ...	"	0	3	2
*Acetone ...	per ton	80	0	0
*Alum, loose lump (delivered) ...	"	17	0	0
Alumina Sulphate (pure) ...	"	17	0	0
Aluminoferrous (in slabs) ...	"	8	10	0
Aluminium (Ingot Metal, 98/99%) ...	per ton	150	0	0
*Ammonia, Anhydrous ...	per lb.	0	1	10
* " 880 ...	per ton	33	0	0
* " 920 ...	"	20	0	0
" Carbonate ...	per lb.	0	0	6½
" Muriate (grey) ...	per ton	47	10	9
" (sal ammoniac) 1st & 2nd, per cwt. ...	"	80/-	&	75/-
" Nitrate ...	per ton	60	0	0
" Phosphate ...	"	110	0	0
" Sulphate (grey), London, net ...	"	—	—	—
" " Hull ...	"	—	—	—
" " Manchester ...	"	—	—	—
*Aniline Oil (pure) ...	per lb.	0	1	2
Aniline Salt ...	"	0	1	2
Antimony ...	per ton	45	0	0
" (tartar emetic), 43/44° ...	per lb.	0	3	4
" (golden sulphide) ...	"	0	1	3
Arsenic, white powdered ...	per ton	60	0	0
Barium Chloride (in casks) ...	"	23	10	0
" Carbonate (native), 92/94% ...	"	11	10	0
" Sulphate (native levigated) ...	"	£7 to £14		
Baryta Chlorate ...	per lb.	0	1	3
*Bisulphide of Carbon ...	per ton	55	0	0
Bleaching Powder, 35% ...	"	15	0	0
" " Liquor, 7% ...	"	6	0	0
Casein (commercial) ...	"	90	0	0
Chromium Acetate (crystals) ...	per lb.	0	1	0
Calcium Chloride ...	per ton	8	0	0
China Clay (at Runcorn), in bulk ...	"	70/-	to	90/-

Coal-tar Products and Dyes:—

Alizarine (artificial), 20% ...	per lb.	0	2	0
Magenta ...	"	18/-	to	35/-
Anthracene, 40/50% A, f.o.b., L'don, per unit, ...	"	0	0	7
Benzol, 90's (naked) ...	per gal.	0	1	11
" 50/90's ...	"	0	1	10
Carbolic Acid (crude, 60°) ...	"	0	1	7½
" (crystallised, 40°) ...	per lb.	0	0	9¼
" Acid (pale liquid, 97/98%) ...	per gal.	0	2	9
*Croosote (ordinary), naked ...	"	0	0	6½
*Crude Naphtha, 30% at 120°C. ...	"	0	0	9
*Grease Oils, 18° Tw. (naked) ...	per ton	6	10	0
Pitch, f.o.b., Liverpool or Garston ...	"	3	2	6
*Solvent Naphtha, 90% at 160° ...	per gal.	0	2	5
Copper ...	per ton	101	0	0
" Sulphate ...	"	42	0	0
Dross Salts ...	"	39	0	0
*Glycerine (crude), 80% ...	"	72	0	0
" (industrial, S.G. 1,260) ...	"	110	0	0
*Iodine ...	per oz.	0	1	0
*Iron Nitrate, 80° Tw. ...	per ton	12	0	0
" Sulphate (copperas), delivered ...	"	4	10	0
" Sulphide ...	"	7	15	0
Lead (Foreign Pig) ...	"	25	12	6
" Litharge Flake ...	"	45	0	0
" Acetate (white) ...	"	83	0	0
" " (brown) ...	"	69	0	0

Lead, Carbonate (White lead), pure ...	per ton	50	0	0
" Nitrate ...	"	56	0	0
Lime, Acetate (brown) ...	"	11	0	0
" (grey), 80% ...	"	17	0	0
Magnesium Chloride ...	"	15	10	0
" Carbonate (light) ...	per cwt.	2	5	0
" Calcined Magnesite ...	per ton	21	10	0
" Sulphate (Epsom Salts) (coml.) ...	"	11	0	0
" (druggists) ...	"	16	0	0
Manganese, Sulphate ...	"	75	0	0
" Borate ...	"	95	0	0
*Methylated Spirit, 64° (industrial) ...	per gal.	0	5	7
*Naphtha (Wood), Solvent ...	"	0	10	0
" " Miscible, 60° p. ...	"	0	10	0

Oils:—

*Cottonseed ...	per ton	95	0	0
*Linseed ...	"	109	0	0
Stearine, 115-120° M.P. ...	"	105	0	0
Potassium, Bichromate ...	per lb.	0	1	6
" Carbonate, 80/82% ...	per to	95	0	0
" Chlorate ...	per lb.	0	1	0
" Hydrate (Caustic Potash) 90% ...	per ton	169	0	0
" " 75/80% ...	"	140	0	0
" Potash Hydrate Liquid, 38° B. ...	"	70	0	0
" Nitrate (refined) ...	"	57	10	0
" Permanganate (commercial) ...	per lb.	0	3	3
" Prussiate (yellow) ...	"	0	1	9
" (red) ...	"	0	5	6
" Sulphate, 90% (ex ship) ...	per ton	30	0	0
" Muriate, 80% ...	"	25	0	0
Silver (metal) ...	per oz.	0	5	12½
Sodium (metal) ...	per lb.	0	1	3
" Acetate ...	per ton	51	0	0
" Arseniate, 45% ...	"	0	0	0
" Borate (Borax), Crystals ...	"	39	0	0
" Bicarbonate (1 cwt. kegs) ...	"	9	10	0
" Bichromate ...	per lb.	0	0	11
" Carb. (Caustic Soda-ash), 48% ...	per ton	12	10	0
" (Alkali), 58% (bags) ...	"	6	0	0
" (Soda Crystals), (bags) ...	"	4	2	6
" Chlorate ...	per lb.	0	0	6½
" Cyanide (100% basis) for export ...	"	0	0	10
" Hydrate (76% C. Soda) (f.o.r.) ...	per ton	24	0	0
" " (74% C. Soda) ...	"	23	5	0
" " (70% C. Soda) ...	"	22	0	0
" " (60% C. Soda) ...	"	21	0	0
" (pure liquid, 90° Tw.) ...	"	10	2	6
" 77/78% Powdered (99%) Hydrate ...	"	24	10	0
" Hyposulphite (commercial) ...	"	16	10	0
" Manganate, 25% ...	"	65	0	0
" Nitrate, 96%, retd., f.o.r., L'pool ...	"	21	0	0
" Nitrite, 100% ...	"	60	0	0
" Phosphate ...	"	26	0	0
" Prussiate ...	per lb.	0	0	9
" Silicate (glass) Alkaline ...	per ton	12	5	0
" (liquid, 100° Tw.) ...	"	9	10	0
" Sulphate (Saltcake), delivered ...	"	3	0	0
" (Glauber's Salt) ...	"	4	0	0
" Sulphide (conc.), 60/65% casks ...	"	20	0	0
" Sulphite ...	"	10	0	0
Sulphocyanide, Ammonium, 95% ...	per lb.	0	2	0
" Barium, 95% ...	"	0	1	4
" Potassium ...	"	0	2	4
" Calcium, 70% ...	per lb.	0	1	4
Sulphur, (Flowers) ...	Sicilian per ton	23	0	0
" (Roll Brimstone) ...	"	21	0	0
" Brimstone (best thirds) ...	"	14	10	0
" (ex ship) ...	"	100	0	0
Tallow ...	"	100	0	0
Tin Crystals ...	per lb.	0	1	10
" English Ingots ...	per ton	285	0	0
Titanium, Potass. Oxalate ...	per lb.	0	1	6
Titanous Chloride ...	per cwt.	4	10	0
Zinc (Spelter) ...	per ton	42	0	0
" Powder, 83/92% ...	"	70	0	0
" Chloride (solution, 102° Tw.) ...	"	23	10	0
" Sulphate, Crystal ...	"	22	0	0

* Packages extra or returnable; otherwise, prices usually include packages.

THE CHEMICAL TRADE JOURNAL

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LONDON, SATURDAY, SEPTEMBER 27, 1919.

VOL. LXV.

CONTENTS.

CURRENT TOPICS.

ORGANISING SCIENTIFIC RESEARCH.

LITTLE is known of the attempt to form a Scientific Research Association, and still less, probably, that the attempt came to a premature end at the British Association meeting at Bournemouth. This event in the scientific world has arisen because certain scientific people felt very strongly that industrial research was being concentrated upon too much by the Department of Scientific and Industrial Research, and that scientific research *per se* was in danger of being swamped in the process; but they were unable to convince any considerable number of their brother scientists that their method of dealing with the question was the right one. The aim of the projected Scientific Research Association was to organise scientific research and to formulate a scheme for the State endowment of such research. The criticism immediately met with when the suggestion to form this new association was made was: Why establish a new organisation—Why should not some existing society do it—the Royal Society, the British Association, or the British Science Guild? The answer of the promoters was that the Royal Society would not do it, and, indeed, its constitution was quite unsuitable, because although it received a grant of £5,000. for research, it merely distributed the money after inquiry as to whether they were justified by the particular research proposed. Moreover, the association of younger men who have not become Fellows is an important feature of any scheme that aims at being really representative. The British Association might do, if it would consent to reorganise its constitution and permanent staff for the purpose—perhaps a good deal to ask,—whilst the British Science Guild was understood to regard any such detailed organisation of research as not within its sphere, though it looked upon the proposal to create such an organisation with sympathy and approval. Having answered their own questions in this way, those concerned proceeded to take the necessary preliminary steps to bring the Scientific Research Association into being. In the spring of this year a provisional committee was appointed, and a circular was sent to about 2,000 people who were thought likely to give their support. Although between 150 and 200 supporters were found, there were some eminent people who held that the work of the proposed new organisation ought to be done by existing bodies. Consequently, it became evident that the estimated sum necessary to pay expenses did not seem likely to be forthcoming, and the promoters were at something approaching a deadlock. It was in these circumstances that advantage was taken of so large a number of scientists being in Bournemouth in connection with the British Association

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to hold a meeting to discuss the position, although it must be understood that the meeting was not in any way convened by the British Association. That meeting, it must be confessed, was quite unrepresentative, and it was clear from the lack of practical support which was forthcoming that there was nothing to do but abandon the idea, which, by the way, had its origin in Cambridge, and the provisional committee which was appointed to carry out the preliminary work consisted entirely of members of that University, though with powers of co-option. The position is that there is a general agreement that scientific research needs to be looked after and co-ordinated by some organisation, but doubt exists as to whether it is necessary to bring a new organisation into existence for the purpose.

AN INDICTMENT OF THE FUEL BOARD.

RECENT events in the domain of scientific research, as distinct from industrial research, tend to suggest that the cry for preventing the overlapping of scientific research is not so sound as it seemed at first. Professor Gray, in his presidential address to Section A of the British Association, complained that the authorities who have taken over the supervision of scientific research are adopting a policy of too much concentration; and at the same meeting of the British Association—and since then at the meeting of the Iron and Steel Institute in London—we have had a valuable object lesson in the policy of the Fuel Research Board of the folly of the concentration of scientific research. Professor Bone, Professor Armstrong, and others, as stated in these columns last week, have made a strong indictment against Sir George Bellby, the Chairman of the Board, that the policy of concentration is being carried to unwarranted limits, and it has, indeed, developed into a secrecy, the rigour of which was not excelled in regard to the most cherished of our secrets during war time. In industrial research all concerned in the particular industry are brought together for the common good, and all the brains in the industry are pooled for that purpose. The very antithesis appears to hold as far as the particular branch of scientific research covered by the Fuel Research Board is concerned. In the very commencement it has turned aside and flouted those scientists who were responsible for bringing it into existence, and pointing the line of investigation which the needs of our industries demanded. We agree with the view that overlapping in scientific research should not be discouraged, and in the circumstances which surround the actions of the Fuel Research Board it should positively be encouraged. So concentrated have the efforts of the Board become, and so jealous is it that nobody else shall do anything, that if Professor Bone, for instance, has a promising student whom he wants to put on to a special research, and asks the Department of Scientific and Industrial Research for a grant, he is told that he cannot have one, because the particular research comes within the scope of the Fuel Board. It will never do to leave ourselves dependent upon such a state of affairs. It is extremely unfortunate that in consequence of the establishment of the Fuel Research Board nothing has been done during the past two or more years by private interest in this matter, which was admittedly vitally urgent in 1915. Knowing

the activity and earnestness, to say nothing of the ability, of those who started the crusade for fuel economy in 1915, we are not surprised that the British Association Fuel Economy Committee has been re-established. Moreover, the Federation of British Industries has formed a committee to do many of the things which the Fuel Research Board was intended to carry out, and some which it was not, whilst the Iron and Steel Institute has quickly collected a fund of over £10,000 to deal with research into fuel economy as it affects those industries. Sir George Bellby is determined not to enter into any controversy, but, whether the critics be right or wrong—there may be a sufficient answer to them—we hardly think that he can maintain silence much longer, even if it mean anticipating somewhat the promised report concerning the accomplished and future work of the Board. Moreover, a statement is due as to why so many acknowledged experts—men who brought the whole question into prominence—are cold-shouldered.

NITRATE OF SODA.

As recently stated in these columns the Producers' Association had threatened to reduce its selling prices, if necessary, to 8s. and 8s. 2d. respectively for ordinary and refined nitrate, in the event of the non-associated companies continuing to stand out. There has been no occasion to carry out this threat—described by us as *brutum fulmen*—for the Association has sold at 9s. per quintal f.o.b. (presumably for ordinary quality) 500,000 tons for delivery October, 1919, to March, 1920. The "climbing down" from the "fixed price" of 10s. 1d. (10s. 4d. for refined) has been voluntary, and the transaction may be considered highly satisfactory from the sellers' point of view, considering that 30,000 to 40,000 tons in second hands fetched only 8s. 8d. to 8s. 9d. per quintal two months ago. It would be interesting to know the buyers in the above important deal, representing, with freight, insurance, and charges, over £15,000,000. sterling. But the only semi-official information is the somewhat obvious one that "a large portion will probably find its way direct to Continental consuming markets." We may point out in this connection that the producers outside the Association have already entered into a three-years' contract for the consignment of 300,000 tons per annum to Belgium, the signatories being the Chilean Chargé d'Affaires in Brussels and the firm of Corblet et Cie. Germany and Austria formerly the chief importers of the Chilean fertiliser, and for the present out of the business, while 650,000 tons was the maximum yearly quantity taken by the rest of the Continent (including Egypt) before the war, when nitrate cost less than half the present figure. It is difficult to see where several hundred steamers and sailing vessels can be found to load nitrate in Chile within the next six months; but the financial and lay Press, enthusiastically hailing the termination of the deadlock, foreshadows the early disposal of a further quantity of 500,000 to 750,000 tons by the Producers' Association. The consequence is a "boomlet" in nitrate shares; but, as stated in our last issue, the stocks in Chile on the 1st inst. were 1,652,540 tons, and gratifying as is a commencement of "mobilisation" of these, we take leave to doubt the advent of the nitrate millennium. The acid test will be applied by the consumer next spring.

SOME MICROSCOPICAL FEATURES OF WHITE LEAD.

By JAMES SCOTT.

ALTHOUGH white lead is regarded as lead carbonate, it has been satisfactorily proved that if it should happen to be absolutely pure in this respect it will be inferior in use to the commoner so-called impure varieties. To be effective in action, condition, and durability, it must consist of 70 to 75 per cent. of lead carbonate, and 30 to 25 per cent. of lead hydrate. If the amount of hydrate is in excess of the higher figure the desirable opacity of the pigment is seriously diminished; while, on the other hand, if less hydrate than the lower figure is present, there is a loss of binding power and general lack of efficiency.

Most of the commercial productions come fairly well within this category; but exceptions have frequently been met with. If the quantity of hydrate goes very much above, or below, either of the extremes noted, the white lead will become absolutely useless as a permanent substance. Consequently, although it is customarily referred to as $PbCO_3$, white lead is more correctly designated $PbCO_3 + Pb(OH)_2$.

Experienced analysts usually test white lead to ascertain if it contains the right proportions of hydrate, by first weighing the pigment, then drying it at $212^\circ F.$, followed by roasting it in a dry air current. The water thereby evolved—from 2 to 3 per cent.—is intercepted by a weighed calcium chloride absorption tube. But in the hands of untrained men very

without decomposing. Lead sulphate, if abundant, may be recognised by its needle crystals; and can be further confirmed by its possible reactions.

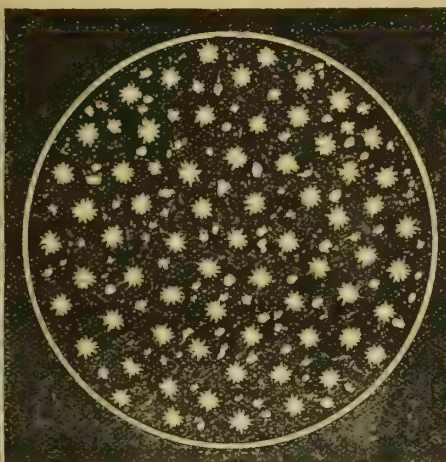
The best white lead only needs from 11 to 15 parts of linseed oil to render it a satisfactory pigment. White lead paint does not eventually crack in the manner that zinc white and baryta white paints are liable to do. It is believed by many chemists that this admirable trait is due to the saponification of the white lead by the oil used in it; lead linoleate thereby forming.

An interesting experiment bearing on this phase is readily undertaken. Make a thin film of white lead oil paint upon a glass slide, and then add a few drops of dilute sulphuric acid (10 per cent. of acid), and gently stir with a fine glass needle. A creamy state will be produced owing to the decomposition of the lead soap; and the accompanying destruction of its oily or hydrofuge nature. Nothing of the kind follows similar treatment of zinc white and baryta white oil paint. A microscopical examination of this treatment discloses some very beautiful lacy patterns.

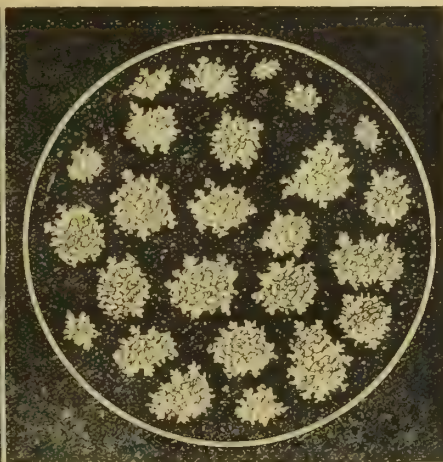
It is true that barium sulphate is immune from the attacks of sulphuretted gases and vapours, and thus retains its whiteness, and may confer the same trait on any white lead with which it is mixed; but it is none the less an adul-



No. 1.—About one-thirtieth inch of a layer of newly formed netted particles of lead carbonate; magnified.



No. 2.—About one-thirtieth inch of a layer of starred lead carbonate, being precipitated from solution; magnified.



No. 3.—About one-thirtieth inch of a layer of lead carbonate granules, of which the visible nodules are composed; magnified.

erroneous calculations may be arrived at by the adoption of this method. A very simple experiment will give a clue to the required quality of white lead. When strongly heated it should lose 14.5 per cent. of its weight, owing to the elimination of carbon dioxide, and water. If this result is not obtained, additional tests should be applied to learn the character of the defects.

Although white lead has been found adulterated, either accidentally or intentionally, with many additions, the only ones likely to be encountered are barium sulphate (heavy spar, or barytes) and lead sulphate. Among the substances inadvertently incorporated in white lead are metallic lead—this gives it a greyish tinge; litharge or massicot—this gives it a yellowish tinge; minium or red lead—this gives it a rosy tinge; excess lead hydrate—this makes it translucent; excess lead carbonate, and lead acetate—these do not appreciably alter its appearance. Compounds which have been purposely introduced into white lead include (besides those above referred to) china clay, chalk, and whitening. They are, however, very seldom used, and hardly require testing for unless the white lead is intended for exceptionally valuable work.

For the discovery of barium sulphate or barytes it is only necessary to treat a sample of the white lead with dilute nitric acid, which will completely dissolve the substance if it is pure. Any deposit left will almost certainly indicate barium sulphate or lead sulphate; most probably the former, the minute granules of which will withstand an excess of any kind of acid

teration. Moreover, in view of the fact that white lead, when satisfactorily varnished, is protected against the entrance of such fumes, the claim made on behalf of barium sulphate must be considered to be simply an excuse for its use. Again, since barium sulphate oil paint habitually in time, cracks and peels, white lead containing it might also succumb to the same fault.

The old Dutch method for the manufacture of white lead, modified to suit modern ideas, still seems to yield the most acceptable composition. In this, as many readers will know, metallic lead in rolled sheet, or some other convenient form, is suspended above acetic acid in large jars which are embedded in manure or spent tan, and covered by boards above and around which the same refuse material is built up. After several months' experience the lead is converted into carbonate and hydrate.

The practice in which acetic fumes act as a catalyst or carrier for the CO_2 instead of forming chemical combination, except in the preliminary stages, maybe, is alluded to now because sometimes lead acetate may occur in the white lead. Amounts of lead acetate ranging from 2 to 11 per cent. have been found. To test for this salt, the dry white lead is ground up with distilled water into a paste, which is washed on a filter with freshly boiled distilled water. The filtrate should only be slightly cloudy when dilute sulphuric acid is added to it. Otherwise, if cloudiness is conspicuous, it signifies the presence of lead acetate in the white lead.

Litharge, sodium chloride, and water, agitated together for several hours, and then penetrated by a current of carbon dioxide, till the substance is neutral, precipitates very excellent white lead; but it is liable to become inferior if not properly manipulated. Variations of this process are adopted in many districts. There can be no chance for any lead acetate forming in these grades.

The laboratory method of producing pure lead carbonate is to pass a solution of sodium carbonate into a solution of lead acetate or lead nitrate, until the formation of a precipitate (*i.e.*, lead carbonate) ceases. Such precipitates are worth microscopical examination during their evolution. My own plan is to place a few drops of a solution of sodium carbonate and lead acetate (or lead nitrate) close together on a glass slide, place the latter on the stage of the microscope, and while looking through the tube cause the two solutions to flow into the other by a touch with a needle. The shapes of the particles of instantly, or else rapidly, formed precipitate can then be well observed.

In the case of the lead acetate reaction irregular networks of extremely minute crystals mostly appear. With lead nitrate starred crystals abound. The first are shown in Fig. 1, and the second in Fig. 2. Some of these objects may be detected in solutions of the respective salts before contact with sodium carbonate solution, owing to the action of CO_2 dissolved in the water, or attracted from the air; but their numbers are incalculably augmented when the sodium carbonate solution is added. Both forms are to be found in either solution—acetate or nitrate—at various times, and often minute separate needles accompany them. The stars and needles are heavier than the granules. The interstices between the stars are gradually filled up until angular objects are formed. The continuous deposition upon these, and upon clusters of less shapely crystals, of relays of particles, as shown in Fig. 3, gives rise to the visible nodules, resembling small white seeds, so well known to chemists.

I have found similar nets, stars, and grains in acetated metallic lead while being converted into white lead; and I believe that the lead hydrate, by occupying positions between the granules, which are nucleated by the stars, holds them together through its affinity for surrounding oxygen, without it being able to truly oxidise itself. This idea seems to be confirmed by watching the magnified white lead breaking down under the influence of a dilute acid.

DISTILLATION OF AQUEOUS SOLUTIONS OF RELATED ORGANIC SUBSTANCES.

AT the recent meeting of the British Association at Bournemouth, a paper on this subject was read before the Chemistry Section by Messrs. J. Reilly, D.Sc., and W. J. Hickinbottom.

When dilute solutions of organic fatty acids are distilled, said the authors, it is well known that certain regularities are observed. Various forms of distillation constants have been advanced to express such regularities. These constants may be derived from Nernst's law of distribution. This law may be used as a starting-point for the discussion of the theory of distillation of dilute solutions. For large changes in concentration Nernst's law does not hold exactly, and a method of steam distillation is recommended in which only small changes in concentration occur. By plotting the constants for the normal fatty acids (formic to caprylic acid) against the number of carbon atoms present in the acid, an approximately straight line results, showing an interdependence between molecular constitution and rate of steam distillation. Acids containing a branched carbon chain (as isovaleric) have greater constants than normal acids of the same molecular weight. The experimental evidence at present available shows that for isomeric substances (as, for example, *normal* and *iso* butyric acids), the distillation constants are distinct enough to differentiate between the substances.

The lower saturated monohydric alcohols, phenols, and other substances have been distilled in a current of steam under definite conditions, and results have been obtained showing a relation between molecular complexity and the distillation constants. In cases where the constitution of a substance is uncertain, and when it is volatile in steam, a comparison of its distillation constants with those of allied substances may assist in deciding its molecular constitution. Within certain limits the distillation constants for formic and acetic acids and the lower saturated aliphatic alcohols

are subject to variations depending on the concentration. The addition of certain non-volatile substances, such as acids or salts, also causes an alteration in the distillation constants. As the homologous series of saturated fatty acids and alcohols are ascended, the distillation constants increase with the molecular weights, the reverse of what might be expected from a knowledge of the vapour tension of the pure substances. It is considered likely that the tendency for the acids or alcohols to form molecular complexes may account for this behaviour.

As well as using the method of steam distillation for analysis of fermentation products and various technical preparations containing the volatile fatty acids, a method has been worked out to detect the presence of butter and of fats of the coconut-oil type in margarine and other products. By determining the distillation constants of the water-soluble volatile acids under definite conditions, constants for the fats are obtained which differ considerably in the case of butter fats compared with other fats which have been examined (coconut oil, palm-kernel oil, babassu fat).

DYESTUFFS FROM SWITZERLAND.

DR. E. A. SWIFT, managing director of the Sandoz Chemical Co. Limited, in the course of a letter to the *Yorkshire Post* regarding a statement which had appeared in that journal that "In responsible quarters it is believed that some of the colours emanating from Swiss sources have their origin in Germany, or are the products of firms financed by Germans," asks what are the "responsible quarters." "Is it the Board of Trade," he asks. "If so, perhaps it might be worth while to know why we are now shipping, and have been shipping by a special arrangement with the Board of Trade for nearly five years, the raw material for the manufacture of the dyes which are returned to this country. Why should the Swiss bother to get British and Allied raw material when the colours 'have their origin in Germany'? Further, an arrangement has now been concluded with 'responsible quarters' by which the Swiss agree to take 95 per cent. of their raw materials from Great Britain or Allied countries, with an English official acting under the British Legation in Berne to act as inspector, with access to the works books; no certificate of origin being granted until this official is satisfied of the absolute *bona-fides* of the dye concerned.

"The writer has just returned from Switzerland, and found a brisk demand for Swiss dyes for export from Switzerland to Germany. Why? Because the Germans are finding the same difficulties as everyone else. Plant takes time to re-adapt, raw material is short and will be short, they have lost coal-fields and chemical deposits, production is less; they cannot work miracles. 'Responsible quarters' know very well, wherever and whoever they are, that their exchange arrangement with the Swiss dye industry, raw material for dyestuffs has been and will be a great boon to the textile trade, and one upon which they could well congratulate themselves.

"As regards the dyes 'being the product of firms financed by Germans,' this statement was made on November 21, 1917, and publicly withdrawn as being 'wholly untrue and without foundation.' So far as the statement made by one of your informants regarding the visit of a delegation of the Colour Users' Association is concerned, it can only be said that we do not believe that is a correct description of the true object of their visit, or of the reply they got. Please let it be clearly understood that on that visit no question of any sort relating to any arrangement was put by the delegation of the Colour Users' Association to the Sandoz Chemical Works.

"We would finally state that we have backed England through thick and thin with our supplies since August, 1914, and we feel sure that the other Swiss makers have done the same. We have fought the German competition before the war more strenuously than British makers ever did. We shall still fight it, and we are confident that we can hold our own. It is to the best interests of the British trade that we should do so. We want no favours—simply a fair field—but such statements as those taken up by us in this letter are not fair because they are not true."

COLOURWORKERS' CLAIMS.—A Court of Arbitration at Old Palace Yard, London, on Tuesday heard an application by the National Federation of General Workers for an advance of wages for workers in the paint, colour, and varnish manufacturing trades. The court reserved their decision.

INSTITUTE OF METALS.

AUTUMN MEETING.

THE annual autumn meeting of the Institute of Metals was held at the University, Sheffield, on Wednesday and Thursday. The President, Professor H. C. H. Carpenter, occupied the chair.

The following are abstracts of some of the papers submitted:

"The Ternary Alloys of Tin-Antimony-Arsenic."

By J. E. Stead, D.Sc., M.Met., F.R.S.

The paper contained a short review of a paper read before the Society of Chemical Industry in 1897, on the ternary alloys of tin-antimony and tin-arsenic, in which it was shown that cold alloys containing between 92.5 and 75 per cent. tin and 75 and 25 per cent. antimony contain cuboidal crystals having the composition of Sb_3Sn embedded in a eutectic consisting of a solid solution of 92.5 per cent. tin and 7.5 per cent. antimony; also that cold alloys containing from traces of arsenic up to 5 per cent. and 99.95 per cent. and 95 per cent. tin contain crystals in the form of flat plates which on being separated were found to have approximately the composition of Sn_3As_2 and a matrix of practically pure tin.

The interesting feature of the present paper is the character of the ternary crystals that form when some of the alloys containing tin, antimony, and arsenic solidify. In the slowly cooling alloy containing 70% tin, 25% antimony, and 5% arsenic, more or less complete spherical shells grow, leaving as the matrix the eutectic of the ternary alloy of tin plus antimony which contains only traces of arsenic. If the alloys contain less than 2.5 per cent. arsenic when associated with 25% of antimony and the balance of tin, the crystals formed are cuboidal and not spherical, but when the arsenic exceeds 2.5%, the antimony remaining at 25%, the crystals begin to change from the cubic to the spherical form. It is not till the crystals themselves contain a ratio of arsenic to antimony of more than 1 to 7 that the spherical forms become pronounced, but in every alloy no arsenic remains in the eutectic, for all of it crystallises out in the ternary crystals, whether they are cuboidal or spherical. When the arsenic is maintained at 5%, and the antimony varies, it is not till the antimony exceeds about 8% that the perfectly flat crystals begin to change into segments of spheres. In these alloys the whole of the arsenic is included in the separate crystals, and none remains in the eutectic.

When an alloy containing 70% tin, 25% antimony, 5% arsenic, is very slowly cooled so as to lead to the formation of very large spherical crystals, and the cold alloy is strongly etched, the central portions of the spherical shells resist the attack and remain white, and the crystalline matter enveloping these nuclei, which subsequently fell out of solution, are stained a brown colour. It is further shown that the exterior borders of the complete crystals consist of aggregations of cubes, from which it is evident that the crystals that first form contain more arsenic than those which fall out of solution at a later period.

In an appendix to the paper, the author gave analyses of the fragments of the cleavages from the central portions of the spherical crystal shells, which yielded on analysis 60.15% tin, 27.5% antimony, and 12.45% arsenic. It was impossible to separate the first portions that fell out of solution by chemical means, and it is possible that what was separated mechanically included other portions of the crystals. The analysis just given only proves that these portions contain about twice as much arsenic, or more than what fell out at a later period.

The analysis of the whole crystals approximated to 48% tin, 42% antimony, and 10% arsenic. When 50% of these crystals were melted with 50% of the eutectic of tin-lead, the crystals found on solidification were more or less spherical in form. Crystallised out of the eutectic of lead-antimony, the crystals were also spherical, but other crystals of undeterminate form were also present adhering to the walls of the spherical segments.

The composition of the flat, platy crystals separated from the alloys containing arsenic, constant at 5%, together with 4% and 6% antimony, contained:

Alloys	Yielded crystals in flat plates.
Tin 91%, antimony 4%, arsenic 5%	= Tin 64.3%, antimony 6.2%, arsenic 29.5%.
Tin 89%, antimony 6%, arsenic 5%	= Tin 64.5%, antimony 6.73%, arsenic 28.8%.

In the alloys containing more antimony, from 8% to 10%, the crystals contained:

Alloys.

Yielded spherical crystals.

Tin 87%, antimony 8%, arsenic 5% = Tin 63.63%, antimony 18.27%, arsenic 18%.

Tin 85%, antimony 10%, arsenic 5% = Tin 56.50%, antimony 27.80%, arsenic 15.7%.

It was difficult to calculate the chemical constitution of crystals of such mixed and complex nature. It is evident, however, that until the ratio of antimony to arsenic exceeded 1 to 1 the spherical crystals of pronounced character did not form; on the other hand, cubic crystals did not begin to change to the spherical form until the ratio of antimony to arsenic in the crystals exceeded about 7 to 1.

The alloys are very brittle, cleavage following the central part of sheet crystals. For that reason excepting for the production of ornamental objects, they are of no commercial value. No attempts have been made to explain why idiomorphic spherical crystals should take spherical form and the discussion of this is left until more research has been made.

Notes by Mr. J. L. Spencer on curvature in mineral crystals indicated many causes why the curved faces were produced, but in no case were these crystals truly idiomorphic or developed out of a eutectiferous matrix.

"Second Report of the Beilby Prize Committee of the Institute of Metals, on the Solidification of Metals from the Liquid State."

By Professor Cecil H. Desch, D.Sc., Ph.D.

The present interim report deals with two questions which have arisen in the course of the main investigation, namely, the form of crystal grains and the conditions of cellular convection. If the form of crystal grains were determined by surface tension, as is required by Quincke's hypothesis, they should resemble very closely the cells in a mass of foam. It is shown that foam-cells, whilst variable in shape, tend to resemble the pentagonal do-decahedron. Grains of beta-brass, isolated by means of mercury, are found to be very similar to foam-cells. The polygonal boundaries of crystal grains in plane sections have also been examined, and compared with the theoretical sections of the polyhedra which would be produced by growth from centres under certain assumed conditions. A comparison of the diagrams obtained leads to the conclusion that surface tension has an important share in determining the form of the grain boundaries, although it does not follow that Quincke's assumption of the preliminary separation into two liquids is true. Two forces, that of surface tension and the directive force of crystalline cohesion, are opposed to one another, and their resultant determines the boundary.

The second section describes experiments to determine the difference of temperature between the centre and periphery of a convection cell in a liquid cooling under the conditions of Benard's experiments. Differential thermo-couples of fine wire have been used, and the results show that the difference of temperature may amount to 6° C., or even more in cells of molten wax 18mm. in diameter and about 1.5° in cells of soap solution 30mm. in diameter. Such differences are quite sufficient to account for the preferential freezing at the borders of cells, which is sometimes observed.

"The Properties of Standard Silver, with Notes on Its Manufacture."

By E. A. Smith, A.R.S.M., and H. Turner.

Standard or sterling silver, which contains 92.5 per cent. of silver, and is the only silver alloy of industrial importance, derives its name from the fact that, from very early times, it has been the legal standard alloy for all British silver coinage, and so-called silver plate. Apart from special investigations undertaken for mint purposes, little has been published hitherto on the properties of standard silver in relation to its employment for industrial purposes, and the purpose of the paper is to record a number of tests the authors have made on the metal, and to draw attention to important details to be observed in its manufacture.

When the alloy is cast there is a tendency for the silver to become concentrated in the middle of the ingot, but when proper precautions are taken the differences in composition in different parts of the ingot are not sufficient to interfere seriously with the application of the alloy to minting and to industrial purposes.

The authors have found the temperature of the metal in the crucible when ready for casting to be about 1200° C., and

the temperature of the stream during pouring to be about 1113° C. The best temperature for annealing in works practice has been found to be 670° C. for all-round work. The time necessarily varies according to the thickness of the sheet, but generally annealing is complete in from 20 to 30 minutes. The hardness of the metal at successive stages of cold rolling has been determined, and the results plotted as a graph. The maximum Brinell hardness of standard silver is about 183. The maximum tensile strength varied from 11 to 14 tons per sq. in. according to the method of casting. Results are given for the Charpy impact test, and the Sankey alternating-bend test, which has only recently been applied to non-ferrous metals.

"Graphite and Oxide Inclusions in Nickel Silver."

By F. C. Thompson, D.Met., B.Sc.

As has been shown to be the case in cupro-nickel, the precipitation of graphite from carbonised nickel-silver occurs around the crystals. This graphitisation, which occurs on annealing the metal at temperatures above 700° C., renders the alloy extremely brittle. There is no means of preventing a gradual carbonisation occurring as a result of repeated remeltings of scrap. All that can be done is to dilute the alloy continuously with new metal. Graphitisation occurs first at the surface and thence passes inwards.

Nickel-silver oxidised during melting shows aggregates of small globules of zinc oxide which are not appreciably deformed as a result of subsequent rolling, a fact which enables such inclinations to be differentiated from slag.

ELECTRIC FURNACES.*

By Verdon O. Cutts.

THE development of the electric furnace in recent years is a subject full of interest. It has been intimately associated with the steel industry, and very closely identified with the arc type of furnace in particular. The measure of success with which it has met has awakened keen interest in other industries. The non-ferrous metallurgist has followed this development with considerable interest, and many attempts have been made to adapt it for the melting of brass, copper, and other non-ferrous metals and alloys.

Attempts to utilise furnaces of the arc type for melting metals which readily oxidise and volatilise have resulted in comparatively high metal losses. This feature must obviously exist in any furnace having an intense local heat. Furnaces of this type require constant regulation, which increases labour costs. Electrode breakages and consumption are also a disadvantage. The induction furnace does not possess many of these disadvantages, and has a low current consumption. It is, however, only built of small capacity for non-ferrous work, has a low power factor, and is comparatively very expensive in upkeep, owing to the melting channels requiring frequent renewal. If it is poured dry, it is necessary to start with molten metal from another source.

The type of furnace described is that of the resistance type. It has a high power factor, about 98%, and a load factor closely approximating to this figure. This makes it a very desirable load. The heating element consists of a trough filled with a granular resistor material, and it is the resistance of this material to the passage of the electric current which generates the heat, which is radiated from the furnace roof.

It is a heavily heat insulated furnace, and consequently it is of comparatively large size for its output. This disadvantage is, however, fully compensated for by the fact that, largely due to this particular feature of design, metal losses due to oxidation and volatilisation are reduced to a figure much below that which is possible with any combustion type of furnace. As an illustration of this, the writer recalls an instance in which operating sheets for a six days' run on yellow brass scrap showed actual metal losses of 1.3%. That this was by no means an exceptional or "show" run, has been clearly proved by operating sheets for a subsequent period of six weeks, during which time the over-all metal losses were 0.8113% whilst still working on yellow brass scrap. One feature which is incidental to the reduction of metal losses is the almost total elimination of the danger of occupational disease due to zinc fumes. This fact, taken in conjunction with the heavy heat insulation of the furnace, ensures ideal operating conditions.

* Paper read at the autumn meeting of the Institute of Metals at Sheffield this week.

There are no electrodes in the generally accepted meaning of the term. Carbon blocks are used as a means of obtaining the necessary electrical connection to the material in the resistor trough. As those are not in contact with the atmosphere, there is practically no erosion or electrode consumption. The only parts of the furnace which require renewal and repair are the refractories and the resistor material. Owing to the absence of any intense local heat, the refractories have a long life. The resistor material requires replenishing about once per fortnight under normal operating conditions. No products of combustion are introduced to the furnace.

These furnaces are made in standard sizes ranging from 40kw. up to 1000 kw. and these are of the pit type, hand and motor tilted type, and also of the tapping type. The unit size most generally adopted is the 105kw., round hand tilting type, which has a normal hearth capacity of 1500lb. and a melting rate of 600lb. per hour. The flexibility of this unit is illustrated by the fact that it is operated with charges varying from 5 cwt. up to 2 tons. With regard to the current consumption of furnaces of this type, experience and commercial practice show this to vary from 300 to 350kw. hours per ton of, say, yellow brass scrap melted.

The largest furnaces, say, 500 to 1000kw., are of the rectangular non-tilting or tapping type. The cold charge is introduced through motor operated doors, and rabbling doors are conveniently placed. One of these furnaces, used for remelting aluminium pig, is supplied with 500kw., and has a hearth capacity of 3 tons. The same furnace has a hearth capacity of 9 tons of brass, with a melting rate of 2 tons per hour when supplied with 600kw. A 1000 kw. furnace of this type is employed for melting zinc cathode, and has a capacity of 200 tons per day. Its operating sheets show that the percentage of metal dross averages 2.43%.

It is interesting to note in conclusion that these furnaces are really a development of a considerable number of furnaces of the same type, which are in regular daily operations.

ACTION OF WATER AND ACIDS ON GLASS.

IN testing the stability of various glasses when in contact with water and chemicals, it is customary to powder the glass so as to hasten the solvent effect by increasing the surface on which the water can act. The tests are further conducted in boiling water or at higher temperatures. Both the powdering and the high temperatures are certainly open to objections, and the tests can hardly give comparative results, when they are not performed under the conditions to which the material will subsequently be exposed. That objection is raised against all accelerated tests. In the *Comptes Rendus*, of August 18 last, Paul Nicolardot recommends series of tests, conducted at temperatures of 100°, 120°, 140°, 160° C., such as he performed in 1916; only in exceptional cases would he go to temperatures of 183°, which Mylus uses at the Reichsanstadt, as Nicolardot considers this temperature as altogether excessive. The tests of various French and other glasses, of which he gives particulars, were, however, made after three hours' boiling of the glass, in water or in hydrochloric acid. He takes either whole glass blocks or powdered glass, sifted through screens, which he distinguished as coarse, medium, and fine powders; his figures express the loss of weight in parts per 1,000 parts of glass. The figures were for a Jena glass, whole, coarse, medium, or fine powder respectively, 0.09, 0.25, 0.75, 2.75; for a Krasna glass, 0.44, 4.25, 9, 61.5; these were the best and the worst glasses tested. In the diluted hydrochloric acid the figures for the Jena glass were 0.03, 2, 5, 40; for the Krasna glass, 0.03, 2, 6, 49. Thus the attack increased very much with the fineness of the powder. When the loss of weight is reduced to unit surface, however—so far as this is possible by estimating the surfaces of the powdered particles,—the attack remained fairly constant in the case of water, the increase in the loss of weight suffered by the fine powdering being slight. This is, of course, the argument on which the advocates of the accelerated tests rely. But the argument does not hold for the acid, in which the fine powders all lost two or three times as much in weight as the whole glass, and all more generally than in water. The results are contrary to expectation in two respects. First of all, water is believed to attack the whole glass of glass vessels as much as acid, if not more; and, secondly, one does not see why the fine powdering should have so markedly a stronger influence in the case of the acid, in which, moreover, the difference between the different kinds of glass was far less striking.—*Engineering*.

MECHANISM OF THE "N-BUTYL ALCOHOL AND ACETONE" FERMENTATION PROCESS.*

By J. REILLY, D.Sc., AND W. J. HICKINBOTTOM.

AMONG the more recent applications of bacteriology to technical processes is the conversion of carbohydrates into a mixture of *n*-butyl alcohol and acetone (A. Fernbach and E. Strange, E. P. 21,073, 1913). Certain bacteria are known, as, for example, *granulobacter butylicum*, *bacillus amylobacter*, and the butylic bacillus of Fitz. *tyrothric tenuis*, which, under certain conditions, convert carbohydrates mainly into *n*-butyl alcohol and acetone, producing, in addition, carbon dioxide and hydrogen, together with small quantities of acids and other alcohols (chiefly ethyl). From 100 grammes of maize may be produced 7 grammes of acetone, 16 grammes of *n*-butyl alcohol, 2 grammes of volatile fatty acids, 19 litres of carbon dioxide, and 16 litres of hydrogen at 20°.

In a normal fermentation, which usually lasts about 24-30 hours, the acidity of the mash gradually increases from a very small value until 10cc. of the mash liquor requires from 3.5 to 4.5cc. of 0.1 *N*-sodium hydroxide solution for neutralisation, after eliminating carbon dioxide. Usually 13 to 17 hours are required before the acidity reaches its maximum value, when the formation of acetone and *n*-butyl alcohol commences. The actual value for the maximum acidity and the interval before the *n*-butyl alcohol and acetone are formed depends to some extent on the experimental conditions, the source of carbohydrate, and the percentage of inoculant. During the production of acetone and *n*-butyl alcohol in the mash, the acidity falls gradually to a constant value of about 1.5-2.5cc. of 0.1 *N*-sodium hydroxide per 10cc. of mash. It was considered that, in view of these variations, a study of the acid-formation in the fermenting mash might give an insight into the fermentation process.

The acids present in the mash are principally acetic and butyric acids, with a small quantity of a non-volatile acid. It is found that the ratio of these acids to each other depends on the age of the fermentation. Shortly after inoculating, the acids are present in the proportions of approximately four or five molecules of acetic acid to one of butyric acid, but as the acidity increases the ratio of acetic acid to butyric falls until at the period of maximum acidity there are about 1.1 to 1.4 molecular proportions of butyric acid to one of acetic acid. During the production of the acetone and alcohol the ratio of acetic to butyric acid increases gradually, so that when the fermentation is completed the volatile acids in the mash are four or five parts of acetic and one part of butyric acid.

The fluctuations in the relative amounts of the two acids present in the mash would indicate that the acids are intimately connected with the production of acetone and *n*-butyl alcohol, especially as the formation of the latter substances may be suppressed almost completely by conducting a fermentation in presence of sodium carbonate. Under these conditions the main products formed are acetic and butyric acids. These acids are obtained in the ratio of one molecule of acetic to 1.8 molecules of butyric. Using these proportions, and assuming that *n*-butyl alcohol and acetone are formed from the acids without any appreciable side reactions, *n*-butyl alcohol and acetone should be produced in the ratio of two parts by weight of the former to one of the latter. Such a result is in accordance with the actual yields obtained. It seems likely, therefore, that the *n*-butyl alcohol is produced from the butyric acid. In support of such a view several facts are adduced; the decrease of the amount of butyric acid in the mash is coincident with the formation of *n*-butyl alcohol; the hypothesis is in agreement with experimental data given by Buchner and Meisenheimer (*Ber.*, 1908, 41, 1,410); the reduction of butyric acid to butyraldehyde has been observed to be brought about by certain extracts; the addition of butyric and propionic acids results in the formation of *n*-butyl and *n*-propyl alcohols respectively; *n*-butyric acid has been observed in most fermentations in which *n*-butyl alcohol is obtained.

It is also probable that the acetic acid is an intermediate substance in the formation of the acetone. Since the decrease in the amount of this acid in the mash during the fermentation is much slower than that of butyric acid. The amount of acetone produced is only half that of the alcohol. Also on adding acetic acid to the fermenting mash it is found that the

added acid is converted principally into acetone. The fatty acid is best added periodically some hours after the maximum acidity of the mash has been reached, in such a manner as to maintain a figure for the acidity of the mash equal to the maximum acidity obtained in a normal fermentation.

There is produced also in the fermentation a small amount of ethyl alcohol. It is not yet determined whether this is obtained in a side reaction, or whether it is due to the presence of some impurity.

The two volatile fatty acids in the mash appear to be attacked each in a different manner, the butyric acid undergoing a reducing action, while the acetic acid is condensed to acetone. To account for this difference, it is suggested that the formation of dipropyl ketone by condensation from the butyric acid may be prevented owing to the increased steric hindrance imposed by the presence of large groups.

TREATMENT OF WOOL-SCOURING LIQUORS.

TWO important developments are promised by Mr. W. Russell Grimwade, B.Sc., in *Science and Industry* (Australia), in connection with the handling of wool-scouring by-products. So great is the existence of natural grease in Australian wools that the Commonwealth could provide all the refined lanoline needed for local consumption, as well as the crude fats, and still have 90 per cent. of its production available for export. This result is not at present being obtained, and large quantities are lost in the scouring process.

One problem in the process has been due to the difficulty of obtaining a uniform raw material. The fat derived from the fine wool of merino lambs, if kept separate, requires very little refining; on the other hand, the fats from other wools are so crude that no amount of refining can make them suitable for toilet preparations, and the only useful purpose they can serve is as an ingredient of lubricants and axle greases. Decomposition and fermentation set in if they are kept for any length of time, and such fats should be treated as quickly as possible if intended for use in the manufacture of good products.

Mr. Grimwade states that machines have now been introduced from America capable of continuously treating the enormous volume of scour liquors, and separating from them the small percentage of fat they contain. By this means a fairly uniform and suitable raw material, which may be treated by any one of several well-known processes, should be available to the refiner. In addition to the natural fats that wool contains, there is present a fair proportion of alkali. The scouring is done with soda, which saponifies fat and degreases the wool fibre. A recent discovery promises important developments in this industry. Under the new process, the potash contents of the wool are made to combine with the natural fatty acids, and so create a true soap in the form of an emulsion, which may itself be used as a detergent for a subsequent scouring operation.

These developments may have far-reaching consequences, as any economy in the cost of scouring, either by utilising the waste products or reducing the quality of alkali necessary in the process, will encourage the handling of the wool before shipment.

CRYSTALS.

ARTIFICIAL crystals of great regularity and clearness and of almost unlimited size are claimed as products of the perfected process of R. W. Moore, an American physicist. The usual growing of crystals consists in evaporating the solution in which a little crystal is suspended as a nucleus. In the new method the solution is kept slightly supersaturated, and the growth continues as long as this condition is maintained. Crystals of Rochelle salt (sodium-potassium tartrate) more than three inches long and two inches thick have been produced with all surfaces and angles perfect. This salt is most soluble in hot water, and supersaturation is obtained by dissolving in hot water and slightly cooling. With the aid of a thermostat the temperature is so regulated as to keep up the supersaturated condition. The seed crystal is suspended in the solution of the material, and growth is said to continue indefinitely with efficient control.

* Paper read before the Chemistry Section of the British Association at Bournemouth.

NEWS FROM THE ANTIPODES.

[FROM OUR OWN CORRESPONDENT.]

SYDNEY, August 8.

The Sheep Dip Embargo.—Speaking on this subject recently, Dr. J. F. Elliott, managing director of Elliott Brothers, Limited, expressed the opinion that the recent action of the Federal authorities in prohibiting the importation of sheep dips was quite unnecessary. Pastoralists should have an absolutely unrestricted choice in the treatment of their flocks, and local manufacturers could compete on perfectly level terms with importers. Sufficient protection was afforded by the heavy freights and other shipping charges, together with the cost of keeping stocks. The greatest protection, however, he affirmed, was the scientific knowledge of the Australian manufacturers, coupled with their familiarity with local conditions. So long as "dumping" was prevented, and the cost at port of shipment was not below that which prevailed in the country of origin, the competition from overseas could be welcomed, not feared. The action taken in Melbourne seemed to him quite unjustified, and the explanation so far supplied could not be considered as in any way adequate.

Commercial Alcohol.—A proposition has been put before the Minister for Customs on behalf of a syndicate representing a large amount of Australian capital for encouraging the manufacture of commercial alcohol for industrial purposes, as advocated by the Bureau of Science and Industry. The new motive fuel, which is known as "Natalite," is largely manufactured in South Africa, and it is claimed that it is in every way superior to petrol, and can be sold much cheaper. It is manufactured from sorghum. It is proposed to start the industry in Papua, if the Government will remit the high duty which would have to be paid before it could be brought into the Commonwealth. Another proposal is to utilise the prickly-pear lands of Queensland, the pear itself containing sufficient alcohol to pay for the clearing of the ground for sorghum crops. The syndicate contemplates the provision of up to £500,000. capital for the industry, which it hopes to have in full swing in two years. The Minister has asked to be supplied with full details of the scheme, stating that if the proposition is as hopeful as indicated, the Federal Government will consider the possibility of assisting it.

New Zealand Phosphates.—The only deposit of rock phosphate worked in the Dominion of New Zealand is that at Horseshoe Bush estate, Clarendon, Otago, but phosphate has been discovered in other localities also—for instance, at Milburn, where it has been found in workable quantities; at Wangapeka, Nelson (discovered in 1885, and containing about 45 per cent. of tricalcic phosphate); at Weka Pass (coprolites discovered in 1887, containing 37 per cent. tricalcic phosphate); at Oamaru and at Flagstaff Hill, near Dunedin (coprolites); at Whangarei (where in 1906 a rock was found which was almost pure phosphate of lime), etc.

Meggitt, Limited.—The balance-sheet of Meggitt, Limited, Sydney, shows a net profit for the year ended May 31 of £21,236., against £67,627. for the previous term. The sum available for distribution with the amount brought forward from the previous year makes £63,197. The interim dividend at the rate of 10 per cent. per annum on all shares, and a bonus at the same rate on all ordinary shares, paid in January, absorbed £9,469. A bonus issue of 59,752 shares of 10s. each took £29,876., leaving £23,852. A further dividend on all classes of shares at the rate of 10 per cent. per annum and a bonus at the rate of 10 per cent. per annum on the ordinary shares has been recommended, and will account for £9,469., leaving £14,383. to be carried forward.

Chemical Market.—Values of chemicals generally are firm in the local market, and several lines are reported as scarce. Caustic soda, 76 per cent., is quoted at £26., but English brands are scarce, and holders ask £30. Stocks of soda ash are getting low, although the quotation has not risen above £14. a ton. Bicarbonate of soda remains steady at £15. 10s., and cream of tartar at 3s. The quotation for calcium chloride is £18., and for liquid silicate £21. In acids, business has been done with both citric and tartaric at 3s. 6d. Supplies of arsenic are becoming low, owing to the hold-up of shipping from Melbourne, whence most of the Australian supplies come. The present quotation for white is £65., and for grey £5. lower. There has been of late a better inquiry for cyanide at 1s. 2d. and 1s. 3d. for low grade, according to quantity, the lower price being asked for parcels of a ton or more. High-grade lots are sold according to parcel on the basis of

1s. 1d. per lb. for large quantities and 1s. 2d. for smaller parcels. Zinc shavings, which are used in conjunction with cyanide in mining operations, are quoted at 1s. 3d. per lb. for half-ton lots or over, and 1s. 4d. for smaller parcels. Stocks of each are fairly plentiful. G grade rosin is much firmer at £37. 10s., and N grade at £42. Turpentine is quoted at 7s. 4d. per gallon for pinetree and 7s. 6d. for Pratt's, while linseed oil is firm at 8s. 10d. for raw and 9s. for boiled. White lead is unchanged. In oils generally fair business is being done.

SCOTTISH SHALE OIL DISPUTE.

WITH reference to the report which has been issued to the Press, presumably by the representatives of the Federation of Shale Oil Workers, Scottish Oils, Limited, the new company which has been formed to take over the shale oil companies, draw attention to the fact that a very important omission has been made in this report—viz., that at the meeting between the company and the labour representatives it was pointed out that it had been found by a careful investigation of the accounts that, owing to (1) the payment of the Sankey award of 2s. per day, entailing an additional working charge of over £200,000. per annum, and (2) the advance of 6s. per ton in the price of coal since July 15, entailing a further additional working charge of £215,000. per annum, the industry was now being worked at a loss of about £190,000. per annum, not allowing for depreciation or any return on capital. The demand of the workers was that the working day should be reduced from eight hours to seven hours, which would have entailed a further large loss.

The board of Scottish Oils, Limited, while desirous of meeting the views of the shale oil workers to the fullest extent in their power, pointed out the impossibility of carrying on the industry under these conditions, and if the terms of the miners were insisted upon there would be no alternative but to close down the industry of shale mining, much as this result was to be deplored. As an alternative, however, the board offered to continue working on the present conditions—which include the Sankey award of 2s. per day—until the end of the year, when the company would be in a better position to judge as to the extent of the economies that would be effected by the amalgamation which has just been carried through, and as to how far they would be in a position to meet the demands of the workers. This offer has now been declined.

GERMAN DYES IN THE UNITED STATES.

THE announcement that the United States Government have decided to permit the importation into that country of German dyes for a period of six months has afforded an opportunity to an influential German newspaper to repeat some of the arguments which have been used at different times during the past five years concerning the alleged impossibility of the Allied countries to produce certain classes of dyes.

The decision of the United States in this matter, it is said, shows that an economic war after the war is not thought of, but that efforts are increasing to resume the former normal economic relations with Germany. But it is considered to be very instructive to find that notwithstanding all promises and announcements the production of dyes, carried on during the war with the aid of German patents and works seized by the Allies, and partly with the assistance of very high State subsidies, has so far not succeeded in eliminating German products. What have been produced in Allied countries, the newspaper remarks, are makeshifts, as the production is scientifically and practically only in a state of development, and in any case has not fulfilled during the war the expectations entertained in Allied countries. This was clearly shown some time ago when the consumers of dyes in Allied and associated countries, so long as they possessed no German products, were compelled to have recourse to Switzerland for all the finer and complicated dyes, which country temporarily occupied a position of monopoly.

It is admitted, however, that the dyestuffs industry in Allied countries will develop gradually and reach a high level which can prejudice the future world situation for German products; yet German technique and science, the newspaper concludes, will not be at a standstill, but will ensure for German goods their position in line with the manufacturers of other countries.

AMERICAN IMPORTS OF CHEMICAL PRODUCTS.

THE War Trade Board Section of the United States Department of State announces (Ruling 825, dated August 15) that General Import Licence PBF 37 has been revised and extended, effective August 15, 1919, so as to permit the free importation, without individual import licences, of pig-tin and all metal alloys containing tin, and all drugs and chemicals except those dyestuffs and other articles enumerated below. As now amended, General Import Licence PBF No. 37 authorises the importation into the United States from all countries of the world, except Hungary and those parts of Russia under the control of the Bolshevik authorities, of all commodities except the following commodities, the control of whose importation by individual import licences is desirable: The products described in Groups I., II., and III., and all products derived directly or indirectly from coal tar, including crude products and intermediate products, as well as dyestuffs, medicinals, and other finished products, and including mixtures and compounds of such products and other products:—

Group I.—Acenaphthene, anthracene having a purity of less than 30 per cent., benzole, carbazol having a purity of less than 65 per cent., cumol, cymene, fluorene, methylantracene, methylnaphthalene, naphthalene having a solidifying point less than 79° C., pyridin, quinolin, toluol, xylo, dead or creosote oil, anthracene oil, pitch of coal tar, pitch of blast-furnace tar, pitch of oil-gas tar, pitch of water-gas tar, crude coal tar, crude blast-furnace tar, crude oil-gas tar, crude water-gas tar, all other distillates of any of these tars which on being subjected to distillation yield in the portion distilling below 190° C. a quantity of tar acids less than 5 per cent. of the original distillate, all mixtures of any of these distillates and any of the foregoing pitches, and all other products that are found naturally in coal tar, whether produced or obtained from coal tar or other source.

Group II.—Acetanilid not suitable for medicinal use, alphanaphthol, amidobenzoic acid, amidonaphthol, amidophenetol, amidophenol, amidosalicylic acid, aminoanthraquinone, aniline oil, aniline salt, anthraquinone, arsanilic acid, benzaldehyde not suitable for medicinal use, benzalchloride, benzanthrene, benzidine, benzidine sulphate, benzoic acid not suitable for medicinal use, benzoquinone, benzoylchloride, benzylchloride, betanaphthol not suitable for medicinal use, brombenzole, chlorbenzole, chlorophthalic acid, cinnamic acid, cumidin, dehydrothiolutidin, diaminostilbene, dianisidin, dichlorphthalic acid, dimethylanilin, dimethylamidophenol, dimethylphenylenediamine, dinitrobenzole, dinitrochlorbenzole, dinitronaphthalene, dinitrophenol, dinitrotoluol, dioxynaphthalene, diphenylamine, ethylbenzyl aniline, hydroxyphenylarsinic acid, metanilic acid, methylanthraquinone, naphthylamine, naphthylenediamine, nitraniline, nitroanthraquinone, nitrobenzaldehyde, nitrobenzole, nitronaphthalene, nitrophenol, nitrophenylenediamine, nitrosodimethylaniline, nitrotoluol, nitrotoluylenediamine, phenol, phenylenediamine, phenylolhydrazine, phenylnaphthylamine, phenylglyccoll, phenylglyccoll - orthocarboxylic acid, phthalic acid, phthalic anhydride, phthalimid, resorcin not suitable for medicinal use, salicylic acid and its salts not suitable for medicinal use, sulphanilic acid, thiocarbanili, thiosalicylic acid, tetrachlorphthalic acid, tetramethyldiaminobenzophenone, tetramethyldiaminodiphenylmethane, toluol sulphochloride, toluol sulphamide, tribromphenol, toluidin, tolidin, toluylenediamine, zylidin, or any sulpho-acid or sulpho-acid salt of any of the foregoing, or of any of the products provided for in Group I.; all other products by whatever name known which are employed in the manufacture of any of the products provided for in Group II. or III., and which are obtained, derived, or manufactured in whole or in part from any of the foregoing or from any of the products provided for in Group I.; anthracene having a purity of 30 per cent. or more, carbazol having a purity of 65 per cent. or more, metacresol having a purity of 90 per cent. or more, naphthalene having a solidifying point of 79° C. or above, orthocresol having a purity of 90 per cent. or more, paracresol having a purity of 90 per cent. or more; all distillates of coal tar, blast-furnace tar, oil-gas tar, and water-gas tar which, on being subjected to distillation, yield in the portion distilling below 190° C. a quantity of tar acids equal to or more than 5 per cent. of the original distillate; all mixtures, including solutions, consisting in whole or in

part of any of the foregoing, except sheep dip and medicinal soaps.

Group III.—All colours, dyes, or stains whether soluble or not in water, colour acids, colour bases, colour lakes, leuco-acids and leuco-bases whether colourless or not, indoxyl and indoxyl compounds; ink powders; photographic chemicals; acetanilid suitable for medicinal use, acetphenetidin, acetyl salicylic acid, antipyrine, benzaldehyde suitable for medicinal use, benzoic acid suitable for medicinal use, betanaphthol suitable for medicinal use, phenolphthalein, resorcin suitable for medicinal use, salicylic acid and its salts suitable for medicinal use, salol, and other medicinals; sodium benzoate; saccharin, methylsalicylate, coumarin, and other flavours; synthetic phenolic resin and all resinlike products prepared from phenol, cresol, phthalic anhydride, coumarene, indene, or from any other article or material provided for in Group I. or II., all of these products whether in a solid, semi-solid or liquid condition; synthetic tanning materials; picric acid, trinitrotoluol, and other explosives except smokeless powders; all the foregoing when obtained, derived, or manufactured in whole or in part from any of the products provided for in Group I. or II.; natural alizarine and natural indigo, and colours, dyes, stains, colour acids, colour bases, colour lakes, leuco-acids, leuco-bases, indoxyl, and indoxyl compounds obtained, derived, or manufactured in whole or in part from natural alizarine or natural indigo; natural methyl salicylate or oil of wintergreen or oil of sweet birch; natural coumarin; and all mixtures, including solutions, consisting in whole or in part of any of the articles or materials provided for in this group.

All applications for licences to import dyes, intermediates, derivatives of coal tar, synthetic organic chemicals and drugs, and all other commodities enumerated in the foregoing, must be accompanied by supplemental information sheets giving complete specifications of the character of the commodity proposed to be imported. Such supplemental information sheets are procurable from the Bureau of Imports, War Trade Board Section, Department of State, Washington, D.C.

Collectors of Customs and United States Consuls abroad have been instructed that certificates of non-enemy origin (Consular Form 235) are no longer required for any commodity whatsoever, but the supplemental information sheet referred to in the preceding paragraph must in each case contain such information as will enable the War Trade Board Section to determine the actual origin of the goods.

UNITED ALKALI COMPANY'S FLINT WORKS.

CONCERN has been felt this year by the people of Flint and district in regard to the United Alkali Company's works at Flint. The company have been dismantling the works for some time. The Mayor of Flint (Alderman H. Powell) has now received a letter from Mr. Max Muspratt, chairman of the United Alkali Company, Ltd., in reply to the representations of a deputation from the Flint Town Council.

The letter states that the company have completed the arrangements by which Courtaulds, Limited, acquire the whole of the works at Flint, that substantial developments will no doubt be made, and that the prosperity of Flint will in no way suffer by the transfer. The letter further states that Flint has ceased to be the best district for heavy chemicals, and that the company have had to recognise that fact. It is a great pleasure that they can do so without the community of Flint having to suffer in any way.

LEVER BROS. AND PRICE'S PATENT CANDLE COMPANY.

THE terms of the offer to purchase the shares of Price's Patent Candle Company, Ltd., were announced in a circular issued on Monday. Lord Leverhulme offers, under a contract which was signed on that day, to purchase the shares at a price equivalent to £106. per share, £40. being payable in cash and the balance by the allotment of thirty-two 15 per cent. "A" cumulative preferred ordinary shares of £1. each in Lever Brothers, which, at the present market quotation of £2. 1s. 3d., are worth £66. The offer is contingent upon holders of at least 90 per cent. of the shares of Price's Candle Company accepting it. The capital of the company consists of £600,000., divided into shares of £10. each. If the whole of the shares are sold to Lord Leverhulme, the transaction will involve a sum of £3,975,000.

ESTIMATION OF METALLIC ZINC CONTENT OF ZINC DUST.*

By W. F. EDWARDS.

By using the Franz Meyer apparatus and observing all of the numerous required details one can obtain quite accurate, consistent results in the chemical analysis of new (unused) zinc dust; and by the exercise of proper care and precautions fairly consistent results can be obtained also on zinc dust that has been used in the process of sherardising.

However, taking everything into consideration, the hydrogen gas method is not suited to the estimation of zinc dust, used or unused, in sherardising. It requires too long a time, too much attention to details, and too much apparatus. Barometer readings, temperatures, vapour tension corrections, gas absorption corrections, etc., are necessary.

The method of estimating the metallic zinc in zinc dust by the reduction of potassium iodate in dissolving the zinc dust in a strong solution of fixed alkali and subsequent titration of iodine distilled from the acidified solution by sodium thiosulphate, in the main as given in the second edition of "Merck's Reagents, Their Purity and Tests," gives consistent results when proper attention is given to a number of details such as continued shaking during the solution of the zinc dust, proper cooling of the solution of potassium iodide in which iodine is absorbed when distilled from the acidified solution, and proper attention to connections in and displacement of the air from the distillation apparatus. This method, like the hydrogen gas method, is subject to too many details to be a good working method in sherardising or other commercial plants.

Amalgam Method.

The amalgam method gives very uncertain results, but in general it may be said to give too high percentages of zinc oxide, and therefore by difference too low percentages of metallic zinc. As usually described, the amalgam method depends on the titration of the excess of a measured quantity of standard acid, usually hydrochloric acid. It is not easy to get a definite end reaction in an acid solution containing zinc salts, as the zinc hydroxide formed does not show sharply enough the point at which the acid is neutralised by the standard alkali solution. By titrating the acid solution of zinc salts with standard solution of potassium ferrocyanide to obtain the zinc directly instead of by deduction from the amount of acid used, one can get a definite enough end reaction for practical purposes, if the solution is filtered before titration. However, the amalgam method can only be of value when carried out with careful attention to details in parallel estimations of the "unknown" zinc dust and standard zinc dusts of known metallic zinc content, under identical conditions of reagents, temperature, and time. Even under such conditions the results are not even satisfactory for ordinary practical purposes.

Ferric Ammonium Alum Method.

The method of reduction of ferric sulphate in my hands gave very inconsistent results, even when care was taken to run parallel estimations as nearly in the same way as practical. However, with crystallised ferric ammonium sulphate (ferric ammonium alum) I was able to get very satisfactory results, both as to consistency and accuracy, the results comparing favourably with those obtained by the hydrogen gas method, the time being approximately 15 mins. instead of from 6 to 36 hrs., the approximate time limits for the gas method. The process is satisfactory when 1 grm. of zinc dust is weighed into a 600cc. Erlenmeyer flask and 50 grms. of the ferric ammonium alum in crystals (the larger the better) and 100cc. of water added. The mixture should be kept in constant stirring motion by giving a suitable motion to the flask. The crystals of ferric alum aid in stirring the zinc dust, and will usually not all be in solution when the zinc dust is dissolved. As soon as the zinc dust is all dissolved add 100cc. of 1 to 10 sulphuric acid and titrate with N 10 potassium permanganate solution. In case there are many analyses to be made it saves calculation to use a potassium permanganate solution each cubic centimetre of which represents 1 per cent. of zinc on a 1 grm. sample.

Comparison of Results.

The results are quite accurate enough for the estimation of the metallic zinc content of used or unused zinc dust in sherardising plants. The following analyses of used and unused zinc dust by the hydrogen gas method and the ferric

ammonium alum method were made from the same sample in each case, and show a very close comparison:

NEW ZINC DUST.

Hydrogen Gas Method.		Ferric Alum Method.	
No.	Per Cent.	No.	Per Cent.
No. 1	94.9	No. 1	94.7
No. 2	94.9	No. 2	94.7
No. 3	94.8	No. 3	94.6
No. 4	95.1	No. 4	94.5
No. 5	95.3	No. 5	94.6
Average	95.0	Average	94.8

USED ZINC DUST.

Hydrogen Gas Method.		Ferric Alum Method.	
No.	Per Cent.	No.	Per Cent.
No. 1	79.4	No. 1	79.7
No. 2	78.8	No. 2	79.6
No. 3	78.6	No. 3	79.7
No. 4	79.5	No. 4	79.8
No. 5	78.4	No. 5	79.8
Average	78.9	Average	79.7

In the case of the hydrogen gas method on used zinc dust I was unable to get a completed reaction in less than 24 hrs., the time being more often 36 hrs. Attempts to speed up this method by using stronger acid than usual led to freak speeds that gave unsatisfactory results. I have not made any attempt to explain the freaks.

On the whole, I think I am justified in stating that the ferric ammonium alum method of estimating the metallic zinc content of both used and unused zinc dust is quite satisfactory for all practical purposes.

AMERICAN PRODUCTION OF SODA COMPOUNDS.

THE following table, taken from the preliminary report on the Mineral Resources of the United States in 1918, issued by the Geological Survey of that country, gives details of the domestic output of sodium and sodium salts in 1917 and 1918.

Salt.	1917.		1918.	
	Quantity (short tons)	Value.	Quantity (short tons)	Value.
Sodium acetate	1,919	\$225,828	2,542	\$447,897
Sodium benzoate	—	—	203	\$86,058
Sodium bicarbonate	119,177	4,029,499	118,535	3,293,153
Sodium borate	—	—	571	438,750
Sodium carbonate	1,399,625	38,028,000	1,399,628	35,635,520
Soda ash	—	—	—	—
Monohydrate and sesquihydrate	55,035	1,202,875	22,478	482,068
Salt soda	77,959	1,698,520	82,215	2,014,021
Sodium chloride and sodium perchlorate	3,915	1,333,426	2,113	1,094,250
Sodium chloride (common salt)	—	—	—	—
Salt in brine	2,890,588	1,083,586	2,830,600	1,245,265
Rock salt	1,005,025	3,897,595	1,633,341	5,884,661
Evaporated salt	2,182,564	14,359,261	2,724,203	20,010,455
Sodium chromate and sodium bichromate	22,116	3,045,133	28,334	9,808,118
Sodium cyanide, sodium peroxide, and metallic sodium	11,201	7,705,300	9,341	5,514,437
Sodium ferrocyanide	4,173	2,577,667	1,325	2,090,410
Sodium fluoride, sodium fluosilicate, and sodium fluoride	1,424	397,305	788	655,705
Sodium nitrite	861	180,145	1,701	609,779
Sodium hydroxide (caustic soda)	488,056	29,102,689	513,363	31,854,470
Sodium phosphate (including all sodium phosphates)	13,305	711,283	15,020	1,427,847
Sodium silicate	251,011	3,317,547	317,161	5,870,973
Sodium sulphate	—	—	—	—
Salt cake	183,500	2,87,041	140,907	2,835,125
Glauber's salt	47,735	722,465	50,233	1,027,581
Nitre cake	387,824	780,278	142,405	301,562
Sodium sulphide	49,494	1,305,473	43,490	2,263,394
Sodium sulphite and sodium bisulphite	13,707	300,668	16,362	478,482
Sodium tetraborate (borax)	320,890	4,717,532	26,673	3,909,565
Sodium thiosulphate (hyposulphite)	26,598	717,924	26,868	1,054,025
Miscellaneous sodium salts	56	40,000	386	1,158,035
	1,164,925	132,787,578	10,196,347	142,979,761

NEW CHEMICAL WORKS AT SELBY.—The Selby (Yorkshire) Urban District Council have approved the plans for a new factory in The Holmes, at Selby, to be erected by the Selby Chemical Company, Ltd.

* Chem. and Met. Eng. (New York)

ITEMS OF INTEREST.

STORAGE OF CALCIUM CARBIDE.—A fine of £3 was imposed on the Severn Engineering Company, Worcester, on Tuesday, for keeping 10cwt. of calcium carbide without a licence.

EXPLOSIVES IN COAL MINES.—The Home Secretary has made an order repealing so much of the schedules to the Explosives in Coal Mines Orders of February 10, 1914, and June 22, 1914, as relates to the explosives monarkite and stomonal No. 1 respectively.

OBITUARY.—The death occurred on Thursday of last week of Mr. F. E. Lott, a member of a firm of analytical chemists to the Burton Corporation, and who was closely identified with the public work of the borough in various forms. He was 64 years of age, and was an authority on the brewing water of Burton-on-Trent.

MALAY STATES TIN EXPORTS.—It is reported officially from Kuala Lumpur that the August exports of tin from the Federated Malay States amounted to 2,955 tons, compared with 3,756 tons in July and 3,259 tons in the corresponding month last year. For eight months of the present year the exports amounted to 25,100 tons against 25,170 tons in 1918, and 26,418 tons in 1917.

GOVERNMENT-AIDED SVELTER WORKS IN AUSTRALIA.—Mr. Hughes, Australian Prime Minister (*Reuter's* Melbourne correspondent telegraphs), has stated in the House of Representatives of the Commonwealth that the Imperial Government have promised to advance £500,000. for the purpose of fostering the treatment of spelter in Australia, and the Commonwealth will also assist in the establishment of similar works.

REPORTED PURCHASE BY LEVER BROTHERS.—It is reported that negotiations are in progress for the purchase by Messrs. Lever Bros., Limited, Port Sunlight, of the big works erected on the Pembrey Burrows during the war for the manufacture of explosives by Messrs. Nobel, Limited. The works employed during the war something like 7,000 people; they are of vast extent, and would, it is stated, be utilised by Messrs. Lever Brothers for the manufacture of soap and margarine.

CAPITAL ISSUES.—The Treasury announce that applications for permission under the Defence of the Realm Regulation 30 F. to raise capital in this country where the proceeds of the issue are to be applied for capital purposes outside the United Kingdom will in future be dealt with by the Board of Trade. All communications with regard to either new or pending applications should be addressed to the Secretary, Capital Issues Committee, Board of Trade, Gwydyr House, Whitehall, London, S.W.1.

OIL-BORING IN SCOTLAND.—The boring for petroleum on the Scottish shale oilfield, on the borders of Edinburgh and Linlithgow, has been stopped. The expert workers from the United States have returned home, it being stated that their contract was completed. The work has been in progress for several months, and the progress was slow, whinstone being encountered under the shale bed. It is not officially conceded that oil-boring has been abandoned, but, it is stated, those with experience on the Scottish shale oil area do not believe there is any flow of oil, and that the only method of extracting oil is by the process conducted by the companies on the Mid and East Lothian shale fields of raising the shale, and thereafter extracting the oil in the surface retorts.

GERMAN SYNTHETIC NITRATE PLANTS.—Writing in the *Journal of Industrial and Engineering Chemistry*, Mr. R. E. McConnell says that during the year ended November 1, 1918, the Oppau plant produced 20,000 long tons of fixed nitrogen by the Haber process. That is to say, the capacity of the plant is equivalent to approximately one-fifth the total of 3,000,000 tons of sodium nitrate furnished by Chili to the entire world during the same period. It is reported that a similar plant, which has a rated capacity of 125,000 tons of fixed nitrogen per year, has been constructed near Halle. If this is true, Germany's total capacity of 215,000 tons of combined nitrogen, by the Haber process, is equivalent to one-half of the total world's consumption of Chili nitrate. It had been stated that nitrogenous products manufactured in Germany in the year 1916 contained 130,000 tons of combined nitrogen, an amount equivalent to 2,500,000 tons of sodium nitrate, which is practically equal to the total tonnage annually mined in Chili for the markets of the entire world. Germany is now in a position to export nitrogenous products in amounts that approximate her normal consumption of 750,000 tons annually.

ZINC AND ZINC DUST PRICES.—There is no change to report in the price of Australian high-grade zinc dust (88/92% metallic zinc), which remains at £68. to £70. per ton, c.i.f. U.K. Inquiries are fairly numerous, being mostly for forward shipment from Australia. The price of Australian electrolytic zinc, containing 99.95% metallic zinc, is unchanged at £42. per ton, f.o.b. Australia, for direct shipment to New Zealand, India, South Africa, and the Far East.

ZINC-COPPER ALLOY.—"Biakmetal," the new zinc-copper alloy of Adolfo Pouchain, an Italian engineer, is claimed to be stronger than steel and less corrosive than copper, its chief qualities being the highest known breaking point, highest limit of elasticity, perfect homogeneity, and high resistance to heat and chemical action. It can be cast, turned, drawn, forged, rolled, and stamped. It can be substituted for steel, brass, and aluminium, and is claimed to have important advantages over these metals for certain uses.

MUNITIONS CONTRACTS.—The Minister of Munitions has appointed a Committee, under the chairmanship of the Financial Secretary to the Ministry, for the purpose of expediting the liquidation of contracts in all Departments of the Ministry, and also to ensure greater co-ordination between the Liquidating and Accounting Departments and their associated services. The Committee will consist of:—Mr. James F. Hope, M.P., chairman, and Mr. M. Webster Jenkinson, O.B.E., Mr. J. L. Coates, and Mr. E. A. Watson, O.B.E. The Minister has delegated to the Committee full authority for dealing with the liquidation of contracts. Complaints as to delay in liquidation will be considered by any of the three members of the Committee.

SWISS DYE PRECAUTIONS.—The secretary of the Manchester Chamber of Commerce has been supplied by the Swiss Legation, London, with a copy of an order of the Swiss Department of Public Economy, made on June 26 last, remitting the issue and the visa of certificates of origin for aniline colours to the control of the Basle Chamber of Commerce. Certificates of origin as to these colours, if not emanating from that Chamber, but from other issuing offices, should bear the following words: "Délivré sur la base d'une facture visée par la Chambre de Commerce de Bâle." The Legation explain the system of export from Switzerland as follows: In order to prevent the export of foreign products under the Swiss flag, it is absolutely necessary that the origin of these goods should be controlled. As the aniline colour industry is concentrated almost exclusively in the neighbourhood of the Basle Chamber of Commerce, and as that Chamber possess a wide experience in this connection, the Department of Public Economy have now deemed it expedient to make the order quoted above. The control exercised by the Basle Chamber of Commerce affords an adequate guarantee that no productions of the colour industry of any country other than those of Switzerland will benefit by a Swiss certificate of origin.

PROPOSED "MADE IN U.S.A." TRADE MARK.—The *Board of Trade Journal* reports that the Merchants' Association of New York has sent to members of Congress and other Federal officials a brief in opposition to the Bill which authorises the adoption, registration, and protection of a national trade mark to distinguish merchandise produced in the United States. The memorandum claims that the Bill will not bring about the results which it aims to produce, and that its operation will injure, instead of promoting, trade with foreign nations. Although the general use of a suitable legend showing the origin of merchandise, such as "Made in U.S.A.," accompanied by a suitable emblem, is favoured by the association, the memorandum dwells on the legal obstacles which will be encountered. The chief is the practical difficulty of determining and enforcing the standards to be followed in licensing or refusing to license houses to use the trade mark. Again, objections are raised to the granting of too much responsibility and authority to one man—the Secretary of Commerce—in enforcing the provisions of the Act. It is stated that the power which the Act would give to the Secretary of Commerce is dangerous, inasmuch as it would give him complete control over the business of persons engaged in foreign trade. He would also encounter difficulties in fixing and enforcing standards based upon the grades and accepted traditions of manufacturers and trade associations in the United States by the necessity of interpreting and considering at the same time the standards of a large number of foreign countries in each of which the standards and traditions vary. The attempt to establish and enforce standards, therefore, would be sure to injure American sellers or offend foreign powers.

GOVERNMENT AND THE BRITISH DYE-STUFFS CORPORATION.—Mr. Harry Spivey, the president of the Heckmondwike (Yorks.) Chamber of Commerce, made a strong complaint at a meeting of the Chamber a few days ago, concerning the extent to which existing regulations are handicapping country dyers and manufacturers who do their own dyeing. Mr. Spivey pointed out that although the British Dyestuffs Corporation and other firms had succeeded in producing several dyestuffs formerly made only in Germany, it could not be maintained that these were produced in adequate quantities to meet the country's requirements. He alleged that the British Government were bent upon the creation in this country of a monopoly in favour of home producers of dyestuffs, while they were themselves the largest shareholders in the British Dyestuffs Corporation, along with the largest Yorkshire syndicate of dyers. Unfortunately, country dyers and manufacturers were at their mercy. Unless British textile manufacturers were supplied with German dyestuffs they could not maintain the quality of the colouring essential for their success, and would be hopelessly handicapped in their competition with America.

LEGAL INTELLIGENCE.

Customs Seizure of Pyrogallie Acid.

The action *Brown v. Buckley*, which came before Mr. Justice Greer, in the Vacation Court, on Wednesday, was a motion by the plaintiff for an injunction to restrain the defendant, his servants or agents, pending the trial of the action, from detaining 5cwt. of pyrogallie acid, the property of the plaintiff, and from acting in respect of the same upon or under a Royal Proclamation, prohibiting the importation of the goods, purporting to be made under section 43 of the Customs Consolidation Act, 1876, by virtue of which the defendant claimed to detain the goods in question.

Mr. R. A. Wright, K.C., in opening, read an affidavit which said that the plaintiff was a dealer and importer of chemical materials, carrying on business in London and Manchester, as Brown and Forth, and the defendant was an officer of Customs. In May, 1919, the plaintiff ordered 5cwt. of pyrogallie acid from the Mallinckrodt Chemical Works, Limited, of Montreal, Canada. The consignment was shipped on the s.s. *Bevie* at New York about July 29, and arrived at Manchester about August 17. By a notice of seizure dated August 29, the defendant, who was an officer of Customs and Excise at Manchester, purporting to act under the Customs Consolidation Act, 1876, informed the plaintiff that the Commissioners of Customs and Excise, by virtue of their powers under the Customs Acts, seized the goods in question as forfeited on the ground that they had been imported into the United Kingdom in contravention of a Royal Proclamation prohibiting their importation except under licence of the Board of Trade.

Mr. Wright submitted that the Executive had no power to issue any such prohibition as they purported to do here. It followed that the seizure of the goods was a wrongful act. Pyrogallie acid was an ordinary article of commerce and had no relation at all to "arms, ammunition, gunpowder," or kindred matters. The proclamation purported to be made under section 43 of the Customs Consolidation Act, 1876, which provided that the "importation of arms, ammunition, gunpowder, or any other goods may be prohibited by proclamation." The Customs, to justify their action, must show that the expression "any other goods" in section 43 was not subject to the *ejusdem generis* rule of construction. The genus would include arms, ammunition, gunpowder, and any other things which would tend to the breach of the peace, or any engines of destruction and disturbance. If it had been intended that the expression "any other goods" should have the unlimited meaning contended for, the words "arms, ammunition, gunpowder," in the section, were mere surplusage. On the ordinary principles of construction, section 43 of the Act of 1876 was not a general section. It would be doing violence to the statute to construe it in a general sense. "Any other goods" must be limited to the class of goods named in the section. Therefore the seizure of the plaintiff's goods by the defendant was without any colour of right at all. The seizure was unjustifiable and the plaintiff was entitled to immediate redress.

The Attorney-General (Sir Gordon Hewart, K.C.), submitted that the proceedings were entirely misconceived. The action was started in the Chancery Division by a writ issued

on September 17. The plaintiff claimed a declaration that the defendant had no lawful authority to deal with the goods; a declaration that the proclamation under which the goods were seized was invalid: an injunction to restrain the defendant from acting in respect of the goods under the proclamation; and delivery of the goods. The plaintiff started the action notwithstanding that proceedings had already been started under section 207 of the Customs Consolidation Act, 1876, to condemn the goods. In such proceedings, every question that was raised by the plaintiff could be decided. The position was that the goods were seized and notice of seizure was duly given on August 29. A claim for the goods was duly made by the plaintiff on September 1, which would be decided in the proceedings under section 207 of the Act of 1876. Pending those proceedings it was impossible for the Commissioners of Customs to dispose of the goods unless the goods were perishable, which was not the case. The defendant was a junior Customs officer and the goods were not under his control, but were under the control of the Commissioners of Customs. So that any order made against the defendant would be nugatory. Moreover, there was no ground for an interim injunction to prevent somebody from detaining or dealing with the goods. The plaintiff asked for the delivery up of the goods. To grant such an application was unheard of in an interlocutory proceeding. His Lordship was asked to decide the issue of the action in an interlocutory proceeding. The construction of section 43 was not so simple as had been suggested. There was a point of substance and a point of very great importance. The matter came before a Court of three Judges, including Lord Chief Justice Chry, in Ireland, before the war, in May and June, 1914, in *Hunter v. Coleman*. In that case the argument proceeded on the basis that "any other goods" meant any other goods. Two of the Judges in that case went into the history of the law before the Act of 1876 was passed. There were reasons of an historical kind as to the meaning of the words "any other goods," and these would be fully explored when the action would be tried. The present proceedings were entirely misconceived and unnecessary. The application should be dismissed.

Mr. Justice Greer said that he did not think it was necessary to deliver a judgment. His Lordship was inclined to think that the plaintiff's construction of section 43 was the right one. But he regretted that it was not possible to decide the question finally on that application. It was not right to decide a question of such importance in an interlocutory proceeding. It was a question of grave importance to the plaintiff and to other traders. The application would be refused, but without any order with regard to costs.

Government Scrap Lead.

At Bow-street Police Court on Wednesday, before Mr. Graham Campbell, Albert Evan Whatcott, 29, general dealer, of Pyrland-road, Canonbury, was charged on remand with stealing 40 tons of scrap lead, valued at £1,291., the property of the Ministry of Munitions.

The defendant was formerly sub-director of a department in the Ministry of Munitions concerned with allocating scrap lead to firms engaged on Government contracts, printers and others, who had been granted priority certificates. It was alleged that shortly after the armistice he sent in a requisition, in the name of the Premier Metal Foundry, for 40 tons of scrap lead, and in his official capacity passed it as being in order. The whole consignment was delivered at an address in Holborn, and was sold by the defendant for about £1,300.

Mr. George Jewell, controller of a section of the Ministry of Munitions dealing in scrap metal, said that he resigned his position in October, 1918, and returned in December. The requisition for 40 tons of lead alleged to have been sent in by the defendant stated that the metal was required for the manufacture of printing leads. It was the defendant's duty to satisfy himself that requisitions were in order, in which event he had authority to allocate the quantity required without consulting any other official. He had no authority to allocate the lead ordered by the requisition in question. It was not true that at the time of the armistice the Ministry had an enormous surplus of lead which they did not know what to do with, but about that time a few allocations were made for commercial purposes without priority certificates being received.

Mr. John William Griffin, managing director of the Premier Printers Lead Company, Limited, having given evidence, the hearing was again adjourned.

CORRESPONDENCE.

*. We do not hold ourselves responsible for the opinions expressed by our correspondents.

THE DYESTUFFS LICENSING SYSTEM.

Sir,—I am instructed by my committee to forward you the enclosed copies of correspondence exchanged between the Board of Trade (Industries and Manufactures Department), and this Association.

The matter dealt with is one of vital interest to the trade, and you may therefore like to publish the correspondence in your valued paper.—Yours, etc.,

THE BRITISH CHEMICAL TRADE ASSOCIATION,

O. F. BLOMFIELD, Assistant Secretary.

London, E.C. 3, September 22, 1919.

[SELECTED COPIES.]

The Secretary,

The British Chemical Trade Association,

London, E.C. 3, August 8, 1919.

Sir,—With reference to your letter of July 29, regarding representation of your Association on the Dye Trade and Licensing Sub-Committee, I am directed by the Board of Trade to state that the constitution of the Committee was settled, after careful consideration, when the Government scheme for affording State assistance to the Dye Industry, outlined in White Paper Cd. 9194, was prepared; and they regret that in the circumstances it is impossible for them to add to the membership of the Committee in question.—Yours, etc.,

PERCY ASHLEY.

Board of Trade

(Industries and Manufactures Department),

Gwyder House, Whitehall,

London, S.W. 1.

Percy Ashley, Esq., C.B.,

Board of Trade,

Industries and Manufactures Department,

Gwyder House, Whitehall, S.W. 1, Aug. 22, 1919.

Sir,—I thank you for the interview accorded to our Mr. Bromfield on August 14.

It is understood that the following summarises your statement at the interview in question.

1. That no definite policy has yet been formulated by the Government as to the disposal of the German dyes which it is understood are being taken by this country on account of the indemnity, but that if any firm is appointed as sole distributing agents on behalf of the Government, such firm will not be allowed to sell to one firm and refuse supplies to another at their discretion. That the Government will take the opinion of various bodies before making any decision, and that this Association is invited to offer its assistance in the matter.

2. That as regards our application for representation on the Licensing Sub-Committee, manufacturers and consumers are already represented, but merchants are not; you consider the present Committee well balanced and adequate, but you invite this Association to submit a definite statement as to the points in the present scheme upon which we disagree, giving our reasons, together with any suggestions we wish to make, and also a statement as to why we consider merchants' interests should be represented on the Committee. Further, that any representations we may make would be submitted to the President of the Board of Trade, and would be carefully considered.

3. That you expressly point out that the Board of Trade does not decline to recognise this Association, but on the contrary this Association is recognised by the Government as representative of the merchanting interests.

To deal with the above points *seriatim*:—

We are glad to note that if a trading firm is appointed as sole distributing agents for the German dyes referred to, they will not be allowed to supply to one concern and refuse another at their discretion. We should like to be assured also that the Government will not instruct any such firm to deal with the dyes in question on anything but an open market basis. I would like to insert here certain general observations which have a bearing on this matter:—

The policy of this Association, from its inception, has been to foster and protect the trade and interests of the British manufacturer and the British consumer. At the same time we oppose the principle of granting special concessions to any particular manufacturer or consumer or any particular group of manufacturers or consumers. It is generally assumed

to be of the highest importance, particularly at the present juncture, that the export trade of the country should be fostered. Dyes are exported and re-exported partly in their original (or reduced) form, and partly as an item in the finished product of dyed or printed goods, etc.

It is estimated that between 50% and 60% of the dyes imported into this country before the war were re-exported in the form of finished goods.

The question of re-exportation of dyes in the original form has also to be considered. It is submitted that if a proportion of the German dyes which are allocated to this country can be sold for re-export at attractive prices, this re-exportation should be allowed, with a view to retaining the British merchants' connection abroad in the meantime, and eventually supplying such connections with British dyes which it is hoped will be on the market and available for export by the time the stocks of German dyes are exhausted.

A great deal of prejudice, and considerable opposition has arisen during the last five years to a class of so-called merchants who have sprung up, and either by speculation or re-handling goods, simply served to increase prices to the consumer. The Association is also opposed to this class, but it is submitted that the *bona-fide* and legitimate merchant is a useful factor, as by his special organisation and trade knowledge, he acts as a financier, a distributor and an exporter, more efficiently than is possible to a manufacturer. This point can be amplified and detailed statements of facts can be produced if desired, but you will probably be prepared to accept the hypothesis without further remark.

It is therefore submitted:—

That the German dyes in question should be sold on an absolutely open market, that is to say, that the firm who are willing to pay the best prices should receive the goods, whether such firms are consumers, merchants or exporters.

That the dyes should be put on the market in comparatively small lots, in order to give the small consumer an equal chance with the large and financially powerful organisations to secure supplies. We deprecate anything in the nature of favouritism or opportunity to "corner."

That the distribution should not be effected by any particular or individual firm, whether camouflaged by an official title or not. There is strong opposition to the so-called "Central Importing Agency" already established. The information which must necessarily accrue to any individual concern acting in such a capacity may be applied at a later date or indirectly for individual advantage. I would mention here that the Association has received various protests on this point, and quite apart from the merchants' point of view, it is submitted that the present system is frequently exceedingly unsatisfactory to the consumer. Many consumers are averse to letting the "Central Importing Agency" know exactly what dyes they are using, because naturally every manufacturer has some particular method of working, which he will not under any circumstances risk getting into the hands of possible competitors. It would be preferable for the distribution of the German dyes to be undertaken either by a Government Department with expert whole-time assistants on the trade and technical sides, or if this suggestion is unacceptable on the ground of expense or reluctance to increase the scope of official action, it is suggested that this Association, representing merchants generally, and not any individual, should undertake the distribution for the Government, possibly somewhat on the lines of the United Kingdom Oil and Oil-Seed Brokers' Association. Further, if this suggestion were in principle considered acceptable, I think it could be arranged for the Association to undertake the work on a basis of actual out-of-pocket expenses only, and a guarantee that such expenses should not exceed a certain specified percentage. (This Association, under its Memorandum and Articles of Association is expressly precluded from trading or making any profit).

We contend that the present Import Licensing Committee, and also the Licensing Sub-Committee, are ill-balanced and unsatisfactory for the following reasons:—

Manufacturing interests are not fairly represented. It is true that the Dye Manufacturers' Section of the Association of British Chemical Manufacturers is represented on the Committee, and therefore presumably had a voice in nominating the Licensing Sub-Committee, but the smaller and independent dye manufacturers are not really represented at all, in so far as even if they are members of the Association of British Chemical Manufacturers, they have, under the constitution of that Association, no real voice in its management, and are entirely controlled and outvoted by the larger subscriptions paid, e.g., by Messrs. British Dyes, Ltd., and

Messrs. Leviustains. The consumers' interests are not fairly represented simply by Messrs. Bradford Dyers Association, and the Calico Printers Association; because, it is submitted, these two organisations, though admittedly the two largest individual consumers in the country, do not take between them 50% of the national dye consumption. The merchant interests are not represented at all. The whole Committee is constituted to deal with a question of importing, and importing is the business of a merchant, not a consumer. The consumer, generally speaking, wants stuff delivered on his doorstep in comparatively small quantities, and usually locks his capital up in manufacturing interests and book debts, and only wants to pay for supplies of raw material on or after delivery. The function of the merchant is to buy in quantity and finance in the country of origin of the imported merchandise, to arrange rapid and economical transport, and to deliver the goods on arrival in smaller quantities to suit the consumer. Before the war at least 95% of the imports of dyes were made by merchants or agents.

It is recognised by the Board of Trade, and admitted in their White Paper No. Cd. 9194: that certain dyes which are required in this country are not manufactured here. Whilst recognising the importance of fostering home production, it is submitted that it is nationally and financially unsound to prevent the importation of raw material which is either unavailable here or which cannot be produced to compete within a reasonable margin with the price at which the product of an allied nation can be delivered here without any principle of dumping being involved. It is suggested that it is in principle unfair to govern the business of the importing merchant, who is at least equally involved with the consumer, through a Committee composed exclusively of representatives of firms whose interests lie (as far as manufacturers are concerned) in preventing imports as far as possible, or (as far as consumers represented are concerned) in hindering imports by outside and competitive firms. It is submitted that such Licensing Committee should be as widely represented as possible, and that all parties interested should be given an opportunity of submitting their point of view.

It is therefore again requested that this Association may be allowed to nominate a representative or representatives to the Dyestuff Licensing Sub-Committee.

Our objections to the present "Central Importing Agency" are outlined above, but these can be amplified if you so desire. Yours, etc.;

The British Chemical Trade Association,
S. J. C. Mason,
Secretary.

The Secretary,
The British Chemical Trade Association,
80, Fenchurch Street, E.C. 3.
August 28, 1919.

Sir,—I am directed by the Board of Trade to acknowledge the receipt of your letter of August 22, and to say that your representations with regard to the importation of dyestuffs into the United Kingdom will be borne in mind in connection with the arrangements for the distribution of any supplies of dyestuffs which may be obtained from Germany under the Peace Treaty.

I am, however, to add that, as already pointed out, the Board cannot see their way to increase the representation on the Licensing Sub-Committee of the Trade and Licensing Committee.—Yours, etc.,

A. W. FLUX.

Board of Trade,
Industries and Manufactures Department,
Gwyder House, Whitehall, London, S.W. 1.

CHEMISTS IN GOVERNMENT FACTORIES.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—I have read both "Muldoon's" and Morrison's letters, and can assure "Muldoon" that he has my sympathy. The answer to Morrison's question as to why Muldoon took such a low salary as £175, in spite of the fact that he was a steel-works chemist is perfectly obvious. A big proportion of the chemists employed by the Ministry were men who had joined the colours and gone to France. When the Ministry found that there was a shortage of chemists they recalled from the colours a large number of these chemists, and put them in Class W.

These men were, however, still to a large extent under the control of the War Office. And if they had left the Ministry would have had to rejoin the army immediately. From the above facts it will be seen that the Ministry had a tremendous pull on them as they were not in a position to bargain, and had to accept the salary which was offered them. This pull, I am sorry to say, the Ministry did not hesitate to use, and the salary offered commenced at £150. "Muldoon," having come from abroad, and having forfeited his position there, was in the predicament of also having to take what was offered him.

Morrison lays great stress on the fact that he was a member of a big trade union which was in a position to enforce to a large extent its demands. I may, however, point out to him that if the chemists had adopted the methods of some of these unions there would have been nothing for him and his fellow-unionists to do, as all the explosive and chemical works would have been more or less at a standstill. These methods I am pleased to say were not adopted.

Morrison makes two very wild statements:—(1) that he did not find leadburners' wages large; (2) that it takes quite as long to become a good plumber and leadburner as to become a good chemist. Now, I was chemist for a considerable time at a Government explosive factory, and while there found that leadburners, aged nineteen in some cases, were taking home £10. to £14. per week. This fact disproves the statement that wages were not large, and apparently at the same time disproves that it takes as long to become a good leadburner as to become a good chemist. I certainly cannot imagine a chemist of nineteen getting such a salary. Of course the above figures include overtime, but although I put in any amount of overtime, being a chemist I was paid nothing extra for it.

Regarding Morrison's remarks concerning the dress of chemists at Gretna, I simply consider these futile, and beside the point. I did not actually work at Gretna, but was in Carlisle for a time, and had many friends there amongst the Gretna chemists, and also knew quite a number of workpeople from Gretna. All the time I was there I heard, in the main, nothing but good spoken of the chemists by the workpeople I knew. I certainly think that Morrison had better say nothing at all about the snobbery of chemists. Your true tradesman trade-unionist is the finest snob of any, and one has only to watch the way they treat their labourers to see this. I have been in industrial work all my life and have noticed this repeatedly.

I sincerely trust that Morrison will get rid very speedily of his jaundiced and spiteful view of chemists, and at the same time will devote himself to correcting a few of his own little faults before indulging in silly and spiteful criticism of a body of men whom everyone acknowledges worked well during the war and at the same time were not overpaid for that work.—Yours, etc.,

WEST GORTON."

Wealdstone, Middlesex, Sept. 22, 1919.

FUSION OF CARBIDE COMPANIES.

A CIRCULAR has been issued to the shareholders of the Nitrogen Products and Carbide Company, Limited, and the Alby United Carbide Factories, Limited, which states:—"On August 10, 1918, a circular was issued regarding the amalgamation of the two companies, but owing to negotiations regarding certain conditions proposed by the Norwegian Government, which were not quite clear or acceptable in the form put forward, the directors were unable to recommend that the amalgamation should then be proceeded with. The directors are pleased to say that the Norwegian Government have met them in a friendly spirit, which has resulted in the ambiguity of the wording being removed, and satisfactory modification of the terms to which objection was taken. The legal formalities on this side are now being completed, and the necessary notices of the meetings, together with the report and accounts, will be issued about the middle of next month."

FATALITY AT A CELLULOSE FACTORY.—An accident occurred at the British Cellulose Works, Spondon, Derby, on Tuesday, resulting in the death of William Deudeney and serious injury to Mr. Walton, chemist to the company. Certain plant which was being dismantled was being examined, and four persons were engaged on the work, but the accident occurred whilst the plant was out of operation.

THE GERMAN CHEMICAL ASSOCIATION AND INTERNAL ECONOMY.

THE Association for the Protection of the Interests of the Chemical Industry in Germany recently took the initiative in convening a meeting in Berlin, which was attended by representatives of industries from all parts of the country, to discuss questions of internal economic policy, and particularly the fluctuating attitude hitherto assumed by the Government in these matters. Although not specifically mentioned, it is obvious that the industries are opposed to the substitution of works' councils for the existing works' communities, which were brought into operation as a temporary expedient at the end of last year for the purpose of giving the workmen on these communities, one of which is established at each works, a voice in the decision of labour and other questions affecting their interests. On the other hand the later scheme contemplates a grant to the workmen's representatives not only of a voice, but also to confer upon them a vote in determining labour questions and other far-reaching powers, including the position of directors, the right of inspection of books, and balance sheets, etc.

The meeting, evidently having in mind the considerations set forth, adopted a series of resolutions. In the first place it was decided that the serious necessities of the near future can only be surmounted by the establishment of a sincere solidarity between producers and a confident co-operation between employers and workmen. As a consequence the meeting welcomed the fact that such a combination for the chemical industry has already been provided by the creation of the "Imperial" community for chemistry; and it was declared to be necessary for the self-governing bodies formed by the works communities with the addition of representatives of merchants and consumers to be maintained without further delay. In order to provide a legal basis for these organisations independent of changes in Government departments, the meeting resolved to submit the following demands to the Government: (1) official recognition of the works' communities and the self-governing bodies formed by them; (2) the immediate constitution of the Imperial Economic Board which, in the opinion of the meeting, must be given a previous hearing in connection with every proposed regulation of economic questions by the National Assembly, and be able on own initiative to submit proposals of their own; (3) the works' communities to be consulted on all economic, and social, and political problems before they are decided, until these demands have been fulfilled; and (4), the self-governing bodies to have transferred to them the exclusive right of sanctioning imports and exports.

The Chemical Association, by adopting the above resolutions, has allied itself with the ideas and demands of a fundamental nature, such as were embodied with emphasis in the recent appeal published by the National Party. The Chambers of Commerce and manufacturers in general, also regard with feelings of alarm the proposal to replace the works' communities by works' councils having such extended powers as to threaten to imperil the future interests of German industries.

EXPORT OF COAL-TAR PRODUCTS.

THE Board of Trade (Export Licence Department) draw attention to the fact that the export of coal tar and derivatives thereof (except solvent naphtha, cresylic acid, and mixtures containing cresylic acid) suitable for use in the manufacture of dyes and explosives, whether obtained from coal tar or other sources, and mixtures and preparations containing such products or derivatives, is still prohibited to all destinations. Certain coal-tar products, such as naphthalene and its derivatives, toluol and its derivatives, picric acid, xylol and its derivatives, carboic acid crystals, anthracene oil, benzole and its derivatives, cresols (ortho, para, and meta) and their derivatives, were originally mentioned by name in the British list of prohibited exports, but these prohibitions have now been merged in the inclusive prohibition on the export of coal-tar products. The export of naphthalene, toluol, picric acid, and the other coal-tar products above mentioned, should therefore be regarded as prohibited to all destinations, and applications for licences to export them should be addressed in the usual way to the Controller, Export Licence Department, 1, Queen Anne's Gate Buildings, Westminster, S.W. 1.

BRITISH CHEMICAL STANDARDS.

THE Superintendent of Research, Royal Arsenal, Woolwich, who is now co-operating in the standardising of steels, has had a number of standard steels tested in the Government Research Laboratory at Woolwich, and has supplied the results given below, which have been issued by Messrs. Ridsdale and Co., Middlesbrough, under the auspices of the body of co-operating analysts. They are, of course, not included in the general averages shown when the standards were issued, but will serve in conjunction with them as a guide for firms doing work for the War Office and others. The Superintendent wishes it to be made clear that the homogeneity of the bulk of standardised turnings represented is not in any way guaranteed by the War Office. The homogeneity has, of course, been fully verified by the firms who provided the bars and by Messrs. Ridsdale and Co.

	Carbon Per Cent.	Silicon Per Cent.	Sulphur Per Cent.	Phosphorus Per Cent.	Manganese Per Cent.	Nickel Per Cent.
Standard.	Direct Combustion in Oxygen.	Solution in Aqua Regia, Single Evaporation only.	Total by Oxidation.	Direct Molybdate Without Evaporation; Converting to $PbMoO_4$.	Direct Molybdate Without Evaporation; Alkalimetric Finish.	Bismuthate Volumetric.
"B4"	0.396	0.027	0.045	—	0.103	0.737
"N"	0.170	0.127	0.032	—	0.038	0.437
"T"	0.517	—	—	—	—	0.733
"O"	0.327	—	—	—	—	0.590
"H"	0.433	—	0.046	—	0.035	—
"S1"	0.927	—	—	0.051	0.053	—
"T"	—	—	—	—	—	3.36
						Dimethylglyoxime Separation and Cyanide Titration.

ELECTROLYTIC FLUORINE.

A PROCESS for the preparation of fluorine has been worked out by Messrs. Argo, Mathers, Humiston, and Anderson, of the Research Department of the United States Chemical Warfare Service. The usual method is that of Moissan and Lebeau—electrolysis of anhydrous hydrofluoric acid HF, to which some potassium fluoride KF is added to make the liquid a conductor of electricity. The vessel should be of platinum; copper may be used, as was found later, but the electrodes must be of platinum or platinum-iridium. Acheson graphite is attacked; the cell must artificially be cooled. The hydrofluoric acid may be made in lead vessels, but it takes up lead then, and is hence unsuitable for analytical purposes. The HF is sometimes prepared by heating the compound HF KF, which is more easy to deal with than the viscous acid. Argo and his collaborators electrolyse this fused compound instead of its solution in hydrofluoric acid. The HF KF fuses at about 200° C. The fusion is accompanied by a slight decomposition, and as the salt is never quite free of water, the first gas evolved during the electrolysis is impure. The electrolysis is conducted in a heavy copper cylinder, about which is wound a nichrome coil. The copper is slightly attacked by the bath. The copper is the cathode; the anode is a rod of graphite, which is surrounded by a diaphragm, the space between the carbon and the diaphragm being packed with pure powdered fluorspar CaF_2 . The KF becomes concentrated in the bath, and when the liquid has turned too viscous, in spite of the addition of more HF, the cell contents are poured out into a copper basin, in which the KF solidifies. The electrolysis evolves heat, and with too high current density there may be sparking and considerable heat evolution in the cell. In fact, the external heating seems unnecessary, and the process does not seem to give much satisfaction, since modifications are suggested. The use of NaF instead of KF seems advisable. But fluorine is, under ordinary conditions, probably the most active element known, as it inflames coal gas, charcoal, and sulphur instantaneously, and attacks almost any element. According to the new experiments, however, pure fluorine is not poisonous, and not so irritating to the lungs as generally believed, and is, in fact, less so than chlorine.

FERTILISER NEWS.

(SPECIALLY CONTRIBUTED.)

Sulphate of Ammonia.—Fair business for the period appears to be doing in sulphate of ammonia, and the new prices are generally recognised as just and equitable. There are buyers waiting, of course, to whom the current figure seems dear, but they will have no option but to come along later on. Not very much is moving in the export line, but a little trade takes place at about £25. per ton, f.o.b. This market is now pretty well controlled in one way or another, and there is not much freedom.

Basic Slag.—This is in excellent request, and looks like going into consumption now more than ever before. Certainly, the material is regularly rising in popular favour. Professor Somerville, in an address as president of the Agricultural Section of the British Association, specially recommended the use of basic slag on poor pastures, and summed up as follows: Few forms of agricultural expenditure are more certain in their results than the judicious use of manures on grass land. The meat and milk producing capacity of the country can be largely and rapidly increased, with great pecuniary gain to the farmer, and still greater economic advantage to the nation. Poor clay soils can be rapidly and profitably improved by the use of phosphates, especially basic slag.

Superphosphates.—Here, also, there is a fair demand, with makers indisposed to undertake business for delivery much ahead. Supplies of raw material and increasing manufacturing and labour costs are playing a very important part in this section of production as in most others, and the superphosphate makers in particular do not regard the future as being at all clear.

Bones and Bone Meals.—Supplies of imported stuff are still very small. With regard to bones, £12. has been paid for mixed crushed from Egypt, but these sales have been of limited character. In bone meal itself there is little change, but a moderate demand of late has ranged up to £14., and even £15., for the better grades. Meat and fish meal sell well where offered at values round about 27s. 6d. and 30s. per unit for ammonia and 2s. 6d. for phosphate.

Blood and Tankage.—Scarcity of freight room continues to prevent arrivals of these fertilising materials reaching this country to any extent, and supplies are still well on the short side. Tankage has been priced recently at 27s. 6d. per unit of ammonia, with 2s. 6d. for phosphates, whilst dried blood is reported to have been in good inquiry at 30s. to 32s. 6d. per unit.

Other Fertilisers.—There appears to be very little, if any, calcium cyanamide on offer in this country, and nitrolim for November delivery is said in one quarter to be likely to cost up to £25. per ton. The American Cyanamid Company has apparently been working to entire capacity, and has attained new records in production. It has recently acquired membership in the Florida Pebble Phosphate Export Association, organised by the leading pebble phosphate mining companies for the promotion of foreign trade, and regards the outlook as promising for a profitable export business in phosphate rock during the next two years.

Interesting Continental Fertiliser Group.—It is reported that the Phosphates Tunisiens have, along with the Montecatini Company, acquired control of the Colla Concimi (Glue and Fertiliser Company) of Rome; and a combination of this latter company with the Unione Concimi, which is related to the same group, appears to be another probability. It is to be noted that the Colla Concimi and the Unione Concimi are the two most important fertiliser producing concerns in Italy, and that the Montecatini can furnish them with the necessary sulphuric acid, whilst the Phosphates Tunisiens will provide, on the other hand, what is required in crude phosphates.

Alsatian Potash.—It is held in certain quarters that it would be to the interest of the Alsatian concerns to adhere to the German Potash Syndicate instead of competing with it. This is not the opinion held by those interested in Alsatian potash. When the Alsatian mines were under the control of the German Syndicate their output was limited to the lowest possible figures; now the Alsatian mines are producing 3.750 tons of low- and high-grade potash salts daily, and this quantity will soon be considerably increased. Contrary to what is asserted by the German Syndicate, that the Alsatian and German potash salts are identical, the former product is of a decidedly richer quality. The raw salts produced by the German mines are carnallite containing 9-12% K_2O , and kainit containing 12-15% K_2O ; while the Alsatian mines can

offer sylvinites 14% (French kainit), with the potash content of 14-16% K_2O , and sylvinites 20%, with a content of 20-22% K_2O . Considerable quantities of 80-98% potash are also being produced at the potash mines in Alsace.

SOUTH WALES NOTES.

(SPECIALLY CONTRIBUTED.)

The production of tinplates is satisfactory, and the mills are increasing their outputs—with the exception of those situated in the Llanelly district where there is a water famine, and some 6,000 men are out of employment. As stated in these notes last week, the experiment of using sea-water in the works has been thoroughly tried and has been a success as regards the "white" and the "finishing" but not for the "black" process. Some of the operatives in the Neath area have had an unofficial meeting, when it was decided to notify the employers that unless all the employees engaged in the trade are allowed to benefit under the recent 12½ per cent. award, they would cease work to-day (Saturday). This has caused some anxiety, but as it is unofficial and not authorised by the men's union it is not likely to meet with general support.

Negotiations are proceeding for the acquisition by a large firm of soap manufacturers of the extensive war works in the Pembrey Burrows. These works were put up under Munitions authority for the manufacture of explosives, and employed during the war some 7,000 people. They are of vast extent, situated in healthy surroundings, and could easily be adapted for the making of margarine and soap.

The Cae Coch mines in Snowdonia which were developed during the war for the purpose of providing sulphur pyrites for the Ministry of Munitions are likely to be closed, and the plant and machinery installed therein during the last few years are intended for sale.

The Basic Fertilisers, Ltd., is the name of a new company who intend to manufacture and deal in raw basic slag, and all kinds of chemical fertilisers. The capital is £30,000, in £1. shares. The company, which is a private one, has for its first directors, Mr. H. G. K. Palmer, shipper, The Hall, Johnston, and Mr. G. Jones, chemical manure manufacturer, Southernwood, Newport.

The patent fuel industry is very active, and all kinds of makes are being quickly bought up, the demand, especially the foreign portion, being of an urgent kind. All the works are operating to their fullest extent, and outputs are on the increase. Important cargoes left Swansea during the week for St. Nazaire, Bordeaux, St. Brieux, Casa Blanca, Palermo, Venice and Dieppe. The supply of pitch is not so good, and prices are advancing.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

(SPECIALLY CONTRIBUTED.)

The ironfounders' strike has already adversely affected the Cumberland and North Lancashire hematite pig-iron trade, business in the iron market being practically idle, and if, as seems probable, users are unable to take deliveries, and more furnaces are damped down, it is certain that the coking industry will be hard hit. Even now all the 380 by-product ovens in East Cumberland are diminishing their operations. They were working only at two-thirds of their capacity a few weeks ago. Within the last few days, however, one or two batteries have further decreased their production, and even then difficulty is being experienced in getting rid of the entire output. In any event, some apprehension is felt as to the maintenance of the rail mills at Workington and Barrow in operation. They are working merely from hand to mouth, and unless Continental and Colonial orders can be secured, it is evident that there must be a considerable decrease in the production of ordinary iron. In that case, of course, the requirements of local coke will undergo a further shrinkage. East Coast coke supplies to the district are still unaffected, no furnaces on low phosphorus brands of iron having damped down, and to East Cumberland this week they are 8,000 tons and to the Furness district, 14,000 tons. The make of by-products is naturally smaller. There continues to be a keen demand for benzole and for sulphate of ammonia, the output in each case being fully absorbed, and pitch also is moving away freely. Creosote is rather duller.

REPORTS OF COMPANIES.

Magadi Soda Company, Limited.

The eighth ordinary general meeting was held in London on Monday, Mr. Samuel Samuel, M.P., D.L. (chairman of the company), presiding.

The Chairman, in the course of his speech, said: On the face of the accounts it would appear that there has been a trading loss of £48,954., but this is not the actual condition. A large proportion was expended on labour, which will not recur. The sales which the company made were, unfortunately, much smaller than we had anticipated. The loan at the end of the year had increased from £50,000. to £112,000., this amount being advanced by various shareholders pending the increase of capital which the directors had already announced to the shareholders would be necessary to complete our facilities for carrying on the business on a sound commercial basis. I should like to call your attention to the very serious labour troubles that occurred in East Africa just when we were ready to start production. Owing to the war, it was impossible to get the necessary machinery completed to carry out the plans of the company to eliminate as far as possible manual labour and to introduce mechanical appliances in every stage of our operations. We were compelled to pay about three times the amount for labour that we had ever done before, and in addition to this we had the greatest difficulty in securing the necessary men to carry on, and we have had to-day very reluctantly virtually to shut down production by hand labour in order not to waste money, and patiently await the arrival and erection of the machinery to continue our operations on a profitable basis. The stock in hand on December 31 last amounted to £53,175., as against £10,965. for the year before. This stock would all have been disposed of at a remunerative price had the war conditions continued. But in consequence of the armistice and the release of the soda ash, the buyers preferred to pay a higher price to taking the new article, especially in view of the fact that the purity of our practically raw soda is so fine that the authorities insist upon levying a higher duty for our raw soda, especially in India, Japan, etc., than they levy upon the soda ash, which is a manufactured article, whilst ours can be designated "raw" material. When we are producing the soda ash by further processes which are necessary, you will be surprised to hear that we shall be able to enter the markets of India and other places at a lower rate of duty. The incident just mentioned was a very great disappointment to your directors, but when one has to deal with Government officials it is certainly impossible to understand their frame of mind or the principles that underlie their decisions.

Last year I put before the shareholders that our claim against the Government for the use of our railway and water supply was still outstanding, but that we were in hopes of being treated fairly—we never expected generosity—from the Treasury, who, although allowing lavish extravagance in all departments, are more than niggardly when the interests of individuals or companies like ourselves are concerned. We have received a letter from the War Office repudiating all liability, and pointing out that under the terms of our agreement with the Colonial Office the Government had the right to use our railway and water supply. We admit that even had they not the right to use them we should have placed the whole of our resources and facilities at the disposal of the nation; but, in taking the position they do, they omit the essential condition that if they commandeer property they must pay a reasonable compensation for using it, and there is nothing whatever in the agreement to say that the Government can take over our property without a reasonable compensation for the disturbance of our trade. We shall, therefore, continue to press our claim. Our Irlam works have been commandeered and our machinery removed. In this case the Government have paid us for the actual machinery they have seized, but they have taken possession of our property at Irlam, which they are using for military purposes, and although we have sent in our claim for rent, we have received nothing up to the present either in the way of rent or compensation.

We have discontinued the production of soda by manual labour owing to the enormous increase in the cost, and we are doing everything we can to expedite the delivery and shipment of the necessary material so as to convert the whole operations to a mechanical production, and reduce the employment of labour to a minimum. We are satisfied that we shall have an organisation capable of handling very large quantities at a minimum of cost. We are also satisfied from the experi-

ments that have been made by our chemists that the article we shall produce will be equal, if not superior, to any that is in the market. We must frankly tell you that we do not see any prospect of producing soda ash during the current year of 1919, but we venture to believe that, unless we are disappointed by labour troubles in this country or other unforeseen circumstances, we shall have the whole of our works completed and producing by the spring of next year. We have had so many disappointments that we do not want to be too sanguine at the present time. The fresh capital which we asked the shareholders to provide us with was readily supplied. We have entered into certain contracts in various markets, which we believe will at least give us a sufficient trade to pay our expenses. We shall be able to sell our soda ash and other products at a price that will defy competition so soon as all our mechanical appliances are in working order, and we are therefore satisfied that the contracts we have made will give satisfactory results to our buyers against no matter what competition they are faced with, as well as to our company. We, of course, shall have in the immediate future to wait patiently for the completion of our works, having decided to stop everything else until this most essential condition has been reached. The Chairman concluded by moving the adoption of the report and accounts.

Mr. H. F. Marriott seconded the resolution.

The Chairman, in reply to questions, said that the labour trouble with which they had had to contend was merely a passing difficulty. The directors had no intention of reducing the capital by cutting down the ordinary shares.

The resolution was unanimously agreed to.

Eastern Chemical Company, Ltd.

The report for the year ended March 31 states that the net profit, after writing off £7,177. for depreciation, is £13,843., as against £14,245. for the previous year. By adding to the above £13,843. the net sum brought forward from previous year—namely, £7,877.—a total of £21,720. is arrived at. Out of this the directors recommend the payment of a dividend of 10 per cent. on the ordinary shares, less tax at 6s. in the £., which will absorb £5,089, and leave a credit balance to carry forward of £16,631. from which to meet liability for English tax and excess profits duty. The terms of Treasury sanction for the issue of 26,305 ordinary shares, referred to in the last annual report, dated December 10, 1918, have since been amended, and these shares have been offered to the shareholders at 30s. in London, or Rs.18 in Bombay. The issue has been considerably over-subscribed, and the new shares are being allotted to the shareholders in accordance with the terms of the offer. The premium that will be obtained from this issue, added to the sum carried forward from profit and loss account, will, the directors hope, be sufficient, after meeting the liability for taxation already referred to, to enable them in due course to submit to the shareholders a scheme for the conversion of the deferred shares into ordinary shares on the basis of two of the latter for one of the former. The gross profits for the past year were slightly less than those for the previous year owing to the increase in cost of raw materials and packages, but the difference was more than made up by a reduction in general expenses. On the other hand, a larger amount was written off for depreciation, with the result that the net profit is reduced by £402. The turnover for the year 1918-19 was well maintained up to the time of the armistice, when, owing to the effects of a cessation of hostilities, combined with famine in India, there was a slight drop in the volume of sales, but at the close of the financial year the position had improved, and the total turnover was appreciably in excess of that of the year 1917-18. The plant has been maintained in good repair, and the efficiency of various processes enhanced, thereby effecting reductions in costs of manufacture. During the general strike of mill hands in January there was some slight interruption in manufacture at the company's works caused by intimidation of the workers, but this was quite temporary, and no further trouble has been experienced.

Associated Portland Cement Manufacturers (1900), Ltd.

At a meeting of the board, on Monday, the directors resolved to recommend the payment of 2½ years' dividend, less tax, on the five-and-a-half per cent. cumulative preference shares for the period from January 1, 1917, to June 30, 1919, after providing £161,478. for depreciation, reserves, and sinking funds, thus clearing off all arrears. The amount carried forward at June 30 was £125,678., as compared with £190,228. at June 30, 1918.



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Buxton Lime Firms Company, Ltd.

A falling-off of about £4,200. in the net profit is revealed by the report, the gain for the past year being £33,430., as compared with £37,677. a year ago and £28,719. for 1916-17. It should be explained, however, that the profit on this occasion has been arrived at after providing for debenture interest and writing off £20,649., whereas last year the amount written off was only £16,965, a difference of £3,684. A further dividend of 2½ per cent. is proposed, making, with the interim distribution, 5½ per cent. for the year, which will leave £24,132. to be carried forward, as against £15,251. brought in. Last year the dividend was 6 per cent., with a bonus of 2 per cent., and for 1916-17 it was 5½ per cent.

Campania de Salitres de Antofagasta.

For 1918 net profits amount to 22,305,520dols. Dividends amounting to 11,520,000dols. have been paid, and transferred to the oficinas fund 8,000,000dols., and to the contingencies exploitation fund 2,000,000dols., to the amortisation of fund 785,520dols.

British Portland Cement Manufacturers, Ltd.

At the annual meeting on Friday of last week, a resolution splitting the £10. preference shares into 10 £1. shares was carried unanimously. The preference share dividend and a dividend at the rate of 8 per cent. per annum on the ordinary shares were declared.

Elliott's Metal Company, Ltd.

The report for the year ended July 31 last states that, after paying debenture interest and providing for excess profit duty, there remains a profit of £64,051., to which must be added £92,953. The stock of copper has been valued on the same basis as last year. The building, plant, and machinery added £28,902., being the balance standing to the credit of profit-and-loss account, after paying excess profit duty up to July 31, 1918, making a total of £92,953., which the directors propose to appropriate as under: To pay a dividend at the rate of 5 per cent. per annum on the preference shares (of which an interim dividend amounting to £3,382. has already been paid), £6,765.; to pay a dividend at the rate of 3s. per share on the ordinary shares, subject to income tax (of which an interim dividend amounting to £14,105. has already been paid), £42,317.; to place to reserve fund (making a total of £110,000.), £20,000.; to write off expenses of new capital (stamp duty), £2,500.; to carry forward £21,371.; at Selly Oak have been fully maintained, as heretofore, out of revenue. In accordance with the special resolutions passed at the meetings held on May 15 and June 3 last, the revised memorandum has been submitted to the Courts, and the alterations were sanctioned on July 22. The increase of £1,000,000. in the capital of the company, passed at the same meetings, has been duly registered and stamp duty paid.

Odum's Nitro-Phosphate and Chemical Company, Ltd.

The balance-sheet for the year ended June 30, shows, after allowing £9,000. for excess profits duty, and including the sum of £1,488. 12s. 11d. brought forward, a balance standing to the credit of profit and loss account of £13,034. 15s. 0d. The directors propose to place to reserve £1,500., and to pay a dividend of 15%, £6,750., leaving to be carried forward £4,784. 15s. 0d. An increased supply of labour and raw material has enabled the company to do a larger trade with satisfactory results. There is a possibility of a shortage of raw materials during the coming season.

COMING EVENTS.

Society of Chemical Industry, Manchester Section.—First meeting of the new session at the Grand Hotel, Friday, October 3, at 7 p.m. Chairman's address: "Some Notes on the Rhineland Chemical Works," by Mr. John Allan.

Oil and Colour Chemists' Association.—The first meeting of the 1919-20 session will be held on Thursday, October 9, at the Food Reform Club, 2, Fumival Street, London, E.C., at 7 p.m. Two papers will be given by Mr. A. de Wade entitled (a) "Notes on the Permeability of Paints and Varnishes," (b) "A Suggested Method for Calculating the Costs of Ready-Mixed Paints." Chemists who are interested in these questions are invited to apply for tickets of admission to Mr. H. H. Morgan, Collingbourne, Hounslow.

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 4, Queen Anne's Gate Buildings, London, S.W., 1., whence further information may be obtained:—

Canada.

A firm of manufacturers' agents at Toronto are desirous of obtaining agencies on a commission basis for British manufacturers of dyes. The territory to be covered consists of the whole of Canada. (Reference No. 638.)

New Zealand.

A firm of commercial brokers and merchants in Auckland desire to get into touch with United Kingdom manufacturers of veneers, asbestos sheets, white lead, paint, linseed oil, etc., with a view to representing them as agents in the Dominion. (Reference No. 645.)

Belgium.

A Belgian inquirer in Brussels desires agency for British firms exporting drugs, etc. (Reference No. 653.)

Italy.

An agent, of many years' standing in Turin (A French subject), desires to obtain agencies for United Kingdom manufacturers and exporters of chemical products. (Reference No. 660.)

A general agent and importer in Milan desires to obtain agencies exclusively for Italy for United Kingdom manufacturers of paints and varnishes, and chemical and pharmaceutical products. (Reference No. 661.)

Scandinavia, Finland, Russia, etc.

A Copenhagen firm desire to obtain the sole representation of United Kingdom exporters or manufacturers of greases and oils (lubricating, burning, benzine, benzol, etc.), for Scandinavia, Finland, Russia, and Germany, if desired. (Reference No. 663.)

Argentine Republic.

H.M. Commercial Secretary of Legation at Buenos Aires reports that a firm in that city, who already represent a number of important British firms for the sale of various classes of goods, is desirous of obtaining the representation of a United Kingdom manufacturer for each of the following lines: Chemical products for pharmaceutical uses, and industrial chemicals. (Reference No. 670.)

A British subject, with twenty years' experience in South America (sixteen in Argentina), is desirous of obtaining agencies for United Kingdom manufacturers and exporters of paints and varnishes, and particularly manufacturers' specialities in these or other lines. (Reference No. 671.)

Brazil.

A general commission agent, British, established at Rio de Janeiro since 1888, would be glad to act as sole agent for an exporter of heavy chemicals. (Reference No. 672.)

Estonia.

The following list of goods urgently required in Estonia has been received from the Estonian Provisional Legation: Petroleum, naphtha, engine oil, cylinder oil, kolophonium, quebracho, caustic soda, glue, and fertilisers. Further particulars may be obtained by United Kingdom firms interested from the Estonian Minister, Estonian Provisional Legation, 45, Markham Square, London, S.W. 3.

Roumania.

A bank in Bucharest wishes to be put in touch with United Kingdom manufacturers and exporters of pharmaceutical and chemical products. (Reference No. 577.)

Chili.

A representative of a hat factory in Santiago, expected to arrive in England shortly, is desirous of getting into touch with aniline dye producers. He will also be interested in the purchase of dyes for hat manufacture. (Reference No. 587.)

Czecho-Slovakia.

Two reliable merchants wish to act as agents for British firms dealing in chemicals and colours. (Reference No. 656.)

H.M. representative at Prague reports that he has received many applications from different parts of Czecho-Slovakia for catalogues and price-lists of chemicals.

British firms who are interested in these goods should send catalogues direct to the Chambers of Commerce in the important centres in Czecho-Slovakia, addressed as follows: Obchodni a zivnostenska komora (Chamber of Commerce), vyvozní kancelar (Export Department), at Prague, Budweis, Olomouc, Brno, Opava, Eger, Reichenberg, Plzen, Bradeč-Kralove, Bratislava, Kosice, or Troppau in Silesia.

IMPORTS OF CHEMICALS AND ALLIED PRODUCTS.

(Concluded from page 311.)

ARTICLES.	QUANTITIES.		VALUE.		ARTICLES.	QUANTITIES.		VALUE.	
	Month ended		Month ended			Month ended		Month ended	
	Aug. 31st.	Aug. 31st.	Aug. 31st.	Aug. 31st.		Aug. 31st.	Aug. 31st.	Aug. 31st.	Aug. 31st.
	1919.	1918.	1919.	1918.		1919.	1918.	1919.	1918.
OILS :			£	£				£	£
Fish : Train, Blubber, and Sperm tuns	4,938	16,438	332,435	968,916	SOAP : Soft Soap cwts.	—	—	—	—
Coco-nut, Unrefined cwts.	70,528	112,054	319,694	413,558	Household & Laundry Soap, in bars or tablets..... cwts.	5,078	—	14,703	—
Olive, Unrefined tuns	456	335	45,506	58,500	Polish'g & Scour'g ..	—	—	—	—
Palm (not including Palm Kernel Oil), Unrefined. cwts.	199,556	202,373	819,836	476,762	Powder	1,320	—	2,447	—
Palm Kernel Oil, Unrefined "	3,640	—	17,665	—	Toilet	1,114	84	12,752	1,806
Total "	203,196	202,373	837,501	476,762	Unenumerated ..	26,256	—	57,298	—
Petroleum :					STARCH, DEXTRINE, AND FARINA OR POTATO FLOUR :				
Crude gals.	1,723,338	—	59,083	—	Rice Starch cwts.	880	700	3,163	3,442
Lamp Oils	12,547,058	11,454,103	540,260	660,685	Other kinds Starch ..	197,400	9,374	364,276	25,621
Motor Spirit ... "	12,942,707	16,747,413	1,001,919	1,634,267	Dextrine, and Farina or Potato Flour ..	91,062	151,247	213,650	540,039
Spirit, other than Motor Spirit ..	—	—	—	—	Total "	289,342	160,321	581,089	569,102
Lubricating Oils ..	5,099,116	12,508,271	495,234	1,416,157	COPPER :				
Gas Oil	2,409,321	1,285,772	77,923	71,509	Regulus & Precipitate :				
Fuel Oil	10,674,942	98,149,722	264,448	3,180,101	From Portugal.. tons	182	250	9,000	24,000
Total of Petroleum ..	45,396,482	140,145,289	2,438,867	6,962,710	" Spain "	1,752	607	146,976	73,976
Seed Oil :					" U.S.A. "	—	—	—	—
Castor Oil tons	11	827	928	64,892	" Peru "	—	—	—	—
Cotton Seed Oil, Unrefined "	91	870	7,505	75,000	" Chile "	—	16	—	1,314
Linseed Oil :					" Cape of Good Hope "	—	—	—	—
Pure	84	—	9,516	—	" Oth'r C'tries ..	381	339	20,982	32,800
Not Pure	—	—	—	—	Total "	2,315	1,212	176,958	132,090
Rape Seed Oil ..	183	—	18,061	—	COPPER ORE :				
Soya Bean Oil ..	2,168	—	169,056	—	From Spain tons	—	—	—	—
Other Seed Oils ..	1,623	377	178,777	32,878	" Chile "	2	—	82	—
Turpentine cwts.	41,973	1,615	186,106	8,883	" Cape of Good Hope "	—	—	—	—
SOAP STOCK	385	25	814	29	" Australia ..	—	—	—	—
STEARINE :					" Oth'r C'tries ..	514	530	18,406	35,580
From Belgium ..	—	—	—	—	Total "	516	530	18,488	35,580
" Oth'r C'tries..	1,937	5,276	8,553	21,690	MANGANESE ORE tons	13,725	17,162	113,999	163,557
TALLOW (including VEGETABLE TALLOW), Unrefined :					PYRITES of Iron and Copper	25,898	76,840	70,877	237,174
From China cwts.	15,941	—	72,043	—	SILVER OREval. £	—	—	86,228	33,931
" U.S.A. "	19,199	8	87,265	22	TIN ORE :				
" Uruguay ..	3,970	18,708	18,350	63,786	From S. America tons	926	3,145	103,018	564,481
" Argentine ..	37,419	29,625	168,140	108,923	" Brit. S.A. "	1	—	100	—
" Australia ..	45,536	2,061	197,948	8,430	" Oth'r C'tries ..	696	—	94,983	—
" New Zeal'd ..	123,647	1,500	586,074	5,400	Total "	1,623	3,145	198,101	564,481
" Other C'tries ..	825	1,062	4,019	4,249	LEAD, PIG and SHEET :				
Total "	246,537	52,564	1,133,839	190,810	From Spain tons	3,125	—	72,006	—
GUM :					" U.S.A. "	860	2,077	22,220	64,243
Arabic cwts.	285	1,928	928	7,643	" Mexico ..	300	—	6,750	—
Kauri	1,727	—	6,480	—	" Australia ..	2,085	1,226	44,836	36,311
Lac-dye, Seedlac, Shellac, and Sticklac ..	12,515	9,035	254,907	120,894	" Oth'r C'tries ..	1,135	44	29,134	1,320
ROBIN	183,669	114,923	398,775	294,579	Total "	7,505	3,347	174,946	101,874
CEMENT for Building and Engineering purposes	—	—	—	—	QUICKSILVER lbs.	379,704	—	115,715	—
GLUE, SIZE, and GELATINE..... cwts.	5,722	6,946	40,716	64,347	TIN, in Blocks, Ingots, Bars, and Slabs :				
OIL-SEED CAKE, not sweetened :					From Straits Settlements tons	1,148	149	311,700	56,338
Cotton-seed Cake tons	14,531	24	341,309	405	" Australia ..	—	—	—	—
Linseed Cake ..	12,228	—	310,130	—	" Oth'r C'tries ..	205	—	54,762	—
Unenumerated ..	125	—	2,535	—	Total "	1,353	149	366,462	56,338
Total "	26,884	24	653,974	405	ZINC :				
PARAFFIN WAX . cwts.	91,318	140,639	198,499	408,159	Crude in cakes ..	5,535	4,754	231,541	253,431

EXPORTS OF CHEMICALS AND ALLIED PRODUCTS.

(Concluded from page 312.)

ARTICLES.	QUANTITIES.		VALUE.		ARTICLES.	QUANTITIES.		VALUE.	
	Month ended Aug. 31st.		Month ended Aug. 31st.			Month ended Aug. 31st.		Month ended Aug. 31st.	
	1919.	1918.	1919.	1918.		1919.	1918.	1919.	1918.
OILS, Refined :			£	£	OIL-SEED CAKE, not			£	£
Coco-nut cwt.	—	—	—	—	sweetened :				
Cotton-seed tons	2	—	282	—	Cotton-seed Cake tons	2	—	30½	—
Olive tuns	1	—	449	52	Linseed Cake .. "	1	3	25½	95
Palm cwt.	2,419	—	8,808	—	Rape-seed Cake .. "	—	—	—	—
Palm Kernel ... "	196	—	910	—	Soya Bean Cake .. "	—	—	—	—
Total val. £	—	—	10,449	52	Unenumerated .. "	—	—	—	—
OILS, Unrefined :					Total "	3	3	55	95
Coco-nut cwt.	22	—	60	—	PARAFFIN WAX . cwt.	20,857	158	58,237	827
Olive tuns	—	—	—	—	SOAP :				
Palm cwt.	1,160	—	3,449	—	Soft Soap cwt.	5,128	2,268	14 507	5,277
Palm Kernel ... "	8,185	—	22,824	—	Household and Laund-				
OIL, SEED :					dry Soap, in bars or				
To Netherlands tons	734	—	73,594	—	Tablets :				
" Belgium "	2,285	—	241,392	—	To China..... cwt.	3,548	1,656	10,046	5,275
" Brazil "	85	—	10,468	—	" Other Foreign				
" Egypt (includ-					Countries ... "	149,641	14,971	530,621	45,862
ing Anglo-					" British South				
Egyptian					Africa "	2	52	11	179
Sudan) "	98	—	9,592	—	" British East				
" British India "	28	—	3,499	—	Indies "	28,381	22,955	61,422	57,784
" Straits					" Other British				
Settlements . "	56	—	7,738	—	Possessions .. "	28,611	18,577	78,824	57,625
" Ceylon..... "	1	—	203	—	Total "	210,183	58,211	680,924	166,725
" Australia ... "	4	—	477	—	Polishing and Scouring				
" Canada "	33	—	3,821	—	Soap cwt.	275	547	721	1,442
" Oth'r C'tries "	6,226	165	691,512	10,861	Soap Powder ... "	1,423	184	3,279	452
TOTAL :					Toilet Soap..... "	14,012	6,073	138,505	60,353
Castor-seed Oil .. "	640	16	64,650	1,320	Unenumerated .. "	3,749	2,455	18,648	6,248
Cotton-seed Oil :					Total of Soap .. "	234,770	69,738	856,585	240,497
Unrefined ... "	—	—	—	—					
Linseed Oil :									
Pure "	7,231	2	812,513	200					
Not Pure "	405	146	35,278	9,255					
Rape Seed Oil .. "	1,247	1	127,708	86					
Soya Bean Oil .. "	20	—	1,820	—					
Other Seed Oils .. "	7	—	317	—					
Total "	9,550	165	1,042,296	10,861					
CANDLES :									
To British South									
Africa cwt.	20	—	155	—					
" Other C'tries "	24,575	110	134,997	588					
Total "	24,595	110	135,152	588					
CEMENT for Building &									
Engineering purposes :									
To Netherlands tons	4,413	—	14,414	—					
" U.S.A. "	21	—	264	—					
" Brazil "	6,529	—	37,708	—					
" Argentine									
Republic ... "	8,557	—	48,323	—					
" British South									
Africa "	7	—	50	—					
" British East									
Indies "	6,235	21	34,832	145					
" Australia ... "	414	—	2,015	—					
" New Zealand .. "	5	—	205	—					
" Canada "	—	13	—	45					
" Other C'tries "	14,302	208	75,465	1,307					
Total "	40,483	242	213,276	1,497					
GLUE, Size, and									
Gelatine cwt.	12,879	1,958	43,037	20,330					

DENSITY AND TEMPERATURE.

MEMBERS of organic compounds belonging to homologous series, differing in composition by the group CH_2 (for instance, the hydrocarbons methane CH_4 , ethane C_2H_6 , propane C_3H_8 , etc., and similarly the alcohols, acids, ethers, etc., derived from the hydrocarbons) show many striking regularities in their properties. Melting and boiling points rise with increasing molecular weight; solubility, refractive power, and activity grow or diminish, and so on. These regularities extend to the molecular volumes, but there is no similar relation for the densities. As a rule, the density diminishes as the molecular weight increases. Thus the densities of benzene C_6H_6 , toluene C_7H_8 , xylene C_8H_{10} are 0.8790, 0.8707, 0.8637, and for methyl acetate, propionate, and butyrate the figures are 0.9593, 0.9383, 0.9207. But in the case of the hydrocarbons pentane, heptane, octane, the density increases with the molecular weight—viz., 0.6454, 0.6705, 0.7005,—whilst in the case of the alcohols, methyl, ethyl, and propyl, there is no regularity at all, the densities being 0.81, 0.8065, 0.8183. The figures given refer to the temperature of 0°C . W. Herz, of Breslau, who is studying the correlation of properties, points out in the *Zeit. für Elektrochemie*, however, that at high temperatures, near the critical points of the respective compounds, there is a regular increase of the density with increasing molecular weight, as one would be inclined to expect, and that the ratio of the densities of two members of a homologous series increases regularly with increasing temperature. At 240°C . the alcohols, methyl, ethyl, propyl, e.g., the critical temperatures of which are 240° , 243° , 263.7°C ., have the densities 0.2722, 0.3825, 0.4920, and this regularity is very general, but does not hold for solids, of course.

DENSITY AND TEMPERATURE.

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THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

The specifications of the following applications are not printed by the Patent Office until the complete specifications have been accepted.

September 15th to 20th (continued)

- Acid Process for Production of White Lead. Arrowmath, H. T. 22,825 and 22,826.
- Anhydrous Magnesium Chloride and Anhydrous Calcium Chloride. Ashcroft, E. A. 23,000.
- Manufacture of Oxides or Salts of Tungsten, or of Metallic Tungsten. Ashcroft, E. A. 23,001.
- Manufacture of Compounds of Metals, or of Metals, or Non-metals Themselves from Ores, Minerals, Intermediate Products, Residues, Wastes, etc. Ashcroft, E. A. 23,002.
- Manufacture of Aluminium, or Its Oxides or Salts. Ashcroft, E. A. 23,003.
- Explosives. Bernardini, L.; and Manuelli, C. 22,775.
- Purification of Gas. Burgoyne, J. S.; and Holt, C. E. 23,167.
- Cyanide and Cyanogen Compounds. Calvert, G. 23,211.
- Treatment of Sulphide Minerals. Capron, F.; and Petersson, E. 23,128.
- Manufacture of Alcohol or Ether. Damiens, A. A. L. J.; Loisy, M. C. J. E. de; and Piette, O. J. G. 22,739.
- Treatment of Peat. Densified Peat, Fuel, and Products, Ltd.; and Macdonald, D. B. 23,178.
- Cleaning, Scouring, and Polishing Powders or Pastes. Denton, G. R. 22,876.
- Ascertaining Specific Gravity. Evans, H. G. 22,603.
- Derivatives of Bromoacetylated Urea Compounds. Farbenfabriken vorm. F. Bayer and Co. 22,766.
- Trimethylacetyl Salicylic Acid and Its Homologues. Farbenfabriken vorm. F. Bayer and Co. 22,767.
- Manufacture of Precipitate Rich in Alkalies and Used in Ash from Raw Juices and Waste Liquors of Sugar Factories. Kowalski, M. von Wierusz-. 22,774.
- Centrifugal Separation. Mauss, W. 23,206.
- Treating or Saturating Amido Organic Substances to Form Salts. Morris, H. N.; and Morris and Co., H. N. 22,940.
- Extracting and Concentrating Aromatic, Flavouring, or Colouring Matters, etc. Peek, Fream, and Co.; and Whymper, R. 23,022.
- Gasification of Solid Fuel. Rincker, F. G. C. 22,785.
- Recovery of Metals from Slags. Vautin, C. 22,651.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 6d. in stamps to the Comptroller, Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane. W.C.

1917.

- Superphosphates. Chemische Fabrik Melle Akt.-Ges.; and Rohsmat, O. 3,509. 104,693
- Acetaldehyde. Deutsche Gold- und Silber-Schiedeanstalt vorm. Roessler. 8,486 and 8,565. 107,584 and 107,585

1918.

- Recovery of Gold, Silver, and Radium from Extremely Dilute Solutions, particularly Seawater. Baur, E.; and Nagel, O. 5,104. 114,316
- Compositions Having a Basis of Cellulose Acetate. Dreyfus, H. 7,192. 132,283
- Centrifugal Separators. Brownlow, R. S. 9,555. 132,291
- Aspirin (Acetyl-Salicylic Acid) Tablets. Pickard, J. A.; Rankin, I. G.; and Pickard, Ives, and Rankin. 9,684. 132,294
- Continuous Sulphonation of Aromatic Hydrocarbons other than Benzene. Barbet et Fils et Cie. E. 10,117. 132,298
- Distilling Hydrocarbons or Converting Them into Products of Lower Boiling-points. Clark, L. 14,658. 132,201
- Coke Ovens. Piette, O. 14,725. 132,201
- Dyeing, Staining, and Mordanting by Means of Salts of Titanium and Iron. Barnes, J.; Wrigley, H.; and Spence and Sons, P. 14,740. 132,345
- Bismuth Compounds and Metallic Bismuth Free from Arsenic. Busvold, N. 15,862. 132,659
- Sulphur Dioxide. Grayson, J. 17,813. 132,387
- New Colouring Matters. A'Brassard and Crawford, F.; and Singer, A. 18,016. 132,390
- Aluminium Alloys. Wigan, O. S.; and G'lover, W. 20,292. 132,411

1919.

- Benzoic Acid. Leach, F. P.; and United Alkali Co. 2,943. 132,433

COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

1919.

- Hydrocarbon Liquids from Carbon. Rousseau, F. P. A. 14,086. 132,490
- Fertilisers Containing Nitrogen and Phosphoric Acid. Norsk Hydro-Elektrisk Kvaeldesfabrik. 15,536. 132,496
- Liquid Ammonia. Norsk Hydro-Elektrisk Kvaeldesfabrik. 15,536. 132,504
- Recovering Ammonium-aluminium Sulphate from Aluminium Sulphate Solutions Containing Ferric Oxide. Gans, R. 22,079. 132,510
- Soap. Gans, R. 22,080. 132,511
- Preparing Acetic Acid from Acetylene as the Primary Material. Soc. des Acieries et Forges de Firminy. 22,482. 132,529

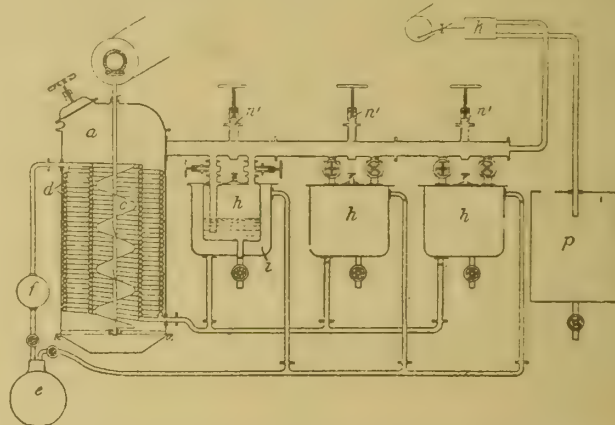
ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Vulcanising India-rubber. S. J. Peachey, Davenport, Stockport. British Patent, 129,826, of 1918.

India-rubber is vulcanised in the cold by alternate treatment with sulphur dioxide and hydrogen sulphide, the two gases yielding sulphur within the substance of the rubber. A solution of hydrogen sulphide in benzene may be used instead of the gas after treatment with sulphur dioxide. The process may be used for the vulcanisation of rubber dissolved in a solvent such as benzene. Sulphur dioxide is passed into the solution, hydrogen sulphide is passed into a second solution, and the two solutions mixed; or one of the gases may be in solution in benzene.

Distilling Tobacco. H. Jephcott, London. British Patent, 129,491, of 1918.

Tobacco, tobacco stalks, and offal tobacco are distilled destructively in presence of an alkali such as lime, caustic soda, or potash, or the residual ash from the process, in a retort *a* provided with a mixing-device *c* and a coil *d* supplied with steam from a boiler *e* through a superheater *f*. The residual charred mass may be used as a fuel, and the ash used as a fertiliser or treated to extract potash. The vapours are



withdrawn by a pump *k*, which causes a reduced pressure in the retort, and are caused by valves *n* to pass through one or more absorbing-chambers *h* containing sulphuric, phosphoric, or other acid heated to the boiling-point by steam-jackets *i*, so as to remove only nicotine and ammonia. The remaining vapours are condensed in chambers *p*, and the condensate fractionated to separate acetone and methyl alcohol.

Monochloracetic Acid and Its Esters. L. J. Simon and G. Chavanne, Paris. British Patent, 129,301, of 1917.

Monochloracetic acid is prepared by direct hydration of trichlorethylene by means of hot sulphuric acid. The process may be carried out by dissolving trichlorethylene in highly concentrated sulphuric acid, adding water, and heating to 150-200° C., or by bringing vaporised trichlorethylene into intimate contact with sulphuric acid in suitable apparatus. The chloracetic acid may be separated by distillation, or by means of a current of hydrochloric acid gas or inert gas, or by diluting the solution and extracting with ether or other solvent. Esters of monochloracetic acid are obtained by adding an alcohol, e.g., ethyl alcohol—to the sulphuric acid solution and distilling.

Lead Chloride and Sulphate. F. E. Elmore, Boxmoor, Hertfordshire. British Patent, 129,773, of 1918.

In processes in which lead sulphate is extracted from ore products by brine or brine and sulphuric acid and subsequently separated from the solution, as in the process described in Specification 127,641, the accumulation of sodium sulphate in the brine is liable to interfere with the process. To regenerate the brine which has thus lost its efficiency, the solution is cooled to about 0° C., either before or after the separation of the lead salts. In the former case, lead salts and sodium sulphate separate out, and, after removal from the brine, which is then fit for use again, the mixture of salts is treated with hot, preferably boiling, water, whereby lead sul-

phate and brine are obtained; in the latter case, the sodium sulphate which separates is dissolved in hot water and used to treat the lead salts first separated, so as to obtain lead sulphate and brine as before, the treatment being preferably effected in a series of vessels on the counter-current principle. If silver is present, the lead salts may be boiled with water to extract lead chloride, the silver remaining with the residual lead sulphate, and the lead chloride is converted into sulphate by the sodium sulphate obtained as above described.

Picric Acid. J. N. Brooke, Lightcliffe, Halifax. British Patent, 129,375, of 1917.

Picric acid and other nitro compounds are continuously prepared in apparatus of the kind described in Specification 128,303, and the acid liquid issuing from the nitration vessels is passed through a cooler and filters, and then the filtrate is passed through one or more secondary nitration and concen-



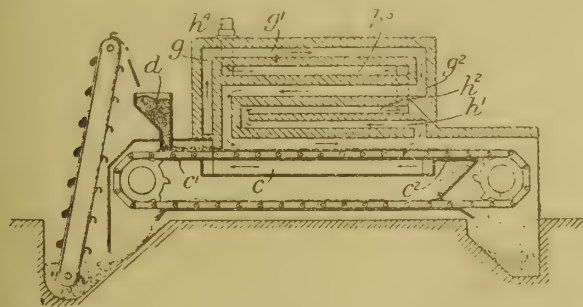
tration units in which it is reheated to complete nitration and concentrate the liquor before final filtration. Using the apparatus shown, the acid liquid from the four primary nitration units 1 - 4 passes to a cooler 5 and thence to filters 6 - 9, in which the picric acid deposits; the filtrate then passes to secondary nitration and concentration units 10, 11 heated by steam coils, and is then filtered to separate more picric acid.

Chromium Sulphate. F. M. Mooney, Montreal, Canada. British Patent, 129,958, of 1919.

A chromate or bichromate is treated with an acid such as sulphuric acid to liberate chromic acid, and sodium thiosulphate is added to reduce the chromic acid. Heat is applied to expel the sulphur dioxide liberated, and the chromium oxide is filtered and washed and dissolved in sulphuric acid.

Furnaces. N. Testrup, and Techno-Chemical Laboratories. Clapham Park, London. British Patent, 129,771, of 1918.

In apparatus of the type described in Specification 115,087 for conducting continuous high-temperature reactions, the air or other gases for combustion are employed to cool the means for carrying the layer of material to be treated past the source of heat. As shown, material is fed from a hopper *d* to a plate *c'* and carried along by scrapers on an endless



chain. Air enters a trunk *c* below the plate *c'*, passes by passages *g*, *g*¹, *g*² of a regenerator, and meets either combustible gas or combustible material admixed with the layer at the left-hand end of the furnace. The fumes pass by passages *h*¹, *h*², *h*³ of the regenerator to a flue *h*⁴. Untreated material falls through a sieve *c*² and is returned to the hopper *d*.

Ammonium Sulphate. Oakbank Oil Company and J. Wishart, Glasgow. British Patent, 129,850, of 1918.

Neutral ammonium sulphate is obtained by introducing a measured quantity of ammonia liquor in the process of eliminating the mother-liquor from the sulphate by centrifugal or

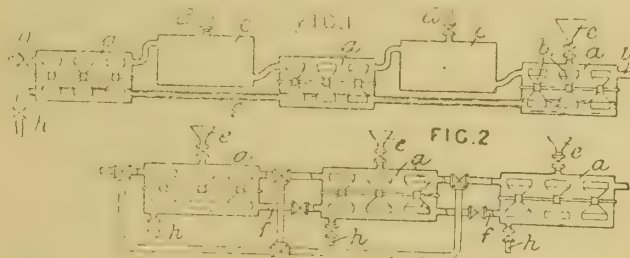
equivalent apparatus. The ammonia liquor used is obtained direct from the crude ammonia still and contains ammonium carbonate.

Refractory Materials. H. M. Olson, Los Angeles; and H. W. Becker, Lompoc, California. British Patent, 129,505, of 1918.

A heat-insulating material which may be rendered abrasive by calcining consists of infusorial earth or non-crystalline silica in a finely divided state and a binder including aluminium sulphate or equivalent and an alkaline sulphate or a double sulphate of alumina or its equivalent and alkali. The composition may vary from 75 to 90 per cent. of infusorial earth and from 5 to 25 per cent. of binder. A preferable mixture consists of 88 per cent. of dry pulverised infusorial earth, 1 per cent sodium sulphate, 1 per cent. aluminium sulphate, and 10 per cent. lime. A suitable metallic sulphate equivalent may replace the aluminium sulphate, and other alkaline sulphate can be used instead of sodium sulphate; or a double sulphate of an alkali and alumina or equivalent may replace the two separate salts. The mixture is gauged or wet with water and moulded into bricks, etc. The mixture may be dried and calcined at from 800 to 2700° F., forming a hard crystalline substance having abrasive qualities.

Nitrates. H. E. F. Goold-Adams, Westminster; J. R. Partington, Lostock Gralam, Cheshire; and E. K. Rideal, Westminster. British Patent, 129,690, of 1917.

In the production of nitrates by absorption of nitrogen oxides (such as the products of the electric-arc oxidation of nitrogen or of the oxidation of ammonia) in solutions or suspensions of alkali, alkaline-earth, copper, zinc, or other compounds, a series of absorption towers or chambers is employed, the gas being passed through until the solution contains only nitrate, and the unabsorbed oxides being oxidised to nitrogen peroxide and led into the next absorption chamber. The apparatus may consist of a number of absorbers *a* in series, with oxidation chambers *c* inserted between consecutive



chambers having air inlets *d*; or each chamber may be large enough to provide oxidation space within itself, the chambers *c* being dispensed with. The gas is admitted at *g* and escapes at *i*, while the absorption liquid is admitted at *e* and passes from chamber to chamber by pipes *f*, escaping at the outlet *h*; or the gas and liquid may travel in the same direction. In a modification, Fig. 2, a number of absorption chambers *a* are arranged so that any chamber in which the liquor has become sufficiently nitrated can be cut out. The gas travels through the chambers in series and the absorption liquor is fed into, and discharged from, each chamber separately at *e* and *h* respectively. Intermediate oxidation chambers may be provided as shown in Fig. 1.

Hydrogen. E. K. Rideal, London, and H. S. Taylor, St. Helens. British Patent, 129,743, of 1918.

Hydrogen containing carbon monoxide as an impurity, for example hydrogen produced by liquefaction processes from water gas or by the steam iron process, is purified by submitting the gas successively to two processes by the first of which the greater part of the carbon monoxide is converted into carbon dioxide, while, by the second, the remainder of the carbon monoxide is removed by fractional combustion with air or oxygen. The impure hydrogen is mixed with steam and passed over a suitable catalyst, for example iron oxide admixed with one or more suitable promoters such as the oxides of chromium, cerium, or thorium, at a temperature of 400-500° C. The resulting mixture of gases is then cooled, mixed with a small quantity of air or oxygen, and passed over a second catalyst at a lower temperature. When using, as the second catalyst, iron oxide and a promoter of the kind mentioned

above, a temperature of 250-300° C. is employed; when using copper oxide, 120° C. is sufficient. The carbon dioxide is removed from the product by lime boxes or soda scrubbers, and oxygen, if present, is removed by passing the gases over a nickel catalyst at 200-300° C.

Denaturing Alcohol. A. F. Joseph, London. A communication from W. N. Rae and C. T. Symons, Colombo, Ceylon. British Patent, 129,904, of 1918.

A denaturant for alcohol consists of an essential oil or oils such as citronella with or without the addition of kerosene or paraffin oil, or mineral naphtha.

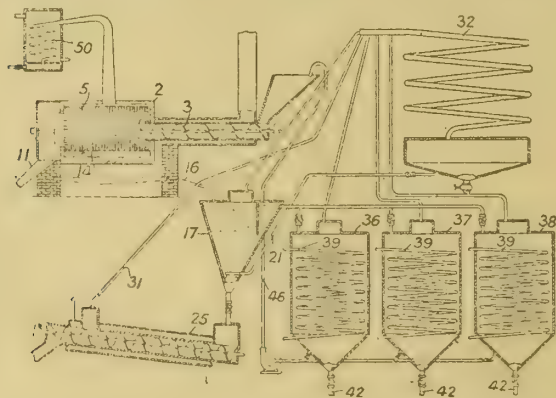
Purifying Hydrocarbons. G. F. Forwood and J. G. Taplay, London. British Patent, 129,349, of 1917.

Shale spirit, crude benzole, and other oils are treated for the removal of sulphur by washing with a solution of the sulphides of the alkalis or alkaline earths. The reagent may be prepared by saturating a strong solution of caustic potash with sulphuretted hydrogen and with flowers of sulphur in succession. The treatment may be effected by agitating the oil with the reagent for about six hours, or by heating them to about 40° C. The reagent is drawn off, and the oil is washed with water, then with dilute caustic soda solution, and finally with water.

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Extracting Products from Shale. H. D. Ryan, York, Penn., U.S.A. British Patent, 129,992. Convention date, March 25, 1918.

In extracting bitumen, paraffin wax, and other constituents from shale, etc., the latter is digested with heavy oil at a temperature too low to effect destructive distillation, and the hot digest or solution is discharged into a bath of light oil in order to prevent the deposition of bitumen on cooling. The shale is fed by a screw conveyor 3 to a retort 2 containing a cylindrical screen 5 rotating in a bath of heavy oil 14 at a temperature of about 600°F; volatile constituents escape to a condensing coil 50 and refractory solid matter is discharged

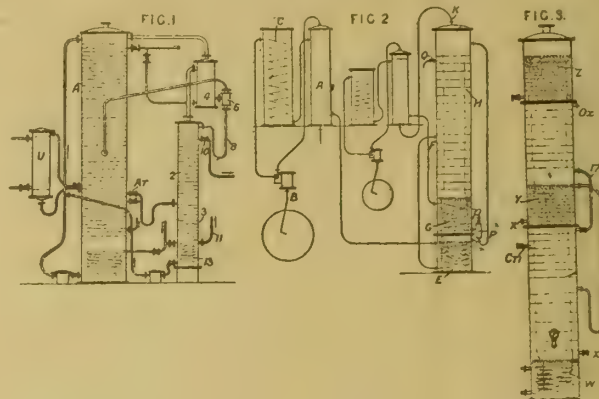


from an outlet 11. The heavy oil digest flows through a pipe 16 into a conical tank 17 containing gasoline. Volatilised light oil escapes to a condenser 32 and is returned to the tank through a pipe 21, and the digest is carried by the upward current of light oil and delivered to tanks 36, 37, 38 containing heating coils 39 where light oil is again driven off to the condenser 32. Part of the digest is returned to the retort through a pipe 46 and the remainder is withdrawn through pipes 42 for further treatment. Clay, etc., is discharged from the tank 17 and conveyed through a heated chamber 25 for the recovery of light oil.

Separating Gaseous Mixtures by Liquefaction. E. Barbet and Fils and Cie., Paris. British Patent, 129,989. Convention date, July 17, 1918.

In the separation of air into its constituents by rectification of the liquid air, the rare gases, argon, helium, neon, krypton, and xenon are obtained in a pure state by a continuous rectification process. The proportions of the gases at various points in the primary and secondary rectifiers are maintained constant by the regulating devices described in

Specification 129,648. To diminish the nitrogen content of the crude argoniferous liquid, some twenty plates are arranged in the lower portion E of the primary rectifier A, Fig. 1, which is further cooled by the use of liquid air from the cooler U or of liquid nitrogen. The impure argoniferous liquid extracted at the point A² passes to a column 2-3, heated at the base by a nitrogen coil 13, which evaporates the oxygen collecting in the base; a portion of this oxygen passes through the pipe 11 to the gas-holder. The vapourised nitrogen from the coil 13 together with that from the coil of the air rectifier pass to the top of the latter. Rectification of the argoniferous mixture is effected by the plates 2, the vapours from the top of the rectifier passing to a condenser 4, the tubes of which are immersed in liquid nitrogen from



the top of the column A or elsewhere and thence to a separator 6, from which the gaseous portion passes back to the column A while the liquid passes back to the argon column through a pipe 8; pure argon is drawn off at the cock 10 and passes through a heat-exchanger, meter, and gas-holder. The reflux may be dispensed with when the argon is not required in a pure state, a smaller proportion being then liquefied in the condenser 4. In the neon and helium separator, Fig. 2, the impure nitrogen from the primary rectification process, containing neon, helium, and hydrogen, passes through a heat-exchanger A to a compressor B, water-cooler C, and back through the heat-exchanger A to a worm E immersed in pure liquid nitrogen in the base of a rectifier H; the vaporised nitrogen passes off to a gas-holder or to the top of the column. The impure nitrogen liquefied in the worm E is fed to the rectifier at the point F; pure nitrogen separates at the base, and a mixture of helium, neon, and hydrogen, free from nitrogen, issues at the top of the column through the pipe K and is compressed and cooled and passed to a coil G in the lower part of the rectifier, the pressure being sufficient to liquefy the whole of the neon and a portion of the hydrogen; the mixed liquid and gas are expanded in a separator P and the liquid passed to the top of the rectifier, pure neon being drawn off at the point Q; the gas passing off at the point p consisting of helium and hydrogen is passed through a heat-exchanger to a gas-holder, the hydrogen being destroyed by sparking with the oxygen or absorbed by wood charcoal. The mixture of oxygen with xenon and krypton coming from the primary rectifier may be freed of oxygen by sparking with hydrogen, but is preferably rectified directly in the apparatus shown in Fig. 3. The mixture is introduced in the liquid state at the point X where it is heated by the tubes Y having closed upper ends; the overflow of this liquid, almost free from oxygen, passes down the siphon tube 16 to the middle of the lower part of the column where it is rectified, pure xenon remaining at the base and being extracted at the point Xe. Krypton vapours contaminated with oxygen pass off through the pipe 17 from the top of the lower portion of the column and pure krypton is withdrawn a few plates lower at Cr¹. In the upper portion of the column, the oxygen is freed from krypton by condensation in the blind tubes Z which are cooled by liquid nitrogen, the condensate forming a reflux for the rectifying plates; pure oxygen drawn off at the point Oz may be passed to the gas-holder or to the base of the primary rectifying. The heating of the column is effected by a worm W through which dry air at about normal temperature is passed, the cooled air being used in the primary rectifier.

NEW COMPANIES.

Castelloid, Ltd.—Private company. Capital £5,000., £1. shares. Manufacturers of such articles as can conveniently be made in celluloid, casein or gelatine, etc. Registered office: 27, Britannia Street, Leicester.

The Bradford Concrete Block Company, Ltd.—Capital £2,000., £1. shares. Registered office: Empress Works, Legrams Lane, Bradford.

Insulators, Ltd.—Capital £75,000., £1. shares. Manufacturers of insulating and chemical materials and products, constructors of and dealers in plant, apparatus, and compounds used in the installation of cold storage premises, etc. Solicitor: R. S. Smallman, 8, Queen Street, E.C.

Kuala Hidong Rubber Estate, Ltd.—Capital £50,000., 2s. shares. Registered office: 107, Fenchurch Street, E.C.

Premier Briquette Company, Ltd.—Capital £125,000., in 120,000 preferred ordinary shares of £1. each and 100,000 ordinary shares of 1s. each. Manufacturers of and dealers in patent fuel, chemicals, fuel oil, etc. Registered office: 80, Coleman Street, E.C.

San Salvador Spanish Iron Ore Company (1919), Ltd.—Capital £126,000., £1. shares. Office: 80, Bishopsgate, E.C.2.

Alloy Castings, Ltd.—Private company. Capital £2,000., £1. shares. Founders, casters, merchants and brokers of, dealers in and agents for, silver, nickel-silver, brass, copper, gun-metal, bronze, aluminium, alloys, and all kinds of metals, etc. Registered office: Porter Works, Elin Street, Sheffield.

Anglo-Caribbean Petroleum Syndicate, Ltd.—Private company. Capital £25,000., £1. shares. Office: 13, Copthall Court, E.C.

Basic Fertilisers, Limited.—Private company. Capital £30,000., £1. shares. Manufacturers of and dealers in raw basic slag and all kinds of chemical fertilisers, etc. Registered office: 20, Copthall Avenue, E.C.

C. F. Gerhardt, Ltd.—Private company. Capital £30,000., in 12,000 7 per cent. cumulative preference and 18,000 ordinary shares of £1. each. Importers and exporters of and dealers in drugs, chemicals, drysalteries, minerals, and produce, etc. Registered office: 5, Fenchurch Street, E.C.

Chemical Engineering Company (Manchester), Ltd.—Private company. Capital £15,000., £1. shares. Qualification 1 ordinary share. Registered office: 49, Deansgate, Manchester.

Ebo Rubber, Ltd.—Private company. Capital £3,000., £1. shares. Registered office: "A" Warehouse, 3rd Section Seal Wharf, Stratford, E.

Hays Marine Waterproof Glue Company, Ltd.—Private company. Capital £6,000., £10. shares. Objects: To take over the business carried on by the Hays Waterproof Glue and New Patent Enamel, Composition, and Varnish Company, Ltd. Solicitor: F. O. Goodman, 24a, Commercial Road, Portsmouth.

H. M. Leask and Co., Ltd.—Private company. Capital £50,000., £1. shares. Object: To acquire the business of H. M. Leask, seed crushers, cake and oil manufacturers, oil refiners, soap boilers, etc. Registered office: 14-15, Sir John Rogerson's Quay, Dublin.

Irish Color Manufacturing Company, Ltd.—Private company. Capital £1,000., £1. shares. Object: To carry on business as manufacturers' dealers in oils and varnishes, etc. Solicitors: Pedan and Reid, 64, Donegal Street, Belfast.

Victor Chemical Company, Ltd.—Private company. Capital £1,000., £1. shares. Registered office: 81, Duncan Gardens, Belfast.

GAZETTE NEWS.

LIMITED COMPANIES.—Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions, Orders, and Official and Other Notices.

Aladdin Cobalt, Ltd.—Meeting of creditors at 638, Salisbury House, E.S., September 24.

Copal Varnish Company, Ltd.—Meeting of creditors at Sherwood House, Piccadilly Circus, W., September 18.

Lynn Chemical Engineering Company, Ltd.—London, S.W. Resolved August 20, confirmed September 9: That the company be wound up. F. W. Stephens, 26-30, Salisbury House, London Wall, E.C., I.A., liquidator.

Southern Californian Oil Syndicate, Ltd.—London, E.C. Resolved August 27, confirmed September 12: That the company be wound up. M. H. Adams, 3, Gerrard Street, W., liquidator. Meeting of creditors at liquidator's, September 29, at 3 p.m.

DISSOLUTIONS OF PARTNERSHIP.

(Note.—When two dates are given in the following announcements, the first is the date of the dissolution. The date in parentheses is that of the official advertisement.)

Crooke R., Junior, and Co.—(Reginald Crooke, deceased, and Norman Crooke), 11, Dale Street, Liverpool, oil and produce brokers. June 30. The business will in future be carried on under the same style by Frederick Graham, by whom the liabilities of the late partnership will be discharged. (September 12.)

BOOKS RECEIVED.

The Institute of Metals: Annual Autumn Meeting, Sheffield. Souvenir Booklet.

A Select List of Scientific and Technical Books, 1919. London: A. and F. Denny.

Sir John Cass Technical Institute.—Syllabus of Classes, Session 1919-1920. London: Jewry Street, Aldgate.

City of Bradford Technical College.—Calendar for the 38th Session, 1919-1920.

Brazil's Trade and Industry in 1918; with Special Reference to the State of Sao Paulo. Hints and Information for Manufacturers and Merchants.—By E. Lloyd Rolfe, Secretary, British Chamber of Commerce of Sao Paulo and Southern Brazil.

ACETIC ACID IN CHESTNUT EXTRACT.—Writing on "The Leather Industry during the War," U. J. Thauau, in *Le Cuir*, mentions the recovery of acetic acid in the manufacture of chestnut extract. During concentration of the liquors in the triple-effect evaporation the acid is found in the water of condensation from the second and third cylinders, and in the method used by the Comptoir des Extraits, condensation waters are used over again for the extraction of the wood. The presence of acetic acid favours an easy extraction, and works trials have proved that extracts so prepared are of better quality and contain less non-tans than those prepared with ordinary water. Such facts would appear to indicate that acetic acid acts as a stabiliser towards the pyrogallol tannin. It is concluded, therefore, that it is not a good practice to recover for other purposes the acetic acid (i.e., for the manufacture of pure acetic acid), as it is equally bad both for the extract maker and tanner, the latter knowing quite well the swelling properties of acid in their liquors.—*Leather World*.

MARKET REPORTS.

TAR AND AMMONIA PRODUCTS.

WEDNESDAY.

Benzole: London 90%, 2s.; North, 1s. 9d. to 1s. 10d.; 50%, 1s. 10d. to 1s. 11d.; North, 1s. 9d. to 1s. 10d. naked. **Carbolic acid,** crude, 60%, East and West Coast, nominally 1s. 7d. to 1s. 8d.; crystals, 39-40%, 9d. to 9½d., f.o.b. **Crude tar,** London, 45s. to 50s.; Midlands, 44s. to 46s.; North, 45s. per ton, ex works. **Pitch,** 77s. 6d. to 80s.; East Coast, 67s. 6d. to 75s., f.o.b.; West Coast, 62s. 6d. to 65s., f.a.s. **Solvent naphtha,** naked, London, 90-190%, 2s. 5d.; North,

2s. 3d. to 2s. 4d.; 90-160%, naked, London, 2s. 5d.; North, 2s. 2d. to 2s. 3d. **Crude naphtha** naked, 30%, 9d.; North, 8d. to 8½d. **Refined naphthaline,** £16. to £18.; salts, £6. to £7. **Toluol,** naked, London, 2s. 6d.; North, 2s. 5d. **Creosote,** naked, London, 6½d.; North, 5½d. to 5¾d.; heavy oil, 6½d. **Anthracene,** 40-45%, 7d. per unit. **Cresylic acid,** 95%, 2s. 5d. to 2s. 6d.; 97-99%, 2s. 7d. to 2s. 8d., ex works, London, and f.o.b., other ports. **Sulphate of ammonia;** home trade, September, £19. 10s. per ton.; October, £20. 10s., basis 24½%. **Nitrate of soda,** £22. to £22. 10s.

FERTILISER MATERIALS.**LIVERPOOL, THURSDAY.**

Nitrate of soda is quiet on spot, and today's quotation for 95-96% quality is £20. 2s. 6d. per ton, net cash, f.o.r. Liverpool, prompt delivery. East Indian bone meal for shipment is without alteration, the quotation for October-December shipment being £17. 10s. per ton, net cash, ex ship Liverpool, for 1½% ammonia, and 52% phosphates. On spot Liverpool holders ask £16. per ton, net cash, for 1½% and 45% quality. Mineral phosphates: There is no change to report in this material, and values at present are only nominal. Dried blood is rather irregular, the nearest value being about 30s. per unit of ammonia per ton, net cash.

LONDON METAL MARKET.**THURSDAY.**

Copper: Standard brands, £99. 15s. to £100. cash; £100. 5s. to £100. 10s. three months; electrolytic, £110. to £121. Tin: Standard, £277. to £277. 10s. cash; £274. 15s. to £275. three months; Straits, £277.; English, £274. to £275. Lead: Soft foreign, £25. 12s. 6d.; English, £26. 15s. Spelter, £41. 10s.; hard, £28. to £30. Antimony, English regulus, 90%, £45. Aluminium £150. Nickel £205. delivered, packages extra. Quicksilver £23. 10s. to £24. Bismuth 12s. 6d. Platinum 442s. per oz. Wolfram 32s. 6d. per unit.

TURPENTINE MARKET REPORT.

Messrs. James Watt and Son, Ltd., 101, Leadenhall Street, London, E.C. 3, report that the stocks of turpentine on September 27 were: American, 30,505 barrels, compared with 5,689 barrels at the corresponding date of 1918; French, 487 barrels (453 barrels); and Spanish, 524 barrels (455 barrels). Deliveries during the week ended September 20 were 1,944 barrels against 440 barrels last year, and since January 1 52,790 barrels, compared with 17,951 barrels in 1918. The price on Saturday last was 128s. 6d., compared with 105s. at the corresponding date of last year. October-December delivery was quoted at 130s., and January-April (1920), 131s. 9d.

MANCHESTER CHEMICAL MARKET.**THURSDAY.**

Business generally continues satisfactory, with a steady volume of trade both for home and export. Quotations all round are firm. Caustic soda is dearer, and £22. now asked for resale lots of 76/77% 58% alkali, £7. net per ton ex store. Refined bicarbonate of soda, bags, £7. 10s. per ton. There is not much inquiry for bleaching powder, and price is easy at £15., softwoods, on rails; soda crystals and saltcake unchanged at recent rates. Chlorate of soda lower at 6d. per lb. Potash dull at 1s. per lb. Bichromates unaltered. Recovered rock sulphur £17. rails makers' works. Demand for copper sulphate continues flat, and price nominal at £41. per ton, f.o.b. Phosphate of soda firmer at £26. per ton. Comm'l. hypophosphate of soda steady at £16. 10s. per ton. Concentrated sodium sulphide higher, at £23. casks on rails. Nitrate of soda, £21. per ton. White powdered arsenic still scarce, and £60. quoted for small parcels. Yellow prussiate of soda is higher on the week at 10d. per lb., and supplies short. Prussiate of potash steady at 1s. 9d. per lb. For lead salts there is fair inquiry, and prices are well maintained. White acetate, £83.; brown, £69.; and nitrate, £56. per ton. Acetate of soda and acetic acid are unaltered at recent rates. English brown acetate of lime, £11. per ton., grey, £17. per ton. Miscible wood naphtha dearer, at 10s. 6d. per gall. Nitrite of soda scarce on the spot at £60., basis 100%. Green copperas still moves slowly, and price easy. Oxalic acid steady at 1s. 2½d. per lb. delivered.

LIVERPOOL CHEMICAL MARKET.**THURSDAY.**

Inquiries for chemicals have come to hand more freely, the demand on export account having further increased. More interest generally has been shown, in covering for forward dates, in view of the continued shortage of supplies of some of the heavier goods for immediate or early deliveries. Bleaching powder has been more in request for U.K. use and for export. The price may be given as £17. per ton free on rail or conveyance, in buyers' packages. Chloride of calcium has been in very fair demand, and is £8. to £11. per ton, in casks, f.o.r. Caustic soda has again been well inquired for, and, with a moderate supply, is less readily obtainable. Prices are: £24. per ton for 76%; £22. per ton for 70 to 72%; and £19. per ton for 60 to 62%. Nitrate of soda has been more in request, and is £21. to £22. per ton. Saltcake has met with

a rather active inquiry, and is £6. 10s. per ton, in casks, f.o.b. Soda crystals have sold with some freedom, and are £5. 10s. per ton, in 2cwt. bags, f.o.r. at works. Bicarbonate of soda has been in active demand, and is £7. 5s. to £10. per ton, according to terms of delivery. Borax has been in good request, and English continues in small supply. Quotations for it are £42. per ton for ordinary, and £44. per ton for powdered, in bags. Ammonia alkali has been in brisk demand, and is £6. 15s. per ton, f.o.r. at works. Hyposulphite has been in fair request, and is £16. per ton for ordinary, and £21. per ton for pea crystals, in 1cwt. kegs. Sulphite of sodium has been quiet, and is £10. per ton for ordinary, and £16. to £18. per ton for pea crystals in 1cwt. kegs. Bichromate of soda has been more inquired for, and is 9d. per lb. Phosphate of soda has been in moderate request, and is £25. per ton. Sulphide of sodium has been but little called for, and is £20. per ton in casks, and £22. per ton in drums. Chlorate of potash has been in fair demand, and is 1s. to 1s. 2d. per lb. Permanganate of potash has been rather more in request, and is 3s. 3d. to 3s. 6d. per lb. Sulphate of potash has moved but slowly, and is £30. per ton. Carbonate of potash has been in quietly steady demand, and is £90. to £95. per ton for 80 to 85%. Caustic potash has been well inquired for, and is £110. to £120. per ton. Nitrate of potash has sold with some freedom, and is £55. to £60. per ton for refined, and £40. per ton for ordinary. Canadian potashes have been neglected. Montreal first quality are £200. to £220. per ton, and second quality, £190. to £210. Bichromate of potash has sold more readily, and is 1s. 6d. to 1s. 7d. per lb. Yellow prussiate of potash has been in very fair demand, and is 1s. 9d. to 1s. 10d. per lb. Sal ammoniac has been steadily called for, and is £80. per ton for lump, £75. per ton for seconds, and £5. per ton extra for ground. Sulphate of ammonia has sold a little more freely, and is £19. 10s. per ton for September; £20. 10s. for October; £20. 15s. for November; £21. for December; £21. 7s. 6d. for January, 1920; £21. 15s. for February, and £22. per ton for March to May, 1920. Carbonate of ammonia has been in moderate inquiry, and is 6½d. per lb. Muriate has had a very limited sale, and is £45. to £50. per ton, according to quality. Magnesia has again met with a fair inquiry. Carbonate is £2. 5s. per cwt., and sulphate, £10. to £16. per ton, according to grade. Alum continues to be well inquired for, and little of it has been available for early deliveries. Prices are: £18. 10s. per ton for the home trade, and £18. 10s. to £19. 10s. per ton for export. Aluminoferric has been in slightly better request, and is £8. 10s. to £12. per ton, according to quality. Sulphate of alumina has been more inquired for, and is £12. to £17. per ton according to grade. Sulphur has been in good request, and English flowers are still in small supply. They are £32. per ton. Roll is £23. per ton, and rock £22. per ton, in bags, f.o.r. Sicilian grades are: Flowers, £28. per ton; roll, £22. 10s. per ton; and rock, £17. 15s. per ton. Cream of tartar has been quieter, and is £11. 10s. to £11. 15s. per cwt. Tartaric acid has been in quietly steady demand, and is 3s. 2d. to 3s. 3d. per lb. Boracic acid has been in very fair request, and is £72. per ton for crystals, and £74. per ton for powdered. Oxalic acid has been in somewhat freer inquiry, and is 1s. 2d. to 1s. 3d. per lb., according to requirements for delivery. Citric acid has been in fair request, and is 4s. 4d. per lb. White acetate of lead has been quiet, and is £83. to £85. per ton. Arsenic has been more inquired for, and high prices continue to be quoted for white powdered. From £58. to £60. may be given as present prices of this grade. Sulphate of copper has been neglected, and is £40. to £41. per ton for use in the United Kingdom.

TYNE CHEMICAL REPORT.**TUESDAY.**

The demand for heavy chemicals continues good, and there is more inquiry for export. Bleaching powder and caustic soda are in good request. Sulphur is scarce and firm at £22. 10s. to £23. per ton. Soda crystals locally in strong request at £5. 10s. per ton, 2cwt. bags. The following prices are per ton net: Bleaching powder, softs, £17.; caustic soda 74 to 77%, £23. 5s.; do., 70%, £22.; do., 60%, £20.; recovered sulphur, 2cwt. bags, £23.; hyposulphite of soda, 5/7cwt. casks, £19.; 1cwt. kegs, £25.; sulphite of soda, 5/7cwt. casks, £12.; do., 1cwt. kegs, £20.; silicate of soda, 75° Tw., £9. 12s. 6d.; do., 100° Tw., £10.; do., 140° Tw., £10. 10s.; soda crystals, 2cwt. bags, £5. 10s.; sulphate of soda (salt cake) in bulk, £4.; pure white sulphate of alumina, £19. 10s.; blanc fixe, £22.; sulphide of sodium, crystals, £18. per ton net.; do., refined concentrated solid, 60/62%, £25. per ton net.; hydrate of barium crystals, £56. per ton net.

COALS.—Market remains steady, and recent prices are well maintained. There is a strong demand for export, and any surplus is quickly taken up. Prices nominally: Best Northumbrian steam coals, 95s. to 100s. per ton; second qualities, 90s. to 95s.; Northumberland small coals, 75s. to 80s.; seconds, 70s. to 75s.; best Durham gas coals, 80s. to 85s.; seconds, 65s. to 75s.; Durham bunker, 70s. to 80s.; seconds, 65s. to 67s. 6d.; foundry coke, 100s.; gas coke, 95s. to 100s.

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Wednesday.

During the past week there has been a fair volume of business transacted in the local chemical market, and quotations continue on a steady level. There has been an increase in the bigger class of deal—so it is currently reported, at any rate,—but in many cases the small bulk order still holds sway. The latest range of prices shows few changes, but if anything tartaric acid has been inclined to harden. Prices current are: Arsenic, £60. per ton, net, Glasgow; bicarbonate of soda, £8. 15s. and £10. per ton, for 6-8 casks and 1cwt. kegs, Liverpool; boracic acid crystals, English refined, £72. for 2cwt. bags, and borax crystals, £39. for 2cwt.

bags, carriage paid; caustic soda, white, 70-72%, £24. per ton, net, Glasgow; chlorate of potash, 1s. 1d. per lb., net, Glasgow; chlorate of soda, 8d. per lb., net, Glasgow; citric acid, 4s. 4d. per lb. 5% Glasgow; cream of tartar 98% £11. 5s. per cwt., net, Glasgow; paraffin wax U.K. deliveries 125°, 6½d. to 6¼d.; 121-3°, 5¼d. to 5¼d.; 118-20°, 5d.; 110-12°, 4d. to 4¼d.; and 98-102°, 4d. to 4¼d.; salammoniac, £80. and £75. per ton, net, any port, for first and second lump respectively; salammoniac crystals, £85. per ton, net, Glasgow; saltpetre, £3. 4s. net, Glasgow; tartaric acid, 3s. 2d. per lb., 5% Glasgow.

Among the sea oils the only change as far as values are concerned is with regard to Newfoundland cod, and this is now quoted at 80s. as against 79s. previously. All available quantities continue to go into quick consumption, and the same comment is also applicable to pale seal at its unchanged quotation of 96s., and Menhaden at its old figure of 86s. Whale oils also keep at the old levels of 97s. for pale, 76s. for brown, and 74s. for black, with no yellow still available.

In the Glasgow and West of Scotland coal trade conditions remain the same—with most of the output continuing to be absorbed for home purposes. On the export side there continues to be little or nothing doing.

IMPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

BRISTOL.

Publication of Official Returns
Suspended.

GLASGOW.

Week ending September 20.

ACETONE—
Baltimore, 250 drms.
IRON PYRITES—
2,100 t.; Huerva, 5,704 t.
LITHOPONE—
Rotterdam, 1 ck.
PARAFFIN SCALE—
New York, 810 brls.
ROSIN—
222 cks.; Gothenburg,
112 brls.
SILICO MANGANESE—
Gothenburg, 20 cs.
SOAP—
New York, 400 brls.

GOOLE.

Week ending September 20.

DECOLOURIZING CARBON—
Amsterdam, 1 bg.

GRANGEMOUTH.

Week ending September 20.

NIL.

GRIMSBY.

Week ending September 20.

NIL.

HULL.

Week ending September 20.

BARIIUM SULPHATE—
Valencia, 200 brls., 898 bgs.
BARYTES—
Antwerp, 278 bgs.
BENZINE—
Suez, 1 cs., 6 drms.
CARBIDE—
Bergen, 94 drms.
KEISELGUIHR—
Christiansund, a quantity.
NITRATE—
Dunkirk, 94 cks.

LEITH.

Week ending September 20.

CAUSTIC SODA—
Rotterdam, 25 t. 17 c., £2,470.

SILICO MANGANESE—
Gothenburg, 10 t., £440.

LIVERPOOL.

Week ending September 20.

ARGON GAS—
New York, 21 crbys.
BEES WAX—
Rotterdam, 104 pkgs.; Zanzibar,
10 bgs.
CARBIDE—
Pasages, 3 drms.
CAUSTIC POTASH—
Rotterdam, 63 drms.
CHEMICALS (otherwise undescribed)
Havre, 12 cs.
CHLOROFORM—
Havre, 2 cs.
CREAM OF TARTAR—
Bordeaux, 20 cks.
DEXTRINE—
New York, 880 bgs.

DYESTUFFS—
Aniline Colour
Bordeaux, 2 kgs.
Argols
Messina, 200 bgs.
Bark Extract
Baltimore, 120 brls.
Chestnut Extract
Genoa, 200 brls., 1,100 cs.;
Leghorn, 500 brls.; Naples,
50 cks.
Gambier
Singapore, 25 t., 4,761 cs.
Logwood Extract
New York, 29 brls.
Myrabolans
Bombay, 5,180 pkgs.; 1,080
pkgs.

Sumac
Palermo, 220 bgs.
Tartars
Messina, 16 cks.
LITHOPONE—
Rotterdam, 480 cks.
MANGANESE ORE—
Bombay, 1,000 t.; Secondee,
491 pkgs., 366 t.
MINERAL WHITE—
Bordeaux, 200 bgs.

PARAFFIN SCALE—
New York, 3,999 brls.

PARAFFIN WAX—
Baltimore, 750 brls.

POTASSIUM BROMIDE—
New York, 40 cs.

ROSIN—
Bordeaux, 1,816 cks.; Jackson-
ville, 1,010 brls.; Pasages, 242
brls.

SILICO MANGANESE—
Bordeaux, 24 cks.

SOAP—
Genoa, 70 cs.; Havre, 7 cs.;
New York, 16 cs., 324 brls.

SODIUM PHOSPHATE—
New York, 75 brls.

STEARINE—
New York, 200 tcs.

TAR (PINE)—
Jacksonville, 1,000 brls.

TURPENTINE—
Bordeaux, 200 cks.; Havre,
6 cs.

WHITE LEAD—
New York, 86 cks., 1,120 kgs.

WOOD OIL—
Hong Kong, 6,000 cs.

LONDON.

Week ending September 20.

ACETIC ACID—
U.S., 27 pkgs.
AMMONIUM PHOSPHATE—
U.S., £2,600.
ANTIMONY (REFINED)—
Japan, 50 t.
ANTIPYRIN—
Switzerland, £560.
BEES WAX—
Brit. India, 9 cs.; Natal, 558
bgs.; Pt. E. Africa, 397 pkgs.;
Zanzibar, 140 pkgs.
BARYTES—
Spain, 135 t., 600 bgs.
CALCIUM LACTATE—
Canada, £216.
CAMPHOR—
Belgium, 5 cs.; Japan, 56 cs.;
Natal, 55 cs.
CARBON (BLACK)—
U.S., 226 cs.
CARNAUBA WAX—
Brazil, 50 bgs.
CAUSTIC POTASH—
Germany, 425 pkgs.; Holland,
3 pkgs.
CHEMICALS (otherwise undescribed)
France, £29.
CHROME ORE—
Rhodesia, 250 t.
COAL PRODUCTS—
Creosote
U.S., £75.
Paranitro-ortho-toluidine
U.S., £80.
COBALT OXIDE—
Canada, 54 brls.

CREAM OF TARTAR—
Italy, 80 pkgs.; Spain, 45 pkgs.

DYESTUFFS—
Annatto
India, 10 pkgs.; Switzerland,
383 pkgs.

Argols
France, 240 pkgs.; Portugal,
589 pkgs.; Spain, 1,321 pkgs.

Gambier
Straits, 2,340 pkgs.

Mimosa Extract
Natal, 6,171 bgs.

Myrabolans
India, 1,232 pkgs.

Saffron
Spain, £665. and 2 pkgs.

Sumac
Italy, 200 pkgs.

Tanners Bark
Cape, 81 t.; Natal, 1,334 t.

Tartars
France, 103 pkgs.

Turmeric
Brit. India, 295 pkgs.; Sweden,
1 pkg.

Valonia
A. Turkey, 30 t.; E. Turkey,
40 t.

ETHYL CARBONATE—
Switzerland, £784.

GALLIC ACID—
Canada, £61.

GELATINE—
Belgium, £450.; Holland, £313.;
Spain, £2,588.; U.S., £25.

GLUE—
France, £3,639.; U.S., £480.

GUAIACOL (LIQUID)—
Switzerland, £168.

HYDROQUINONE—
U.S., £250.

IRON OXIDE—
Spain, 20 brls., 15 cks.

LACTIC ACID—
Canada, £106.

LITHOPONE—
Holland, 1,200 brls.; Spain,
200 brls.; U.S., 1 brl.

MAGNESIUM CHLORIDE—
Holland, £280.

MANGANESE ORE—
Brit. India, 2,000 t.

MOLYBDENITE ORE—
N.S.W., 9 t.

OCHRE—
France, 146 cks.

OXALIC ACID—
Denmark, £300.

OXIDE (WHITE)—
China, 400 bgs.

PARAFFIN SCALE—
U.S., 565 t. 13 c.
PARAFFIN WAX—
U.S., 377 t. 9 c.
PHENACETIN—
Switzerland, £96.
PHENOLPHTHALEIN—
Canada, £293.; U.S., £67.
PITCH—
U.S., 5 kgs., 1 brl.
POTASSIUM BROMIDE—
U.S., £248.
POTASSIUM CARBONATE—
Russia, 2,308 pkgs.
POTASSIUM IODIDE—
Japan, 3 cs.
ROSIN—
France, 130 brls., 740 cks.; U.S.,
219 t. 5 c., 1,500 brls.
ROSIN OLEATE—
U.S., 5 brls.
SOAP—
Ceylon, £10.

SODIUM BROMIDE—
U.S., £520.
TALLOW—
Argentine Republic, 395 t. 12 c.;
N.Z., 73 t.; U.S., 44 t. 8 c.
TANNIC ACID—
Canada, £100.
TAR—
Sweden, 50 cks., 200 brls.; U.S.,
100 brls.
TAR OIL—
Sweden, 100 brls.
TERPINOL—
U.S., £1,541.
WAX—
Holland, 22 cs.
WHITE LEAD—
Belgium, 55 cks.; Canada, 32
cks.
WOOD OIL—
Japan, 210 brls.
ZINC OXIDE—
Holland, 50 brls.; U.S., 693 brls.

MANCHESTER.
Week ending September 20.
DYESTUFFS—
Aniline Colour
Antwerp, 1,304 cks.
FORMIC ACID—
Rouen, 62 cks.
GLUE—
Antwerp, 68 pkgs.
LITHOPONE—
Baltimore, 100 brls.
OXALIC ACID—
Rotterdam, 20 cks.
PARAFFIN SCALE—
Baltimore, 500 brls.
PARAFFIN WAX—
Baltimore, 1,272 brls., 1,180 pkgs.
RED LEAD—
Antwerp, 6 cs.
SODA—
Antwerp, 100 brls.
STEARINE—
Rotterdam, 1 bg.

MIDDLESBROUGH.
Week ending September 20.
NIL.
NEWCASTLE-ON-TYNE
Week ending September 20.
ROSIN—
Gothenburg, 6 brls.
N. & S. SHIELDS.
Week ending September 20.
NIL.
STOCKTON-ON-TEES.
Week ending September 20.
NIL.
SWANSEA.
Week ending September 20.
NIL.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

BRISTOL.

*Publication of Official Returns
Suspended.*

GLASGOW.

Week ending September 20.

CHEMICALS (otherwise undescribed)
Adelaide, 10 c.; Antwerp, 11 t.
14 c.; Bombay, 5 t.; Boston,
41 t.; Brisbane, 5 t. 10 c.; Cal-
cutta, 5 t.; Colomba, 1 t. 18 c.;
Gothenburg, 1 t.; Melbourne,
10 c.; Naples, 19 t. 4 c.; New
York, 24 t. 3 c.; Rouen, 13 t.
9 c.; Sydney, 6 t. 3 c.
COAL PRODUCTS (otherwise undes.)
Bombay, £34.; Colomba, £503.;
Karachi, £82.; Gothenburg,
£125.; Madras, £209.; New
York, £170.; Rouen, £159.

COPPERAS—
Karachi, 41 t.

DEXTRINE—
Rouen, 5 t.

DYESTUFFS (otherwise undescribed)
Havre, 15 t. 11 c.; Melbourne,
£242.

GLUE, SIZE, AND GELATINE—
Marseilles, 4 c.

LEAD NITRATE—
Rouen, 5 t.

MAGNESIA (CALCINED)—
Antwerp, 1 t. 10 c.

MANGANESE CHLORIDE—
New York, 5 t. 1 c.

PARAFFIN WAX—
Genoa, 44 t. 14 c.

POTASSIUM BICHROMATE—
Antwerp, 1 c.

RED LEAD—
Karachi, 1 t. 5 c.; Melbourne,
3 t.; Sydney, 6 t.

SHEEP DIP—
Brisbane, 40 t. 12 c.; Sydney,
35 t. 13 c.

SOAP—
Antwerp, 167 bxs.; Calcutta,
10 bxs.

SODA ASH—
Gothenburg, 125 t.; Leghorn,
31 t. 8 c.; Naples, 20 t.

SODIUM BICHLORATE—
Sydney, 5 t. 14 c.

SODIUM BICHROMATE—
Bombay, 5 t. 1 c.; Brisbane,
1 t. 18 c.; Genoa, 32 t. 3 c.;
Madras, 10 t. 17 c.; Melbourne,
16 t. 7 c.

SPERMACETI WAX—
Rouen, 1 t. 7 c.

WAX—
Colomba, 6 c.; Karachi, 3 t.

WHITE LEAD—
Rouen, 4 t. 16 c.

GOOLE.

Week ending September 20.

NIL.

GRANGEMOUTH.

Week ending September 20.

BASIC SLAG—
Rotterdam, 20 t.

CAUSTIC SODA—
Rotterdam, 101 t.

PARAFFIN WAX—
Genoa, 138 t. 6 c.; Rotterdam,
19 c.

ROSIN OIL—
Rotterdam, 3 t. 13 c.

SODIUM SILICATE—
Christiania, 5 t. 13 c.

GRIMSBY.

Week ending September 20.

NIL.

HULL.

Week ending September 20.

CAUSTIC SODA—
Belgian Congo, 1 cs.

CHEMICALS (otherwise undescribed)
Alexandria, 500 bgs., 40 cks.,
15 drms.; Belgian Congo, 20 cs.,
2 cks., 1 kg., 5 brls.; Christiania,
10 cks., 35 kgs., 20 crbys.;
Malta, 20 drms., 92 cks.; West
Coast Africa, 2 cs.

DISINFECTANTS—
Belgian Congo, 11 cs.

GLUE—
Alexandria, 5 bgs.

PITCH—
Antwerp, 81 brls.

ROSIN—
Belgian Congo, 1 cs., 2 cks.

SALT—
Belgian Congo, 14,241 bgs., 200
brls., 202 cs.

SOAP—
Alexandria, 100 brls.; Belgian
Congo, 1,479 cs., 13 pkgs., 11
kgs.

TAR—
Belgian Congo, 29 brls.; Chris-
tiania, 100 brls.

TURPENTINE—
Belgian Congo, 20 drms.

WOOD PRESERVATIVE—
Belgian Congo, 20 brls.

LEITH.

Week ending September 20.

AMMONIUM SULPHATE—
Dunkirk, 261 t. 14 c.

BORAX—
Rouen, 25 t., £975.

COAL PRODUCTS—
Tar
Gothenburg, 23 t., £150.

LIVERPOOL.

Week ending September 18.

ACETANILID—
Genoa, 1 c., £14.

ACETIC ACID—
Antwerp, 19 c., £103.; Genoa,
5 t., £190.; Malta, 11 c., £44.;
Oporto, 1 c., £6.; Salonika,
17 t., £982.

ALUM—
Abo, 10 c., £9.; Accra, 4 c., £5.;
Algeria, 4 t., £77.; Calcutta,
10 t., £145.; Kingston, 1 c., £2.;
Madras, 3 t. 10 c., £51.; Oporto,
2 c., £3.; Pernambuco, 1 t. 8 c.,
£65.; Rangoon, 2 t. 16 c., £42.;
Santos, 1 t. 19 c., £35.; Sec-
ondee, 1 c., £2.; Singapore,
4 c., £4.

ALUM (CHROME)—
Amsterdam, 2 t. 4 c., £180.

ALUMINA SULPHATE—
Cearo, 1 t. 10 c., £22.; Montreal,
5 t., £42.; Pernambuco, 2 t.
10 c., £395.; Piraeus, 3 t. 8 c.,
£52.

ALUMINOFERRIC—
Calcutta, 35 t. 19 c., £315.

AMMONIA—
Calabar, 1 c., £4.; Helsingfors,
10 c., £28.; Oporto, 1 c., £4.

AMMONIA (ANHYDROUS)—
Aracaju, 2 c., £37.

AMMONIA ALUM.—
Volo, 2 t.

AMMONIUM CARBONATE—
Alexandria, 1 t., £66.; Aracaju,
5 c., £15.; Bahia, 12 c., £51.;
Bilbao, 2 t. 9 c., £165.; Carta-
gena, 2 t., £120.; Constantinople,
6 c., £18.; Pernambuco, 9 t.
16 c., £676.; Piraeus, 1 t. 4 c.,
£104.; Salonika, 4 c., £17.

AMMONIUM MURIATE—
Alexandria, 13 t. 19 c., £884.;

AMMONIUM MURIATE—
Bourgas, 2 t. 10 c., £158.; Con-
stantinople, 10 c., £32.; Genoa,
14 t. 1 c., £831.; Lisbon, 10 c.,
£36.; Malta, 1 t. 15 c., £100.;
Marseilles, 18 c., £51.; New York,
5 t. 18 c., £262.; Patras, 2 c.,
£6.; Stamboul, 2 t. 10 c., £161.;
Varna, 10 c., £32.

ANTIMONY—
Christiania, 2 t.; Rotterdam,
60 t.; Santander, 3 pkgs.

ANTIMONY SULPHATE—
Wiborg, 4 c., £19.

ANTIMONY SULPHIDE—
Bilbao, 5 c., £65.

ARSENIC—
Bahia, 1 t. 14 c., £210.; Lagos,
13 c., £68.

BARIUM SULPHOCYANIDE—
New York, 19 c., £137.

BENZOIC ACID—
Genoa, 1 c., £81.

BENZYL CHLORIDE—
Antwerp, 5 c., £38.

BLEACHING POWDER—
Bari, 20 t. 2 c., £454.; Bergen,
20 t. 13 c., £276.; Christiania,
4 t. 14 c., £63.; Fiume, 2 t. 13 c.,
£46.; Lisbon, 32 t., £449.;
Maccio, 2 t. 5 c., £33.; Oporto,
10 t. 3 c., £162.; Pernambuco,
5 t. 17 c., £102.; Piraeus, 4 t.,
£71.; Rouen, 9 t. 16 c., £111.;
Smyrna, 2 t. 12 c., £48.; Trond-
hjem, 2 t. 2 c., £31.

BORAX—
Alexandria, 4 t., £165.; Antwerp,
8 t., £320.; Christiania, 14 c.,
£31.; Constantinople, 10 c., £20.;
Havre, 5 t., £250.; Rouen, 10 t.,
£409.

BORIC ACID—
Constantinople, 1 t., £73.; Hel-
singingfors, 14 c., £105.; Kingston,
1 c., £5.; Sorfara, 1 c., £10.

CALCIUM CARBIDE—
Burutu, 2 c., £6.

CALCIUM CARBONATE—
Oporto, 10 c., £18.

CALCIUM CHLORIDE—
Alexandria, 1 t., £8.; Genoa,
60 t. 18 c., £422.; Karachi, 1 t.
7 c., £10.

CARNAUBA WAX—
Genoa, 35 bgs.

CAUSTIC SODA—
Adelaide, 17 drms.; Amsterdam,
74 drms.; Barcelona, 10 drms.;
Batavia, 340 pkgs.; Bilbao,
4 drms.; Bombay, 507 drms.;
Buenos Ayres, 946 drms.;
Burutu, 2 drms.; Calcutta, 160
drms.; Christiania, 729 drms.;

CAUSTIC SODA—

Naples, 67 drms.; Rangoon, 200 drms.; Rosario, 58 drms.; Samarang, 30 drms.; Vera Cruz, 69 drms.; Yokohama, 347 drms.

CHEMICALS (otherwise undescribed)

Alexandria, 5 t., £214.; Pernambuco, 3 t. 14 c., £273.; Piraeus, 1 t., £41.; Rouen, 2 c., £9.

CHINA CLAY—

Bombay, 2,379 cks.; Valencia, 40 pkgs.

CHLORIDE OF LIME—

Lisbon, 10 t. 16 c., £171.

CITRIC ACID—

Christiania, 4 c., £93.; Malta, £12.

COAL PRODUCTS—

Carbolacene

Malta, 13 c., £29.

Carbolic Acid

East London, 5 c., £6.; Genoa, 10 t., £537.; Kobe, 24 t. 19 c., £1,039.; Melbourne, 1 c., £3.; Montreal, 2 t., £121.

Cresylic Acid

Rabat, 1 t. 2 c., £31.

Naphthalene

Accra, 5 c., £18.; Aden, 4 t. 18 c., £124.; Amsterdam, 7 c., £14.; Buenos Ayres, 23 t., £671.; Lagos, 2 c., £11.; Mossel Bay, 1 c., £2.

Pitch

Bilbao, 4 t. 19 c., £97.; Braila, 2 t. 10 c., £15.; Lagos, 6 t. 10 c., £45.

Tar

Accra, 8 c., £9.; Addah, 1 t. 5 c., £17.; Adjuah, 9 c., £3.; Bissao, 3 c., £75.; Braila, 10 t., £70.; Cape Coast, 1 t. 13 c., £16.; Galatz, 20 t. 5 c., £183.; Malmo, 65 t. 6 c., £532.; Saltpond, 2 t. 10 c., £45.; Sierra Leone, 8 c., £10.; Transvaag, 1 t. 18 c., £27.; Winnebuh, 1 t. 13 c., £29.

COBALT NITRATE—

Oporto, 2 c., £34.

COPPER CARBONATE—

Rouen, 10 c., £65.

COPPER SULPHATE—

Bordeaux, 10 t., £450.; Callao, 4 t. 10 c., £180.; Chefoo, 1 t., £54.; Constantinople, 1 t., £40.; Lagos, 2 c., £5.; Madras, 1 c., £2.; Piraeus, 5 c., £10.; Santos, 2 t., £80.; Smyrna, 4 t. 17 c., £222.; Trondhjem, 12 t., £492.

CREAM OF TARTAR—

Copenhagen, 8 c., £60.; Manizales, 2 c., £19.; Melbourne, 1 t., £225.; Wiborg, 1 c., £13.; Yokohama, 3 t. 10 c., £553.

CREOLINA—

Barcelona, 3 c., £9.; Maracaibo, 1 t. 17 c., £171.; Puerto Cabello, 5 c., £17.

DISINFECTANTS (otherwise undes.)

Accra, 1 t. 5 c., £203.; Akuse, 6 c., £17.; Alexandria, 3 t. 13 c., £216.; Bombay, 10 t. 2 c., £101.; Cartagena, 8 c., £21.; Cape Coast, 5 c., £14.; Delagoa Bay, 10 c., £169.; Jesselton, 2 c., £3.; Lagos, 6 c., £7.; Sapele, 2 c., £15.; Secondee, 11 c., £23.; Salonika, 9 c., £17.; Warri, 8 c., £27.; Vigo, 2 c., £18.

DYE STUFFS—

Aniline Dye
Alexandria, 3 t., £420.; Barcelona, 6 t. 3 c., £1,141.; Copenhagen, 5 c., £141.; Dunkirk, 1 c., £16.; Halifax, 4 t. 10 c., £571.; Kobe, 2 t. 9 c., £2,344.; Melbourne, 3 c., £116.; Montreal, 3 t., £1,238.; Passages, 3 c., £109.; Rangoon, 1 t. 6 c., £1,034.; Sydney, 19 c., £700.; Yokohama, 19 c., £696.

ETHER (SULPHURIC)—

Wiborg, 5 c., £75.

FERRO TUNGSTEN—

Rotterdam, 5 t., 156 kgs.

FORMALDEHYDE—

Antwerp, 13 c., £78.

GELATINE—

Sao Paulo, 10 pkgs.

GLUE—

Brisbane, 35 pkgs.; Santa Cruz de Tenerife, 1 pkg.

GLUE, SIZE, AND GELATINE—

Bordeaux, 50 pkgs.; Boston, 439 pkgs.; Dunkirk, 40 pkgs.; Durban, 1 ck.; New York, 40 pkgs.; Genoa, 10 pkgs.; Oporto, 60 pkgs.; Rangoon, 100 pkgs.; Rotterdam, 300 pkgs.

IRON SULPHATE—

Volo, 24 t. 15 c., £225.

LACTIC ACID—

Antwerp, 1 t., £70.; Genoa, £23.

LEAD CARBONATE—

Pernambuco, 5 c., £40.

MAGNESIUM CHLORIDE—

Bombay, 19 t. 19 c., £382.

MAGNESIUM SULPHATE—

Bordeaux, 2 t., £30.; Jesselton, 1 c., £1.; Mascio, 1 t., £16.; Pernambuco, 2 t. 10 c., £40.

MANGANESE—

Rotterdam, 25 cks.

METHYL SALICYLATE—

Barcelona, 1 ck., £8.

MURIATIC ACID—

Antwerp, 2 t. 19 c., £105.

NICKEL AND AMMONIUM

SULPHATE—

Buenos Ayres, 12 c., £35.

NICKEL SULPHATE—

Christiania, 20 t.

NITRIC ACID—

Oporto, 1 c., £10.

OXALIC ACID—

Corunna, 1 c., £7.; Rio de Janeiro, 2 c., £17.

PARAFFIN WAX—

Trieste, 900 bgs.

PHOSPHORIC ACID—

Genoa, 1 c., £9.

PITCH—

Genoa, 74 t. 8 c., £1,881.; Rio de Janeiro, 5 c., £18.; Rouen, 40 t. 3 c., £373.

POTASH ALUM—

Nantes, 3 t., £75.

POTASSIUM BICHLORATE—

Alexandria, 1 t. 18 c., £310.; Calcutta, 16 c., £131.; Constantinople, 10 c., £81.; Tantai, 3 t. 4 c., £504.

POTASSIUM BI-OXALATE—

Corunna, 2 c., £25.

POTASSIUM CHLORATE—

Lisbon, 1 t., £136.; Oporto, 10 c., £68.; Piraeus, 14 c., £96.

POTASSIUM METABISULPHITE

Lisbon, 18 c., £194.

POTASSIUM PRUSSATE—

New York, 3 t., £588.; Oporto, 1 c., £20.

PYROGALLIC ACID—

Rangoon, 50 lbs., £62.

RED LEAD—

Calcutta, 2 t.

SALAMMONIAC—

Batoum, 2 t., £147.; Genoa, 10 t. 6 c., £712.; Malta, 1 t. 10 c., £87.; Marseilles, 1 t., £72.; New York, 3 t., £215.; Salonika, 5 t. 19 c., £420.; Serbia, 1 t., £70.; Smyrna, 3 t., £222.

SALICYLIC ACID—

Genoa, 1 t. 17 c., £397.

SALT—

Delagoa Bay, 1 t.

SALT PETRE—

Accra, 2 c., £8.; Sierra Leone, 3 c., £10.; Maracaibo, 2 t., £142.; Patras, 9 c., £27.

SHEEP DIP—

Buenaventura, 8 c., £35.; Cape Town, 9 t. 8 c., £352.; Delagoa Bay, 1 t. 2 c., £59.; Dunedin, 5 t., £228.; East London, 14 t. 2 c., £525.; Kilindini, 4 t. 14 c., £310.; Manizales, 1 t., £41.; Pernambuco, 4 t. 5 c., £363.; Pt. Elizabeth, 9 t. 7 c., £350.; Rio de Janeiro, 6 t., £305.; Wellington, 1 t., £50.

SOAP—

Accra, 50 bxs., 3 pkgs.; Addah, 1 c., 95 pkgs.; Amsterdam, 109 bxs.; Antwerp, 9 bxs.; Arica, 10 pkgs.; Bagdad, 915 pkgs.; Bangkok, 50 pkgs.; Barbados, 4 bxs., 1,367 pkgs.; Barranquilla, 35 pkgs.; Basra, 1,100 pkgs.; Batavia, 883 pkgs.; Bathurst, 1 pkg.; Belawan, 400 bxs.; Berbice, 2 pkgs.; Bombay, 761 bxs.; Boston, 1 bx.; Bordeaux, 150 cs.; Buenos Ayres, 8 bxs.; Calabar, 3,700 bxs.; Calcutta, 871 bxs.; Casablanca, 200 bxs.; Catania, 7 cs.; Christiania, 1,785 bxs.; Colombo, 43 bxs.; Colon, 500 bxs.; Constantinople, 1,190 pkgs., 87 bxs.; Corinto, 500 bxs.; Cristobal, 200 bxs.; Copenhagen, 1,062 bxs.; Curacao, 313 bxs.; Dakar, 144 bxs.; Demerara, 50 bxs.; Duala, 1,400 bxs.; Dunkirk, 6,479 bxs.; Durban, 31 bxs.; Genoa, 327 pkgs., 300 bxs.; Havre, 500 cs.; Iddo, 100 bxs.; Jesselton, 100 bxs.; Kano, 50 cs.; Karachi, 600 bxs.; Kingston, 2,352 cs., 2,350 bxs.; Kobe, 25 cs.; Kuala Lumpur, 400 bxs.; Lagos, 20 cs.; Martinique, 500 cs.; Melbourne, 40 bxs.; Naples, 220 bxs.; Newcastle, 5 pkgs.; Pt. Said, 5,513 bxs.; Pt. Swettenham, 28 bxs.; Oporto, 256 pkgs.; Pt. of Spain, 1,732 bxs.; Punta Arenas, 10 pkgs.; Puerto Barrios, 1 pkg.; Pt. Harcourt, 650 pkgs.; Palermo, 16 pkgs.; Paramaribo, 285 pkgs.; Rufisque, 15 pkgs.; Rotterdam, 1,044 bxs.; Rabat, 200 pkgs.; Rangoon, 4,270 bxs.; St. Croix, 295 pkgs.; St. John's, N.F., 311 bxs.; St. Kitts, 25 cs.; St. Thomas, 242 pkgs.; St. Lucia, 124 cs.; Salonika, 175 cs.; Samarang, 100 bxs.; Samsoun, 300 pkgs.; San Pedro de Macoris, 35 pkgs.; Seville, 30 pkgs.; Sibolga, 50 cs.; Singapore, 3,180 bxs., 40 pkgs.; Smyrna, 85 pkgs.; Sourabaya, 500 bxs.; Suellaba, 200 pkgs.; Sydney, 59 bxs.; Tangiers, 50 pkgs.; Tarkwa, 20 pkgs.; Tenerife, 154 pkgs.; Trebizonde, 201 pkgs.; Tumaco, 40 pkgs.

SODA ASH—

Amsterdam, 500 bgs.; Barranquilla, 53 pkgs.; Batavia, 235 pkgs.; Bombay, 3,120 pkgs.; Buenos Ayres, 2,963 pkgs.; Calcutta, 6,650 pkgs.; Christiania, 30 pkgs.; Norrkopping, 100 pkgs.; Pernambuco, 30 pkgs.; Samarang, 304 bgs.; Sourabaya, 206 pkgs.; Rotterdam, 9 pkgs.; Tsing-Tao, 6,216 bgs.; Yokohama, 2,019 bgs.

SODA CRYSTALS—

Bombay, 250 pkgs.; Norrkopping, 100 pkgs.; Pt. Swettenham, 100 pkgs.; Rangoon, 14 pkgs.; Samarang, 20 bgs.

SODIUM BICARBONATE—

Amsterdam, 590 bgs.; Batavia, 25 pkgs.; Bergen, 2 pkgs.; Christiania, 110 pkgs.; Fremantle, 20 kgs.; Pt. Sudan, 10 pkgs.; Rangoon, 1,234 pkgs.; Rotterdam, 243 pkgs.; Yokohama, 1,077 pkgs.

SODIUM CYANIDE—

Barcelona, 241 pkgs.; Corinto, 180 cs.

SODIUM NITRATE—

Santa Cruz de Tenerife, 385 bgs.

SODIUM SILICATE—

Barranquilla, 20 pkgs.; Bombay, 3 pkgs.; Boston, 90 pkgs.; Buenos Ayres, 569 pkgs.; Rosario, 100 pkgs.; Vera Cruz, 814 pkgs.

SULPHURIC ACID—

Oporto, 7 c., £16.; Pernambuco, 5 t., £138.; Trondhjem, 7 c., £15.

SUPERPHOSPHATE—

Tenerife, 25 t.

TALLOW—

Rangoon, 1 pkg.

TANNIC ACID—

Barcelona, 7 c., £160.

TARTARIC ACID—

Christiania, 18 c., £311.; Malta, £10.; Montreal, 5 t., £1,534.; New York, 3 t., £957.

VEGETABLE PITCH—

Burutu, 8 cks.; Talcahuano, 3 c., £2.

VEGETABLE TAR—

Talcahuano, 5 c., £15.

WOOD PRESERVATIVE—

Accra, 10 t., £14.; Alexandria, 2 t., 10 c., £79.; Calcutta, 6 t. 4 c., £85.; Lisbon, 1 c., £4.; Secondee, 4 c., £5.

LONDON.

Week ending September 17.

ACETANILID—

Amsterdam, 1 kg., £14.; Dunkirk (F.), 2 brls., £50.

ACETIC ACID—

Antwerp, 1 cs., £6.; Brisbane, 6 cs., £16.; Copenhagen (F.), 12 brls., £175.; Cape Town, 7 cs., £29.; Galatz, 20 brls., £284.; Jaffa, 2 cs., £18.; Rotterdam, 18 cks., £225.; Rosario, 5 cs., £13.; Wellington, 24 cs., £74.

ACETO SALICYLIC ACID—

Amsterdam, 5 cs., £130.; Bangkok, 1 cs. (pt.), £10.; Rosario, 1 cs. (pt.), £6.

ACETONE—

Antwerp, 3 drms., £88.; Rotterdam, 10 drms., £349.; Singapore, 2 pkgs. (pt.), £14.

AMMONIA—

Antwerp, 2 drms., £10.; Buenos Ayres, 10 pkgs., £26.; Cape Town, 12 cs., £23.; Colombo, 4 cs., £8.; Constantinople, 4 cs., £8.; Durban, 44 cs., £65.; Hong Kong, 9 cs., £18.; Lisbon, 54 crbys., £84.; Pt. Elizabeth, 4 cs., £8.; Shanghai, 15 cs., £29.; Soerabaya, 5 cs., £7.

AMMONIA (ANHYDROUS)—

Alexandria, 3 cylds., £30.

AMMONIUM BENZOATE—

Sao Paulo, 2 pkgs. (pt.), £16.

AMMONIUM CARBONATE—

Antwerp, 1 t. 15 c., £106.; Buenos Ayres, 10 c., £37.; Calcutta, 2 t., £145.; Cologne, 10 t., £601.; Coquimbo, 1 t. 2 c., £108.; Genoa, 24 t. 12 c., £1,327.; Monte Video, 1 t. 15 c., £175.; Padang, 10 c., £38.; Penang, 6 c., £23.; Perth, 5 c., £23.; Pt. Elizabeth, 2 c., £9.; Rio de Janeiro, 5 t. 1 c., £586.; Santiago, Chile, 1 t. 12 c., £134.; Sao Paulo, 5 c., £24.; Talcahuano, 20 c., £84.

AMMONIUM CHLORIDE—

Bangkok, 2 pkgs., £14.; Calcutta, 2 cs., £15.; Geelong, 3 kgs., £10.

AMMONIUM FLUORIDE—

Mauritius, 2 cs., £30.

AMMONIUM MURIATE—

Auckland, 2 c., £9.; Adelaide, 3 c., £11.; Constantinople, 2 c., £7.; Galatz, 1 t., £55.; Madras, 4 c., £17.; Santiago, Chile, 1 t. 6 c., £156.; Valparaiso, 11 c., £60.

AMMONIUM PHOSPHATE—

Copenhagen, 10 c., £60.; Piraeus, 1 t., £112.

AMMONIUM SULPHATE—

Dunkirk, 193 t. 14 c., £4,840.; Kobe, 200 t., £4,600.

AMYL ACETATE—

Paris, 13 drms., £161.

ANTIMONY (CRUDE)—

Rio de Janeiro, 15 c.

ANTIMONY OXIDE—

Genoa, 40 cks., £160.

ANTIMONY REGULUS—

Antwerp, 1 t.

ANTIMONY SULPHIDE—

Bahia, 10 cks., £22.; Boston, 15 cks., £347.; Dunkirk, 1 ck., £32.; Demerara, 3 bgs., £6.; Lisbon, 20 kgs., £55.; Paris, 21 cks., £392.

ARSENIC

Beyrou (F.), 10 c., £32.; Genoa, 1 t. 3 c., £39.; Rio de Janeiro, 1 t. 3 c., £92.; Santos, 1 t., £53.; Sao Paulo, 3 t., £156.

BARIUM SULPHIDE

Christchurch, 2 cks., £6.

BASIC SLAG

Belewan, 400 t., £1,600.; New Plymouth, 200 t., £750.

BEES WAX

Amsterdam, 4 c.

BENZOIC ACID

Genoa, 1 cs., £55.; New York, 2 cs., £75.

BISMUTH CARBONATE

Auckland, 1 cs. (pt.), £8.; Buenos Ayres, 1 cs. (pt.), 12 cs., £719.; Cape Town, 1 cs. (pt.), £40.; Wellington, 1 cs. (pt.), £14.

BISMUTH GALLATE

Buenos Ayres, 1 cs. (pt.), £17.

BISMUTH SALICYLATE

Buenos Ayres, 2 cs., £72.; Singapore, 1 cs. (pt.), £13.

BISMUTH SUBNITRATE

Buenos Ayres, 1 cs., £76.; Cape Town, 1 cs. (pt.), £18.; Calcutta, 2 cs., £160.

BITROPHOSPHATE

East London, 1 cs. (pt.), £13.

BITUMINOUS SOLUTION

Punta Arenas, 30 drms., £91.

BLEACHING POWDER

Bangkok, 2 c., £6.

BORIC ACID

Calcutta, 1 t. 11 c. (F.), £120.; Haifa, 1 c., £5.; Madras, 7 c., £35.; Rosario, 4 c., £15.

BORAX

Antwerp, 19 t. 18 c., £1,000.; Switzerland (via Antwerp), 9 t. 17 c., £394.; Auckland, 2 c., £5.; Cologne, 20 t., £772.; Delagoa Bay, 2 c., £9.; Durban, 6 c., £26.; Jamaica, 15 c., £30.; Malta, 10 c., £20.; Paris, 20 t., £780.; Punta Arenas, 2 c., £6.

CALCIUM CARBIDE

Amsterdam, 25 t., £606.

CALCIUM CARBONATE

Antwerp, 2 cks., £5.; Buenos Ayres, 2 cks., £6.

CALCIUM CHLORIDE

Sydney, 1 t. 3 c., £45.

CALCIUM GLYCEROPHOSPHATE

Antwerp, 1 cs. (pt.), £6.

CALCIUM HYPOPHOSPHATE

Genoa, 2 cs., £45.

CARBON BISULPHATE

Novorossisk, 5 t., £540.

CAUSTIC POTASH

Cape Town, 1 cs. (pt.), £13.

CAUSTIC SODA

Cape Town, 5 c., £6.; Malmo, 10 t. 3 c., £220.; Rotterdam, 31 t. 14 c., £635.; Shanghai, 4 c., £13.

CERESINE WAX

Amsterdam, 1 t.; Genoa, £370.; Helsingfors, £63.; Malmo, 14 c.; Wellington, 2 t.

CHEMICALS (otherwise undescribed)

Alexandria, 1 cs., £29.; Athens, 1 cs. (pt.), £7.; Bangkok, 1 cs. (pt.), £7.; Beyrou, 1 cs., £8.; Calcutta, 2 cs., £16.; Cape Town, 1 cs., £8.; Durban, 1 cs., £7.; Foochow, 2 cs., £9.; Hong Kong, 2 cs., £14.; Iddo, 3 cs., £66.; Mombasa, 1 cs., £9.; Singapore, 2 cs., £42.; Socrabaya, 3 cs., £159.; Sydney, 8 cs., £250.; Wellington, 1 cs., £10.; Zanzibar, 2 cs., £21.

CITRIC ACID

Aden, 4 c., £102.; Calcutta, 1 c. (F.), £27.; Calcutta, 5 c., £115.; Dantzig, 10 c. (F.), £230.; Durban, 3 c., £72.; East London, 2 c. (F.), £29.; Fremantle, 1 c., £26.; Hastings, N.Z., 1 c. (F.), £15.; Limon, 1 c., £25.; Montreal, 1 t. 5 c., £565.; Penang, 1 c., £26.; St. Helena, 1 cs. (pt.), (F.), £6.; Shanghai, 3 c., £60.

CITRIC ACID

Thursday Island, 2 c., £50.

COAL PRODUCTS

Aniline Dye
Adelaide, 1 pkg., £35.; Auckland 7 pkgs., £199.; Brussels, 6 pkgs., £131.; Gothenburg, 1 kg., £66.; Lyttleton, 6 pkgs. (pt.), £201.; Malmo, 1 cs., £39.; Melbourne, 17 pkgs., £799.; Oaman, 1 ck., £56.; Perth, 2p kgs., £41.; Sydney, 1 cs., £30.; Wellington, 1 cs., £40.

Aniline Oil

Brussels, 1 cs., £9.

Bitumen

Calcutta, 6 cks., £34.

Carbolic Acid

Calcutta, 5 drms., £7.; Kobe, 79 cks., £472.; Pt. Elizabeth, 2 cs., £5.; Santos, 2 cs., £9.; Singapore, 1 cs., £8.

Cresote

Antofagasta, 13 drms., £8.; Hong Kong, 10 cks., £60.; Rio de Janeiro, 1 cs. (pt.), £5.

Cresote Salts

Constantinople, 40 brls., £65.; Smyrna, 40 brls., £66.

Naphthalene

Adelaide, 25 cs., £125.; Alexandria, 20 cks., £49.; Beira, 1 cs., £5.; Brussels, 2 kgs., £7.; Calcutta, 50 cs., £110.; Paris, 19 cks., £1,914.

Pitch

Antwerp, 538 t., 60 brls., £2,247.

Tar

Beira, 165 drms., £19.; Suez, 2 drms., £9.

Tar Oil

Monte Video, 50 cks., £133.

Terebine

Durban, 3 cs., £10.; Perth, 2 cs., £11.

COPPER SULPHATE

Bissao, 2 c., £6.; Calcutta, 4 c., £6.; Paramaribo, 1 t. 10 c., £59.; Rangoon, 5 c., £13.

CREAM OF TARTAR

Bombay, 1 c. (F.), £13.; Copenhagen, 10 c., £125.; Callao, 2 c., £34.; Cape Town, 2 c. (F.), £34.; Calcutta, 7 c. (F.), £136.; Calcutta, 1 pkgs., £7.; Delagoa Bay, 2 c. (F.), £32.; Durban, 1 c. (F.), £16.; East London, 2 c. (F.), £30.; Hong Kong, 2 c. (F.), £30.; Karachi, 1 cs. (F.), £5.; Pt. Elizabeth, 4 c. (F.) (F.), £65.; Pt. Elizabeth, 5 c., £29.; Rio de Janeiro, 4 c., £50.; Santos, 1 c., £13.; Santiago, Chile, 10 c., £168.; Wellington, 4 t. (F.), £830.

DISINFECTANTS (otherwise undes.)

Antwerp (F.), 5 t., £630.; Athens, 2 t. 13 c., £410.; Auckland, 7 c., £106.; Belawan, 5 c., £12.; Benguela, 8 c., £31.; Beira, 2 c., £25.; Brisbane, 5 c., £8.; Buenos Ayres, 32 t. 16 c., £1,490.; Cairns, 5 c., £14.; Calcutta, 4 t. 8 c., £159.; Christchurch, 2 c., £20.; Delagoa Bay, 15 c., £43.; Dunedin, 1 t. 2 c., £123.; Durban, 8 t. 16 c., £596.; Invercargill, 13 c., £39.; Karachi, 13 c., £25.; Lisbon (F.), 6 c., £33.; Lisbon, 8 c., £65.; Lyttleton, 17 c., £108.; Mauritius, 5 c., £8.; Penang, 18 c., £29.; Pernambuco, 5 c., £13.; Perth, 8 c., £20.; Pt. Swettenham, 5 t. 11 c., £250.; Sandakan, 9 c., £16.; Suez, 5 c., £12.; Wellington, 1 t. 2 c., £177.

DYESTUFFS

Tanning Crystals

Calcutta, 5 cks., £73.

ETHER

Buenos Ayres, 1 cs., £10.

ETHER (ACETIC)

Lisbon, 1 cs., £6.

FULLER'S EARTH

Bombay, 5 t.

GLUE

Antwerp, 16 t. 17 c.; Malmo, 4 c.; Novorossisk, 5 c.

GLUE, SIZE, AND GELATINE

Adelaide, 1 t. 10 c.; Antwerp, 7 c.; Bilbao, 10 c.; Bombay, 2 t. 5 c.; Boulogne, 1 c.; Cape Town, 1 t. 5 c.; Calcutta, 3 c.; Christchurch, 1 c.; Cyprus, 11 c.; Dunedin, 3 c.; Dieppe, 3 t. 4 c.; Durban, 3 c.; East London, 1 c.; Karachi, 1 c.; Kobe, 2 t.; Madras, 5 c.; Melbourne, 10 c.; New York, 1 c.; Perth, 5 c.; Pt. Elizabeth, 2 c.; Rotterdam, 3 c.; Singapore, 1 c.; Wellington, 1 t.; Yokohama, 4 t.

GLYCERINE

Bangkok, 1 c., £10.; Bombay, 2 c., £13.; Calcutta, 3 c., £34.; Galatz, 1 c., £8.; Hong Kong, 4 c., £28.; Karachi, 1 c., £15.; Paris, 3 t. 2 c., £390.; Rosario, 4 c., £30.; Salonic, 1 c., £6.; Samarang, 1 c., £5.; Talcahuano, 1 t., £150.; Yokohama, 9 c., £154.

HEXAMETHYLENETETRAMINE

Constantinople (F.), 2 cs., £34.

HYDROBROMIC ACID

Calcutta, 1 cs., £13.

HYDROCHLORIC ACID

Belawan, 1 c., £6.; Calcutta, 3 c., £12.; East London, 12 c., £35.

HYDROGEN PEROXIDE

Alexandria, 1 cs., £9.; Durban, 1 cs., £6.; Pt. Elizabeth, 2 cs., £8.

HYPOPHOSPHITES

Christchurch, 1 cs., £18.; Genoa, 2 cs., £88.

HYPOPHOSPHITE SALTS

Paris, 5 cs., £114.

INFUSORIAL EARTH

Paranagua, 16 c., £21.; Rio de Janeiro, 1 t. 2 c., £27.; Santos, 12 c., £16.

IODINE

Perth, 3 cs. (pt.), £23.

IODINE (RESUBLIMED)

Antwerp, 1 cs. (pt.), £48.; Buenos Ayres, 1 cs., £45.; Genoa, 2 cs. (pt.), £91.; Lisbon, 1 cs. (pt.), £9.

IRON AND AMMONIUM CITRATE

Antwerp, 1 cs. (pt.), £17.; Buenos Ayres, 1 cs. (pt.), 2 cs., £59.; Shanghai, 1 cs., £42.

IRON & POTASSIUM CYANIDE

Antwerp, 1 cs. (pt.), £13.

IRON PERCHLORIDE

Batavia, 1 cs., £5.; Buenos Ayres, 21 pkgs., £20.; Santos, 2 cs., £5.

IRON PYROPHOSPHATE

Montreal, 1 cs., £13.

KEISELGHUR

Calcutta, 10 c., £8.

LACTIC ACID

Havre (F.), 1 ck., £15.

LEAD ACETATE

Antwerp, 1 kg., £11.; Bombay, 20 cks., £70.; Calcutta, 1 cs. (pt.), £9.; Cape Town, 2 kgs., £13.; East London, 3 kgs., £18.

LEAD CARBONATE

Sao Paulo, 2 cs., £19.

LEAD LINOLEATE

Brussels, 3 brls., £78.

LEAD RESINATE

Messina, 1 ck., £6.

LITHIUM BENZOATE

Constantinople, 1 cs. (pt.), £17.; Rio de Janeiro, 1 cs. (pt.), £8.

LITHIUM CARBONATE

Genoa, 2 cs., £95.

MAGNESIA (CALCINED)

Antwerp, 1 cs., £8.; Bordeaux, 4 cs., £84.; Sao Paulo, 5 pkgs. (pt.), £72.

MAGNESIUM CARBONATE

Auckland, 1 cs., £6.; Adelaide, 6 cs., £16.; Genoa, 50 cs., £119.; Lisbon, 10 cs., £37.; Punta Arenas, 1 cs., £9.; Rio de Janeiro, 9 cs., £79.; Rosario, 7 cs., £28.

MAGNESIUM CARBONATE

Sao Paulo, 5 cs., £44.

MAGNESIUM CITRATE

Auckland, 2 cs., £28.; Calcutta, 1 cs. (pt.), £6.; Christchurch, 2 cs., £16.

MAGNESIUM HYDRATE

Switzerland, 8 pkgs., £28.

MAGNESIUM OXIDE

Leghorn, 6 cks., £36.

MAGNESIUM SULPHATE

Auckland, 2 t., £78.; Beira, 4 c., £9.; Bermuda, 11 c., £23.; Bombay, 17 c., £57.; Colon, 3 c., £7.; Galatz, 1 t., £38.; Hastings, 10 c., £19.; Karachi, 5 c., £13.; Limon, 10 c., £24.; Melbourne, 2 t. 6 c., £98.; Napier, 10 c., £19.; Panama, 11 c., £26.; Porto Alegre, 27 c., £68.; Sydney, 12 c., £22.

MANGANESE BINOXIDE

Antwerp, 5 cks., £42.

MANGANESE HYPOPHOSPHITE

Montreal, 4 cs., £123.

MANGANESE LINOLEATE

Brussels, 1 brl., £18.

MERCURIALS

Lisbon, 1 cs. (pt.), £7.

MERCURY AMMONIATE

Calcutta, 3 cs., £145.

MERCURY BICHLORIDE

Lisbon, 1 cs., £47.

MERCURY CHLORIDE

Buenos Ayres, 2 cs., £101.

MERCURY IODIDE

Constantinople, 2 cs. (pt.), £25.; Swatow, 1 cs. (pt.), £6.

MERCURY OXIDE

East London, 1 cs. (pt.), £6.

MERCURY PERCHLORIDE

Calcutta, 1 cs., £6.; Santos, 4 cs., £148.

MERCURY PRECIPITATE

Helsingfors, 1 cs. (pt.), £23.

MERCURY SALICYLATE

Constantinople, 1 cs. (pt.), £6.

METHYL ALCOHOL

Amsterdam, £350.

METHYL SALICYLATE

Antwerp (F.), 1 cs. (pt.), £13.; Buenos Ayres (F.), 1 cs. (pt.), £10.; Constantinople (F.), 1 cs., £22.; Sao Paulo, 1 cs., £6.

NICKEL SALTS

Malmo, 3 cks., £25.

NITRIC ACID

Bangkok, 1 c., £6.; Belewan, 1 c., £5.

OXALIC ACID

Melbourne, 4 cks., £135.

PARAFFIN WAX

Antwerp, 1 t. 9 c.; Paris, 20 t. 10 c.

PARALDEHYDE

Perth (F.), 1 cs., £22.

PHENIC ACID

Antwerp (F.), 1 cs., £9.; Rosario, 2 cs., £5.

PHOSPHO CITRIC ACID

Cape Town, 5 c., £39.

PHOSPHORIC ACID

Adelaide, 3 cs. (pt.), £7.; Calcutta, 1 cs., £9.; Antwerp, 1 cs., £9.; Montreal, 22 pkgs., £198.; Pernambuco, 3 cs., £30.; Paris, 30 crbys., £334.

PHOSPHORUS

Antwerp, 1 cs., £6.

PHOSPHORUS AMORPHOUS

Durban, 20 cs., £242.

PLUMBAGO

Launceston, 1 t.; Pt. Elizabeth, 1 t.; Rio de Janeiro, 19 c.

POTASSIUM & TARTARIC ACID

Singapore, 1 cs. (pt.), £8.

POTASSIUM BICARBONATE

Christchurch, 1 kg., £7.; Melbourne, 1 bkg., £7.; Singapore, 1 kg. (pt.), £5.

POTASSIUM BICROMATE

Demerara, 1 rl., £17.; Lyttleton 1 kg., £9.

POTASSIUM BROMIDE—

Buenos Ayres (F.), 1 cs. (pt.), £9.; Cape Town (F.), 1 cs. (pt.), £10.; Rosario, 2 cs., £17.; Santos, 1 cs. (pt.), £12.

POTASSIUM CARBONATE—

Antwerp, 1 cs. (pt.), £6.; Brussels, 2 cs. (pt.), £46.

POTASSIUM CHLORIDE—

Demerara (F.), 10 c., £56.; Durban (F.), 5 c., £28.; Delagoa Bay, 2 t., £196.; Singapore, 3 cs., £16.

POTASSIUM CITRATE—

Melbourne, 1 cs., £14.; Wellington, 1 cs. (pt.), £8.

POTASSIUM CYANIDE—

Buenos Ayres, 4 cs., £58.; Penang, 6 cs., £350.; Singapore, 2 cs., £75.

POTASSIUM HYPO—

Montreal, 1 cs., £35.

POTASSIUM IODIDE—

Auckland, 1 cs. (pt.), £22.; Cape Town, 3 cs. (pt.), £39.; Durban, (F.), 2 cs. (pt.), £40.; Durban, 1 cs., £42.; Genoa, 2 cs. (pt.), £39.; Helsingfors (F.), 1 cs. (pt.), £78.; Lisbon, 1 cs. (pt.), £8.; Rosario, 2 cs., £80.; Shanghai, 1 cs., £81.; Wellington, 2 cs., £159.

POTASSIUM PERMANGANATE—

Rio de Janeiro, 1 cs. (pt.), £9.

POTASSIUM PRUSSATE—

Antwerp, 1 ck., £34.; Brussels, 1 ck., £28.

POTASSIUM SULPHOGUAICOLATE

Buenos Ayres (F.), 2 cs. (pt.), £75.; Rosario (F.), 1 cs. (pt.), £15.

PRUSSIAN BLUE—

Rio de Janeiro, 1 ck., £32.

PYROGALLIC ACID—

Hong Kong, 3 cs. (pt.), £9.; Lisbon (F.), 1 cs. (pt.), £5.

QUININE—

Buenos Ayres, 333 ozs.; Cape Town, 1,000 ozs.; Fremantle, 500 ozs.; Genoa, 882 ozs.

SALICYLIC ACID—

Auckland, 2 cs., £19.; C. Town, 1 cs., £6.; Genoa, 2 cs., £25.

SALT—

Auckland, 30 t.; Berbice, 9 c.; Durban, 3 t.; Mauritius, 1 t.; Monte Video, 2 t.; Napier, 105 t.; Porto Alegre, 1 t.; Valparaiso, 4 c.

SALTPETRE—

Auckland, 1 c., £6.; Bahia, 10 c., £29.; Bangkok, 2 c., £12.; Bordeaux, 118 t., (F.), £5,000.; Channel Islands, 5 t. (F.), £185.; Durban, 5 c., £17.; East London, 3 c., £9.; Galatz, 1 t., £68.; Ghent, 11 c., £30.; Lisbon, 1 t., £77.; New York, 100 t., (F.), £3,858.; Pernambuco, 1 t., £59.; Pernambuco, 50 t., £2,630.; Rio de Janeiro, 2 t. 9 c., £147.; Rio de Janeiro, 4 c. 28 c., £327.; Santander, 15 t., £720.; Santos, 2 c., £7.; Santos, 1 t. 19 c., £118.

SHEEP DIP—

Buenos Ayres, 30 t. 5 c., £1,623.; Durban, 18 c., £58.; Wellington, 16 c., £90.

SILVER NITRATE—

Buenos Ayres, 1 cs. (pt.), £33.

SOAP—

Antwerp, 213 t. 7 c.; Alexandria, 7 c.; Amsterdam, 3 t. 1 c.; Bangkok, 5 c.; Barbados, 1 c.; Batavia, 6 c.; Bilbao, 2 c.; Bombay, 1 t. 16 c.; Buenos Ayres, 6 c.; Calcutta, 1 t. 1 c.; Callao, 2 c.; Cape Town, 1 t. 7 c.; Chefoo, 1 c.; Christchurch, 1 c.; Cologne, 12 t. 15 c.; Colombo, 3 c.; Dunedin, 1 c.; Dominica, 1 c.; Dunedin, 1 c.; Dunkirk, 15 c.; East London, 2 c.; Fara, 1 c.; Genoa, 10 t. 5 c.; Hong Kong, 13 c.; Karachi, 8 c.; Kilindini, 1 c.; Lisbon, 4 c.; Madras, 19 c.; Malta, 84 t. 9 c.; Mazagan, 19 t. 8 c.; Marseilles, 2 c.; Montreal, 1 c.; Monte Video, 3 c.; New York, 12 c.; Paris, 27 t. 7 c.; Penang, 5 c.

SOAP—

Pernambuco, 6 c.; Piraeus, 4 t. 18 c.; Pt. Elizabeth, 3 c.; Pt. Moresby, 1 c.; Pt. Sudan, 1 c.; Punta Arenas, 1 t. 2 c.; Rabat, 2 c.; Rio de Janeiro, 5 c.; Rotterdam, 10 t. 17 c.; Salonika, 17 c.; Samarang, 8 c.; Singapore, 1 t. 11 c.; Smyrna, 5 c.; Shanghai, 2 t. 7 c.; Soerabaya, 12 c.; Stockholm, 39 t. 18 c.; Suez, 3 c.; Surinam, 1 t. 2 c.; Tangiers, 2 t. 10 c.; Tamatave, 27 t. 17 c.; Tripoli, 1 c.; Trinidad, 1 c.; Wellington, 2 t.; Zanzibar, 4 c.

SODA—

Cape Town, 1 t., £7.; Colombo, 1 t. 1 c., £12.

SODA ASH—

Genoa, 45 t., £315.

SODA CRYSTALS—

Calcutta, 15 c., £9.; Madras, 10 c., £5.; Punta Arenas, 1 t. 9 c., £17.

SODIUM BENZOATE—

Calcutta, 4 cs., £42.; Constantinople, 2 cs., £68.; Rotterdam, 40 cs., £4,953.; Santos (F.), 1 cs. (pt.), £16.

SODIUM BICARBONATE—

Allepi, 16 c., £16.; Bombay, 6 c., £24.; Buenos Ayres, 1 t., £42.; Calcutta, 1 c., £9.; Cape Town, 9 c., £18.; Durban, 10 c., £33.; Lisbon, 5 c., £6.; Madras, 9 c., £30.; Mollendo, 5 c., £10.; Panama, 3 c., £6.; Penang, 1 c., £5.; Rio Grande do Sul, 10 c., £7.; Rosario, 10 c., £14.; Talcahuano, 18 c., £9.; Trieste, 1 t., £23.

SODIUM BICROMATE—

Rotterdam, 10 t., £1,015.

SODIUM BISULPHITE—

Antwerp, 4 t. 12 c., £122.

SODIUM CARBONATE—

Hong Kong, 2 c., £5.

SODIUM CACODYLATE—

New York (F.), 2 cs., £475.

SODIUM GLYCEROPHOSPHATE—

Antwerp, 1 cs. (pt.), £7.

SODIUM HYDROSULPHITE—

Kobe, 3 cs., £50.

SODIUM HYPO—

East London, 1 t., £23.

SODIUM IODIDE—

Genoa, 2 cs. (pt.), £39.; Lisbon, 1 cs. (pt.), £11.

SODIUM NITRATE—

Calcutta, 2 c., £10.; Penang, 1 cs. (pt.), £12.

SODIUM PRUSSATE—

Boston, 5 t., £315.; New York, 80 t. 1 c., £5,967.

SODIUM SALICYLATE—

Melbourne, 5 kgs., £84.; Wellington, 1 cs. (pt.), £12.

SODIUM SULPHATE (GLAUBER

Galatz, 4 t., £90. SALTS)

SODIUM SULPHITE—

Hong Kong, 9 c., £7.

STEARINE—

Rotterdam, 10 c.

SULPHATE OF QUININE—

Cape Town, 700 ozs.

SULPHUR—

Aracaju, 10 c., £16.; Paris, 4 t., £120.

SULPHUR (FLOWERS)—

Lisbon, 10 brls., £24.; Piraeus, 10 brls., £17.

SULPHUR (ROLL)—

Lisbon, 5 brls., £11.

SULPHUR (SUBLIMED)—

Batavia, 2 c., £5.

SULPHURIC ACID—

Bangkok, 3 c., £16.; Beira, 8 t. 15 c., £140.; Constantinople, 16 c., £30.; Demerara, 7 t. 10 c., £137.; Pernambuco, 5 t., £500.; Trinidad, 2 t. 10 c., £46.

SULPHUROUS ACID—

Cape Town, 3 cs., £7.

SUPERPHOSPHATE—

Channel Islands, 168 t., £1,092.

TALLOW—

Genoa, 48 t.

TANNIC ACID—

Brussels (F.), 2 cks., £75.; Buenos Ayres (F.), 1 cs. (pt.), £28.; Constantinople (F.), 1 cs. (pt.), £53.; Lisbon (F.), 2 cs. (pt.), £25.; Rosario (F.), 1 cs. (pt.), £6.; Sao Paulo, 4 cs. (pt.), £71.

TAR—

Malmö, 3 cks., £100.

TARTARIC ACID—

Aden, 1 cs. (F.), £8.; Bombay, 2 t., £690.; Calcutta, 1 c. (F.), £12.; Calcutta, 3 c., £62.; Callao, 13 c., £283.; Delagoa Bay, 4 c. (F.), £83.; Durban, 5 c., £88.; Fremantle, 2 c., £39.; Hastings, N.Z., 1 cs. (F.), £6.; Hiogo, 5 t., £1,729.; Iquique, 2 c., £43.; Jamaica, 7 c., £140.; Karachi, 11 c. (F.), £239.; Limon, 1 c., £19.; Melbourne, 3 t., £863.; Mollendo, 1 cs., £7.; Montreal, 2 t. (F.), £672.; Montreal, 2 t., £620.; Osaka, 5 t., £1,729.; Penang, 1 c., £21.; Rio de Janeiro, 10 c., £195.; Santiago, Chile, 5 c., £110.; Sao Paulo, 1 ck., £10.; Sydney, 19 c., £273.; Thursday Island, 1 c., £18.

TERPINE HYDRATE—

Constantinople (F.), 3 cs., £45.

TITANIUM AND SODIUM**OXALATE—**

Auckland, 1 ck., £13.

VALERIANIC ACID—

Constantinople, 1 cs. (pt.), £9.

WAX—

Dunedin, 1 c.; Galatz, 4 t. 18 c.; Genoa, 1 t.; Helsingfors, 5 c.; Malmö, 6 c.

WHITE LEAD—

Auckland, £210.; Bordeaux, £300.; Calcutta, £466.; Cape Town, £128.; Durban, £14.; Lisbon, £43.; Novorissisk, £85.; Paris, £1,965.

ZINC CHLORIDE—

Amsterdam, 5 drms., £19.

MANCHESTER.

Week ending September 17.

ALUM—

Antwerp, 28 brls.

ALUMINA SULPHATE—

Antwerp, 349 bgs.

AMMONIUM CARBONATE—

Antwerp, 35 kgs.

BARIUM CHLORIDE—

Oporto, 4 cks.

BARIUM SULPHOCYANIDE—

New York, 8 cks.

BORAX—

Rotterdam, 85 bgs.

COAL PRODUCTS (otherwise undes.)

Bordeaux, £2,374.; Constantinople, £204.; Montreal, £184.; New York, 75 drms.; Rotterdam £281.

COAL PRODUCTS—

Carbolic Acid Crystals

Bordeaux, 26 drms.

Creosote Oil

Naples, 2,600 t.

DYESTUFFS (otherwise undescribed)

Bordeaux, 4 drms.

MAGNESIUM BISULPHATE—

Montreal, 10 cks.

PITCH—

Antwerp, 315 t.

SALT—

Quebec, 4,800 sks.

SHEEP DIP—

New York, 130 cs.

SOAP—

Antwerp, 18 cs., 300 pkgs.;

Rotterdam, 12 cs.

SODIUM BICARBONATE—

Antwerp, 145 bgs.; Rotterdam,

40 bgs.

SODIUM HYDROSULPHATE—

Antwerp, 50 bgs.; Rotterdam,

10 drms.

SODIUM PRUSSATE—

New York, 20 cks.

SODIUM TANNATE—

Montreal, 6 drms.

STEARINE—

Rotterdam, 16 bgs.

TANNIC ACID—

Rotterdam, 4 brls.

TARTARIC ACID CRYSTALS—

Montreal, 50 brls.

ZINC CHLORIDE—

Rotterdam, 41 cks.

MIDDLESBROUGH.

Week ending September 20.

AMMONIUM SULPHATE—

Kobe, 1,505 t., £29,051.; Yokohama, 947 t. 9 c., £18,241.

CAUSTIC SODA—

Kobe, 201 t., £3,800.

COAL PRODUCTS—

Pitch

Antwerp, 2,057 t. 14 c., £7,459.

DYESTUFFS & COAL PRODUCTS—

(otherwise undescribed)

Madras, 2 t. 9 c., £476.

MAGNESIA—

Canada, 7 t. 9 c., £476.

SALT—

Ahus, 219 t., £547.; Beira, 1 qr., £2.; Durban, 1 t. 12 c., £68.; Transvaal, 2 c., £48.

NEWCASTLE-ON-TYNE

Week ending September 20.

ANTIMONY

Rotterdam, 10 t.; Stockholm, 22 t.

BLEACHING POWDER—

Gothenburg, 23 t.; Rotterdam, 47 t. 14 c.

BORAX—

Rotterdam, 2 t.

CAUSTIC SODA—

Bergen, 6 c.; Gothenburg, 2 t.; Gefle, 10 t.

MAGNESIA—

Rotterdam, 9 c.

RED LEAD—

Bergen, 10 c.; Rotterdam, 4 t.

SOAP—

Bergen, 7 c. 2 qrs.

SODA ASH—

Gothenburg, 30 t.

SODIUM HYPOPHOSPHITE—

Gothenburg, 5 t.

SODIUM SILICATE—

Gothenburg, 9 t. 18 c.

SODIUM SULPHIDE—

Gothenburg, 5 t. 4 c.

SULPHUR—

Gothenburg, 10 t.

N. & S. SHIELDS.

Week ending September 20.

GELATINE—

Christiania, 7 c.

STOCKTON-ON-TEES.

Week ending September 20.

NIL.**SWANSEA.**

Week ending September 20.

COBALT OXIDE—

Antwerp, 8 c., £358.

COPPER SULPHATE—

Amsterdam, 1 t. 18 c., £100.

NICKEL SALTS—

Copenhagen, 9 c., £25.; Gothenburg, 1 t., £200.

NICKEL SULPHATE—

Amsterdam, 17 c., £50.

OXALIC ACID—

Havre, 4 t. 5 c., £583.

SULPHUR—

PRICES CURRENT.

THURSDAY, Sept. 25, 1919.

PREPARED BY MESSRS. HIGGINBOTTOM AND CO., 21, SPRING-GARDENS, MANCHESTER.

The values stated are F.O.R. at makers' works, or at usual ports of shipment in U.K., unless otherwise specified
The prices in different localities may vary.

Acids:—		£	s.	d.			£	s.	d.
*Acetic 40% and 60%	per cwt.	30/-	&	45/-	Lead, Carbonate (White lead), pure	per ton	50	0	0
" " Glacial	per ton	85	0	0	" Nitrate	"	56	0	0
*Arsenic, S.G. 2,000°	per ton	70	0	0	Lime, Acetate (brown)	"	11	0	0
Boric, Crystals	"	72	0	0	" (grey), 80%	"	17	0	0
*Fluoric	per lb.	0	0	7	Magnesium Chloride	"	15	10	0
*Muriatic (Tower Salts), 28° Tw.	per carboy	0	6	6	" Carbonate (light)	per cwt.	2	5	0
*Nitric, 80° Tw.	per ton	32	0	0	" Calcined Magnesite	per ton	21	10	0
Oxalic	per lb.	0	1	2½	" Sulphate (Epsom Salts) (coml.)	"	11	0	0
Phosphoric, 1,750°	"	0	1	9	" (druggists)	"	16	0	0
*Sulphuric (fuming, 70%)	per ton	—			Manganese, Sulphate	"	75	0	0
" (Pyrites, 168°)	"	7	18	9	" Borate	"	95	0	0
" (" 140°)	"	4	10	0	*Methylated Spirit, 64° (industrial)	per gal.	0	5	7
" (free from arsenic, 144°)	"	5	7	4	*Naphtha (Wood), Solvent	"	0	10	0
Tannic (commercial)	per lb.	0	2	6	" " Miscible, 60° p.	"	0	10	6
Tartaric (crystals)	"	0	3	2					
*Acetone	per ton	80	0	0	Oils:—				
*Alum, loose lump (delivered)	"	17	0	0	*Cottonseed	per ton	93	0	0
Alumina Sulphate (pure)	"	17	0	0	*Linseed	"	95	0	0
Aluminoferic (in slabs)	"	8	10	0	Stearine, 115-120° M.P.	"	105	0	0
Aluminium (Ingot Metal, 98/99%)	per ton	150	0	0	Potassium, Bichromate	per lb.	0	1	6
*Ammonia, Anhydrous	per lb.	0	1	10	" Carbonate, 80/82%	per to	95	0	0
" 880	per ton	33	0	0	" Chlorate	per lb.	0	1	0
" 920	"	20	0	0	" Hydrate (Caustic Potash) 90%	per ton	160	0	0
" Carbonate	per lb.	0	0	6½	" " 75/80%	"	140	0	0
" Muriate (grey)	per ton	47	10	9	" Potash Hydrate Liquid, 38° B.	"	70	0	0
" (salammoniac) 1st & 2nd, per cwt.	80/- & 75/-				" Nitrate (refined)	"	55	0	0
" Nitrate	per ton	60	0	0	" Permanganate (commercial)	per lb.	0	3	3
" Phosphate	"	110	0	0	" Prussiate (yellow)	"	0	1	9
" Sulphate (grey), London, not	"	—			" (red)	"	0	5	8
" " Hull	"	—			" Sulphate, 90% (ex ship)	per ton	30	0	0
" " Manchester.	"	—			" Muriate, 80%	"	25	0	0
*Aniline Oil (pure)	per lb.	0	1	2	Silver (metal)	per oz.	0	5	3
Aniline Salt	"	0	1	2	Sodium (metal)	per lb.	0	1	3
Antimony	per ton	45	0	0	" Acetate	per ton	51	0	0
" (tartar emetic), 43/44%	per lb.	0	3	4	" Arseniate, 45%	"	60	0	0
" (golden sulphide)	"	0	1	3	" Borate (Borax), Crystals	"	39	0	0
Arsenic, white powdered	per ton	60	0	0	" Bicarbonate (1 cwt. kegs)	"	10	0	0
Barium Chloride (in casks)	"	23	10	0	" Bichromate	per lb.	0	0	11
" Carbonate (native), 92/94%	"	11	10	0	" Carb. (Caustic Soda-ash), 48%	per ton	12	10	0
" Sulphate (native levigated)	"	£7 to £14			" (Alkali), 58% (bags)	f.o.r. {	6	0	0
Baryta Chlorate	per lb.	0	1	3	" (Soda Crystals), (bags)	wks. {	4	2	6
*Bisulphide of Carbon	per ton	55	0	0	" Chlorate	per lb.	0	0	6
Bleaching Powder, 35%	"	15	0	0	" Cyanide (100% basis) for export	"	0	0	10
" " Liquor, 7%	"	6	0	0	" Hydrate (76% C. Soda) (f.o.r.)	per ton	24	0	0
Casein (commercial)	"	90	0	0	" " (74% C. Soda)	"	23	5	0
Chromium Acetate (crystals)	per lb.	0	1	0	" " (70% C. Soda)	"	22	0	0
Calcium Chloride	per ton	8	0	0	" " (60% C. Soda)	"	21	0	0
China Clay (at Runcorn), in bulk	"	70/- to 90/-			" (pure liquid, 90° Tw.)	"	10	2	6
					" 77/78% Powdered (99%) Hydrate	"	24	10	0
Coal-tar Products and Dyes:—					" Hyposulphite (commercial)	"	16	10	0
Alizarine (artificial), 20%	per lb.	0	2	0	" Manganate, 25%	"	65	0	0
Magenta	"	18/- to 35/-			" Nitrate, 96%, retd., f.o.r., L'pool	"	21	0	0
Anthracene, 40/50% A, f.o.b., L'don, per unit,	"	0	0	7	" Nitrite, 100%	"	60	0	0
Benzol, 90's (naked)	per gal.	0	2	0	" Phosphate	"	26	0	0
" 50/90's	"	0	1	10½	" Prussiate	per lb.	0	0	9
Carbolic Acid (crude, 60°)	"	0	1	7½	" Silicate (glass) Alkaline	per ton	12	5	0
" (crystallised, 40°)	per lb.	0	0	9½	" (liquid, 100° Tw.)	"	9	10	0
" Acid (pale liquid, 97/98%)	per gal.	0	2	9	" Sulphate (Saltcake), delivered	"	3	0	0
*Creosote (ordinary), naked	"	0	0	6½	" (Glauber's Salt)	"	4	0	0
*Crude Naphtha, 30% at 120°C.	"	0	0	9	" Sulphide (conc.), 60/65% casks	"	23	0	0
*Grease Oils, 18° Tw. (naked)	per ton	6	10	0	" Sulphite	"	10	0	0
Pitch, f.o.b., Liverpool or Garston	"	3	2	9	Sulphocyanide, Ammonium, 95%	per lb.	0	2	0
*Solvent Naphtha, 90% at 160°	per gal.	0	2	5	" Barium, 95%	"	0	1	4
Copper	per ton	100	0	0	" Potassium	"	0	2	4
" Sulphate	"	41	0	0	" Calcium, 70%	per lb.	0	1	4
Dross Salts	"	39	0	0	Sulphur, (Flowers)	Sicilian per ton	21	0	0
*Glycerine (crude), 80%	"	72	0	0	" (Roll Brimstone)	"	21	0	0
" (industrial, S.G. 1,260)	"	110	0	0	" Brimstone (best thirds)	"			
*Iodine	per oz.	0	1	0	(ex ship)	"	14	10	0
*Iron Nitrate, 80° Tw.	per ton	12	0	0	Tallow	"	100	0	0
" Sulphate (copperas), delivered	"	4	10	0	Tin Crystals	per lb.	0	1	10
" Sulphide	"	0	0	0	" English Ingots	per ton	276	0	0
Lead (Foreign Pig)	"	25	12	6	Titanium, Potass. Oxalate	per lb.	0	1	6
" Litharge Flake	"	45	0	0	Titanous Chloride	per cwt.	4	10	0
" Acetate (white)	"	83	0	0	Zinc (Spelter)	per ton	42	0	0
" (brown)	"	69	0	0	" Powder, 88/92%	"	70	0	0
					" Chloride (solution, 102° Tw.)	"	13	10	0
					" Sulphate, Crystal	"	22	0	0

* Packages extra or returnable; otherwise, prices usually include packages.

THE CHEMICAL TRADE JOURNAL AND CHEMICAL ENGINEER.

No. 1689.

LONDON, SATURDAY, OCTOBER 4, 1919.

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EDITORIAL NOTICES.

Communications for the Editor, if intended for insertion in the current week's issue, should reach the office not later than Wednesday morning.

CURRENT TOPICS.

THE POSITION OF THE MERCHANT.

THE refusal of the Board of Trade to give the British Chemical Trade Association representation on the Dyes Licensing Sub-Committee, the correspondence concerning which we have already published, brings into prominence the whole question of the position of the merchant in the chemical trades, and the attitude of the large chemical manufacturers towards him. The reply of the Board of Trade to the British Chemical Trade Association that there is no need for it to be represented on the Dyes Licensing Sub-Committee raises one or two rather acute questions which cannot but be the better for being discussed. Incidentally, it may be pointed out that other trades have been and are experiencing much the same degree of hostility to the merchant that it is alleged is now being manifested in the chemical trades; but whether the conditions of the latter are so different from, say, the metal and hardware trades, as to lead to a different result, it is perhaps too early yet to say. The fact is that in these latter trades the merchants, after being severely handled during the war by Government departments, instigated by some of the large manufacturers, it is claimed, have to a large extent re-established their position as an essential factor in the trading organisation of the country. In treating this question of the utility or otherwise of the merchant on broad and impartial lines, it is only fair to say that the whole fabric of our export trade has in the past been built up by the brains and capital of the merchants. Conditions during the war were favourable—owing to the fact that, generally speaking, the Government were the only purchasers—for eliminating the merchant, and to a large extent that was done; but it cannot be said that the price to the consumer fell as a consequence of that elimination. There is, indeed, apt to be too much confusion between that common detestation, the middleman, and the merchant, but in fact there is nothing in common between the two. The middleman is the person who too often unnecessarily interposes between the merchant and the consumer, and takes few risks, and frequently has no capital; whereas the merchant is, in effect, the selling organisation for the manufacturer. The only alternative to him is the setting up by the manufacturer of a retail sales organisation; and as during the war, with the number of customers largely reduced, the partial elimination of the merchant had little effect

on prices, it is at least arguable that with a return to ordinary commercial conditions, and a large increase, necessarily, in the number of customers to be dealt with by the manufacturer, the cost of the necessary sales organisation which must be established if the merchant is to be entirely eliminated, will not result in prices being more favourable to the consumer than under the old régime. That question, however, we will leave the merchant and the manufacturer to fight out between them. If the large chemical manufacturers believe that they can carry on their trade better direct with the consumer, there is nothing in our commercial system which can give the merchant cause for complaint, provided the manufacturer has no extraneous aids to assist him which tell unfairly against the merchant. Every manufacturer is at liberty to carry on his business in the manner he thinks best, and the merchants would be the last to contest that argument. The bone of contention of the merchant, however, who has spent years developing a clientèle and has sunk all his capital for the general good of British trade, both here and abroad, as well as, naturally, for his own benefit, is that the manufacturers have been able to secure, if not direct, then indirect, assistance from the Government. The British Chemical Trade Association is so far recognised as representing the merchant class—it also has among its membership a certain number of the smaller manufacturers, who feel that their interests are liable to be swamped by membership of the Association of British Chemical Manufacturers—that its representative attends personally two or three times a week at the Department of Import Restrictions, and is in many cases able to get much quicker decisions with regard to applications for licences, for instance, than if the individual member of the Association took the question up direct with the Controller. That, of course, is not a privilege or facility special to this particular Association; it follows from the fact that Government Departments find it much more convenient to deal with representative bodies than with individuals, and the wisdom of that course has been demonstrated time after time during the past few years. It emphasises, incidentally, the necessity for all traders, be they merchants or manufacturers, to form their recognised trade association, and to endeavour to conduct its affairs on the strongest possible lines.

Having regard to the above facts, it is not surprising that the British Chemical Trade Association is taking a strong line of action on being refused representation on the Dyestuffs Licensing Sub-Committee, and the resentment is the more on account of the manner in which the decision was conveyed to them. The reasons for the application for membership are set forth in the correspondence; but an additional fact may be stated. It is known that in part payment of the indemnity Germany is sending to this country some £2,000,000. worth of dyestuffs. That will be dealt with by the Sub-Committee, which, put frankly, is alleged to consist of representatives of two dye-manufacturing concerns and two consuming combinations. Obviously, the merchants have a keen interest in the manner in which this large quantity of material is to be disposed of. Inquiries in the proper quarters have elicited the reply that no scheme has yet been arranged, but rumour has it that a scheme has, to say the least, been drafted, but the merchants have had no voice in it. Another matter which is causing discontent among the merchants is the routine which

an importer has to go through in order to get dyestuffs from abroad. He has to name his foreign house, the price paid for the material, and the person to whom he is going to sell. We do not suggest that in the interests of British manufacturers these regulations are too stringent, but the grievance is that a competing firm is acting, under the name of the "Central Importing Agency," as the Government's agents in connection with the importation of dyestuffs into the United Kingdom, and there is a natural disinclination to give away all this confidential business information to another firm in the trade, whatever its standing. In a sense, this is merely a perpetuation of the general war-licensing system, and merchants in all industries feel that they have been compelled to give away to Government officials who were often previously engaged in the particular trade, and have returned to it since, information which will by no means strengthen their position under normal conditions. It was hoped, however, that this method of procedure would be abandoned when Peace was signed, and there is more than one precedent for having foreign dyestuffs coming into the country under licence, distributed by a trade association, thus affording equal protection, facilities, and information to all members. If that were done we imagine the course would be to have a joint committee representing the Association of British Chemical Manufacturers and the British Chemical Trade Association. At the moment, of course, the further action which the British Chemical Trade Association contemplates taking, and has already set in motion, must be held up on account of the vital matters now occupying the attention of the Government, but we draw attention to the position because we do not wish to see the British chemical industry handicapped by internal disputes.

EXPORT CREDITS.

THE Board of Trade announce that the Government are prepared, through the Export Credits Department of the Board of Trade, 10, Basinghall Street, E.C. 2, to consider applications for advances up to 80 per cent. of the cost of the goods to the seller, including freight and insurance and the commission paid to the Department by the seller, in respect of exports to Finland, the Baltic Provinces (Latvia, Esthonia, and Lithuania), Poland, Czecho-Slovakia, Jugoslavia, and the areas in Russia to which the scheme for insurance against abnormal commercial risks applies.

The credits will be granted for such periods as the Department may determine in each case at the time of application for the advance. Advances will not be made for the export of raw materials, or of surplus Government stores, and preference will be given to the finance of goods where the larger part of the cost is due to manufacture in this country. All applications must be passed to the Department by the bankers of the seller, whose recommendation must be attached. Interest will be calculated at the rate of 1 per cent. above the Bank of England rate from time to time ruling, with a minimum of 6 per cent. per annum. Commission will be payable by the seller at the time the advance is taken; he may, however, include this commission in his invoice. The rates will not be less than 3 per cent. for the first year, 4 per cent. for the second year, 5 per cent. for the third year.

EFFICIENCY IN THE CHEMICAL INDUSTRY.

By J. H. WEST, A.C.G.I.; A.M.INST.C.E.

IT is a widely recognised fact that chemical manufacture in this country has been, and is still, very largely conducted on extremely inefficient lines, especially on the engineering side, and more particularly in the small works which represent so large a proportion of the whole industry. During the war British chemical manufacturers have been almost entirely free from external competition, they have obtained abnormally high prices for their goods, and they have had abundance of orders for special products required in connection with the war. The lean years are now upon us. Competition will again make itself felt, probably more severely than ever; wages and the cost of fuel and raw materials have risen enormously, and the chemical manufacturer is about to be faced with a tremendous problem in his efforts to place his goods on the market at competitive prices and yet make a profit. If he succeeds it can only be by attaining and keeping up the highest possible standard of efficiency in every department of his works, and more particularly on the engineering side, for it is there that large economies can be made by saving fuel, power, labour, and time.

This question of increasing the efficiency of chemical manufacture is one of the greatest national importance if we are to maintain and improve our position in the world's chemical markets; and it is an urgent one, for now is the time to make the improvement if it is to be of any value. It is no use waiting until the works are on the point of closing down through inability to make profits on the old lines. Everyone, from the Prime Minister downwards, is calling for increased production and a decrease in imports and in the consumption of fuel. Higher efficiency inevitably leads to increased output from the same plant, less consumption of fuel, and lower importation of raw materials per ton of product turned out.

The formation of the Chemical Engineering Group of the Society of Chemical Industry was a very hopeful step towards the recognition of the necessity for better efficiency in chemical manufacture, but it was only a preliminary step. What a magnificent opportunity now lies before this Group, not merely of justifying its existence, but of inaugurating an efficiency crusade which might well prove the very salvation of the industry! No other body is so well qualified to undertake this work; will it rise to the occasion? So far it has not shown much indication of doing so. It is a big undertaking, and one that requires to be handled on big, far-seeing lines, and above all it wants to be begun and pushed on with at once. In two or three years' time it may be too late.

Of the seven immediate aims of the Group put forward in February of this year, the last is far and away of greater importance than all the others. It reads as follows:—"Generally to promote by any means that may be available to the Group in regard to chemical industry in all its varied and associated lines—metallurgical and others—that increased productiveness and that higher commercial efficiency which have become essential not merely to enable this country to recover what we may have lost of foreign trade during the past

few years and to multiply and enlarge our markets overseas, but also to enable the country to sustain, and in due course reduce, the immense economic burden which the great war has laid upon us."

Now the problem of how to realise this increased productiveness and higher commercial efficiency may be divided into two parts, viz.: (1) The education of the chemical manufacturer as to the necessity for increased efficiency and the direct pecuniary advantages resulting from it; (2) the provision of men qualified to secure and maintain for the chemical manufacturer the increased efficiency which he wants, or will want when he has grasped the advantages to be derived therefrom.

The first question is really the fundamental basis of the whole problem. The British manufacturer is an exceedingly conservative individual, wedded to the methods he has used for years, which are most likely those his father used before him. He has a strong distrust of science and scientific methods, though the war has done a little to modify this prejudice, and above all he dislikes any outside interference with, or inquiry into, his system of manufacture. He likes to surround his works with an impenetrable wall, behind which his processes are carried out according to wonderful trade secrets; but if this wall keeps the secrets from passing out, it also prevents the light of progress and improvement from getting in.

It is notorious that the engineering side of the smaller works, at any rate, is almost invariably run on the most deplorable lines, the so-called engineer being generally a more or less superior fitter, with the natural result that no attention whatever is paid to fuel or power economy, or to manufacturing efficiency in any form. It is useless to say that the reason for this state of affairs is the lack of competent chemical engineers. Who can doubt that if there were an unlimited supply of fully trained and experienced chemical engineers available to-day, nine out of ten chemical manufacturers would refuse to employ them? No, the fault lies with the manufacturer's ignorance of what can be done by the application of scientific principles to the problems of manufacture, and his unwillingness to change his own methods, the inefficiency of which he does not in the least realise. Until this attitude can be changed it is quite useless training chemical engineers, reading papers on chemical engineering subjects, or endeavouring in any way to develop the science of chemical engineering. *The demand must come from the industry.*

VIGOROUS EFFICIENCY CAMPAIGN NECESSARY.

Here then is a great work for the Chemical Engineering Group to undertake. Let them go to the Executive of the Association of British Chemical Manufacturers and convince them of the necessity for a prompt, vigorous, and widespread efficiency campaign among the members of the Association in the first instance, and ultimately the whole body of British chemical manufacturers. Once the Association are convinced of the energetic determination of the Group to carry out the work, there is little doubt of their hearty co-operation and financial assistance.

Lectures and demonstrations should be arranged at all centres of chemical manufacture, and if possible at the chemical works themselves. The manufacturer must be convinced that he has far more to gain than to lose by bringing his problems into the open, and having them investigated by experts. An important feature of such lectures should be the explanation of the methods of testing the efficiency of boilers and plant, and of methods of ascertaining and analysing the various items which make up the cost of manufacture, for the average chemical manufacturer has but the vaguest notion of how his cost of production is made up, and it is precisely this ignorance which blinds him to the lack of efficiency in his works. The lectures should also give full information as to the results which have been obtained in actual works practice by the introduction of modern methods based on scientific principles, together with data showing the financial gain resulting therefrom.

First, then, get the manufacturer interested and alive to the fact that perhaps his methods could be improved upon, even if they are the result of many years' experience; next, show him how to find out what he really is doing from the efficiency point of view; then show him what improvement he might expect and be sure of getting with the best modern methods and appliances; and finally, when he has become a disciple of efficiency, persuade him, if possible, to give others the benefit of his experience. As regards the last point, it would be an enormous gain to the industry as a whole, and therefore to the country, if the manufacturer could be got to see that his deadly enemy is not his British competitor at all, but the foreign manufacturer in the same line. More co-operation and team work between British competitors in the same line is badly needed to assist in keeping foreign-made goods out of our home and overseas markets.

It will doubtless be argued that the campaign outlined above would cost a great deal, and that it would be impossible to find suitable lecturers and demonstrators. On the other hand, the Chemical Engineering Group has two great organisations behind it, viz., the parent Society of Chemical Industry, and the Association of British Chemical Manufacturers, both vitally interested in the prosperity of the British chemical industry, and it would be strange indeed if enough financial support could not be obtained to make a start, while the scheme should rapidly become self-supporting. As regards the provision of qualified men to carry on the campaign, there must surely be some enthusiasts available from among the present large and rapidly growing membership of the Group.

TRAINING CHEMICAL ENGINEERS.

So much for the first and most important part of the problem. The second part relates to the provision of properly qualified chemical engineers to advise and assist the manufacturers to attain and afterwards maintain the highest possible commercial efficiency in their works.

Paragraph 3 of the aims of the Chemical Engineering Group deals with the training of chemical engineers, and this question should be taken up without delay and put upon a proper footing, though, as has already been emphasised, it is useless training men until a demand arises from the industry for their services, for the existence of the trained men will not create the demand,

and men will not come forward to be trained until they are sure that there will be work for them to do at the end of their training. In any event, the organisation of training centres and courses of instruction must inevitably take a considerable time, so that under the most favourable circumstances it must be several years before a supply of trained men adequate to the needs of the industry can be available.

What, then, can be done in the meantime, probably the most critical period in the whole history of the industry? The only solution which appears practicable is that embodied in the following suggestion, viz., that the Chemical Engineering Group should at once establish a Consultative Committee of chemical engineers, whose services in an advisory capacity should be at the disposal of chemical manufacturers on the payment of standard fees, a portion of these fees going to the exchequer of the Group, and the remainder serving to remunerate the members of the Committee for their professional services. In this way the manufacturer would secure the assistance of experts in the various branches of chemical engineering, and he would have the assurance that he was obtaining unbiased advice, backed by the best knowledge and skill in the country.

At the present time there are, unfortunately, a number of persons about who call themselves chemical engineers on the strength of a few months spent in an explosives factory during the war, but who have had no training and practically no experience of the work. If the Chemical Engineering Group does not soon take in hand the question of the status of the chemical engineer, and set up a standard of qualifications to uphold that status, much harm will be done by such people. This question of the status and qualifications of the chemical engineer is a very urgent one, and the Group should make it one of the first matters to be dealt with, for the longer it is left the more difficult it will become, and the greater danger there will be of the manufacturer losing confidence in the chemical engineer owing to disappointments arising from dealing with incompetent men.

The collection and dissemination of information and data relating to chemical engineering, upon which great stress is laid in the Group's aims, is a very desirable undertaking, but it is of nothing like the same importance as the necessary machinery for linking up the manufacturer's interest with the activities of the Group, a point which seems to have been rather overlooked. It is no good waiting for the manufacturer to come to the Group—the Group must carry its campaign right into the works of the manufacturer, and now is the time to do it.

In conclusion, it should be stated that any criticisms of the Chemical Engineering Group contained in the above, and the suggestions made for the more vigorous and rapid extension of its sphere of usefulness, are put forward in the most friendly spirit, and are prompted solely by the conviction that the immediate needs of the chemical industry in this country call for the most energetic and speedy efforts to attain the utmost possible efficiency in manufacture.

WAGES IN THE CHEMICAL TRADES.—At the forthcoming periodical national wages revision in the chemical, soap, and candle and explosives industries Mr. James O'Grady, M.P., on behalf of the Federation of General Workers, will claim 10s. weekly increase for adults and 5s. for juniors, with proportionate advances for piece workers.

COMMERCIAL SYNTHESIS OF ORGANIC COMPOUNDS FROM ACETYLENE.*

By M. J. MARSHALL.

WHILE the use of acetylene as an illuminant has been well known for many years, its use in the commercial synthesis of organic chemical compounds is of more recent origin. However, the possible commercial utility of acetylene gas, on account of its very high chemical reactivity, has long been recognised by chemists, and attempts to utilise it in this manner date back probably just as far as its use as an illuminant.

This property of acetylene is due largely to the fact that it is a highly unsaturated compound of simple structure, having the formula $\text{CH}:\text{CH}$. Thus, not only does it react easily with other compounds, but at the same time the reaction products are quite simple in structure, thus making it possible to manufacture compounds which can be used as starting points in a large number of chemical syntheses. This high reactivity of acetylene makes the number of possible syntheses very large, but up to the present time only a comparatively small number of these reactions have been developed commercially.

The present article will not be confined merely to compounds which have been produced on a commercial scale, but patented processes will also be included, as a large number of these embryo processes are certain to be commercially successful in the future.

As was mentioned above, acetylene is an unsaturated compound, and can therefore form additional products with other compounds. At the same time, acetylene can be polymerised by heating to a sufficiently high temperature, decomposed into its elements by detonation under high pressure, or oxidised either directly or by electrolysis.

HYDRATION OF ACETYLENE.

The most important reaction at the present time, from a commercial and technical point of view, is the hydration of acetylene gas to form acetaldehyde, itself the source of many important synthetic compounds. This reaction proceeds according to the equation: $\text{C}_2\text{H}_2 + \text{H}_2\text{O} = \text{CH}_3\text{CHO}$, and takes place only in the presence of salts of mercury. The reaction was the subject of many patents, but it was not operated on a commercial scale till 1916, when the Shawinigan Water and Power Company, at the request of the British Government, successfully installed and operated the process with the aim of producing acetone for the manufacture of cordite. For this purpose a subsidiary company was formed, under the name of the Canadian Electro Products Company. The process of this company consists briefly of the following steps:

(1) The production of acetaldehyde from acetylene by passing acetylene gas through large kettles containing aqueous solutions of mercury salts. The aldehyde vapour is separated from the excess acetylene gas by refrigeration. This is then rectified to give a pure acetaldehyde of 99.9 per cent. purity.

(2) Oxidation of the aldehyde to acetic acid in the presence of appropriate catalysts. This is effected by passing air or oxygen through the aldehyde under pressure in the presence of catalysts, such as vanadium pentoxide, cerium oxide, manganese acetate, etc. The degree of conversion of the aldehyde to acetic acid is very high. After separating the excess aldehyde by rectifica-

tion, acetic acid, running 99.8 per cent. pure, can be obtained.

(3) Conversion of the acetic acid to acetone by passage through hot tubes over lime as a catalyst. This proceeds according to the equation: $2\text{CH}_3\text{COOH} = (\text{CH}_3)_2\text{CO} + \text{CO}_2 + \text{H}_2\text{O}$. This process was operated with reasonable success for about one year, the acetone being shipped to the British Government. However, towards the end of 1917 the manufacture of acetone was stopped, and acetic acid was produced and shipped to the British Government as before. It is not probable that the company will resume the manufacture of acetone, as this material can be produced more cheaply from commercial calcium acetate. It is understood that a plant of this type for the production of acetic acid has been in operation in Germany since 1916.

OTHER PRODUCTS FROM ACETALDEHYDE.

While, therefore, at the present time acetic acid is the main product manufactured from acetaldehyde on a commercial scale, there is no doubt that in the near future acetaldehyde will be the source of many other important organic compounds. This substance is even more wonderful than acetylene with respect to the great variety of reactions in which it can take part.

Paraldehyde.—Another product which has been manufactured for some time by the Canadian Electro Products Company is paraldehyde. This is manufactured by treating pure acetaldehyde with very small amounts of sulphuric acid. Considerable heat is evolved, and the aldehyde is converted to paraldehyde containing a certain amount of excess aldehyde. This excess aldehyde is finally removed by appropriate means, in order to obtain the pure paraldehyde.

Aldol.—While mineral acids tend to cause acetaldehyde to polymerise to paraldehyde; aqueous solutions of alkalis, on the other hand, cause the so-called aldol condensation, according to the equation: $2\text{CH}_3\text{CHO} = \text{CH}_3\text{CH}(\text{OH})\text{CH}_2\text{CHO}$. Thus N. Grunstein (U.S.P. 1,234,156, Br.P. 101,636, 1917) protects the production of aldol by treating acetaldehyde with calcium or strontium oxide, and a little water. On completion of the reaction this mixture is neutralised with acid, and the aldol is separated by distillation *in vacuo*. Aldol has been proposed for the preparation of cellulose acetate solvents. It is also used as a source of butadiene for the manufacture of synthetic rubber.

Ethyl Acetate.—If pure acetaldehyde is allowed to stand for about four hours in contact with about 5 per cent. of its weight of finely divided aluminium ethylate, about 90 per cent. is converted directly to ethyl acetate, according to the equation: $2\text{CH}_3\text{CHO} = \text{C}_2\text{H}_5\text{OOC}\cdot\text{CH}_3$. It should be noticed that this reaction involves the polymerisation of two molecules of acetaldehyde, as in the formation of aldol, although the resulting product is entirely different. This is one very good example of the great diversity of reactions in which acetaldehyde can take place.

From a technical point of view, this is a promising reaction, as the ethyl acetate produced is of very high quality, while the means necessary to effect the actual conversion are very simple. The great drawback at present, however, is the preparation of the aluminium ethylate. German patent No. 286,596 (1913) claims the preparation of this catalyst by the action of anhydrous alcohol on aluminium foil in the presence of a small amount of mercuric chloride. This action is not by any means rapid, and, after solution of the aluminium, it is

* Canadian Chemical Journal.

necessary to free the aluminium ethylate from the alcohol and mercuric salt. This last has also been the subject of several patents.

Acetal.—Acetal is often used instead of aldehyde for carrying out condensation reactions. It results from the combination of ethyl alcohol and acetaldehyde, according to the equation: $2C_2H_5OH + CH_3CHO = CH_3CH(OC_2H_5)_2$. It is prepared by mixing acetaldehyde and ethyl alcohol in the presence of a trace of hydrochloric acid, and an amount of calcium chloride equivalent to 10 per cent. of the weight of the liquid. Two layers form, which are separated, and the upper one repeatedly treated with fresh portions of calcium chloride till no more water separates. The liquid is then shaken with anhydrous sodium carbonate to remove traces of acid, filtered, and fractionally distilled.

Ethyl Alcohol.—Patents have been taken out for the preparation of ethyl alcohol from acetaldehyde by passing a mixture of acetaldehyde vapour and hydrogen over reduced nickel at temperatures below 180° . It is hardly probable, however, that alcohol can be produced as cheaply by this method as by the ordinary fermentation process.

Aldehyde Ammonia.—Aldehyde ammonia has recently come to the fore as an accelerator in the vulcanisation of rubber. This can be prepared by the direct addition of ammonia to aldehyde. The aldehyde is dissolved in anhydrous ether, and dry ammonia gas passed through. The aldehyde ammonia separates as a crystalline solid, which can be separated by filtration.

Chlorination Products of Aldehyde.—Acetaldehyde chlorinates very rapidly, with the evolution of much heat. A mixture of several products is obtained, which, so far, have not found any large commercial use. It is stated that acetyl chloride is formed in this way, although the amount so formed is not sufficiently large to be of technical importance. One of the products appears to be butyl chloral. On the whole, however, very little exact information is available so far concerning the exact nature of the reactions accompanying the chlorination of aldehyde.

Manufacture of Pure Nitrogen.—In the oxidation of aldehyde to acetic acid by means of air, considerable amounts of fairly pure atmospheric nitrogen are obtained. This by-product should certainly find a use in one of the several nitrogen fixation processes at present in existence.

PRODUCTS FROM ACETIC ACID.

From acetic acid a number of interesting products are obtained. Thus by passing chlorine gas into acetic acid in the presence of acetic anhydride, monochloroacetic acid is obtained. This product is of great importance in the manufacture of indigo.

Acetone.—If acetic acid vapour is passed over lime at a temperature of 450° C. practically all the acid is converted to acetone, with the liberation of carbon dioxide. In this case the lime acts as a catalyst only. As was mentioned before in connection with the description of the process of the Canadian Electro Products Company, this method of manufacturing acetone cannot compete financially with the ordinary method, consisting of the dry distillation of commercial calcium acetate. This is due to the high initial cost of the acetic acid compared with that of the acetate of lime.

Manufacture of Acetic Anhydride.—Acetic anhydride is an acetic-acid derivative of extreme technical im-

portance. It is used very largely in the manufacture of cellulose acetate and synthetic drugs. While cellulose acetate is a more valuable product than cellulose nitrate, nevertheless, at the present time the high cost of acetic anhydride limits its use considerably.

A method for the manufacture of acetic anhydride directly from acetaldehyde has been patented by Société L'Oyonnith (Fr. Pats. 420,346 (1910), 442,738 (1911)). The aldehyde is diluted with acetic anhydride and treated with chlorous anhydride, Cl_2O . The following reactions are stated to take place: $Cl_2O + 2CH_3CHO = (CH_3CO)_2O + 2HCl$. This process, therefore, supplies a means for the production of acetic anhydride directly from aldehyde, without the intermediate formation of acetic acid or an acetate.

Not only can acetylene act on free water to form acetaldehyde, but it can also form aldehyde by actually abstracting water from other chemical compounds, and thus acting as a dehydrating agent. Thus acetylene dehydrates acetic acid in the presence of mercury salts to form acetic anhydride and acetylates. The anhydride so formed immediately acetylates the aldehyde to form an ester of the ethylidene type, known as ethylidene diacetate. If this substance is heated, it tends to break up into aldehyde and acetic anhydride. This last reaction, therefore, opens a door for the manufacture of acetic anhydride directly from acetylene. Considerable attention had been devoted recently to the development of this process in Europe, but there seems to be a number of fundamental difficulties which have not yet been overcome.

The ordinary technical method of manufacturing acetic anhydride is by the action of chlorides of sulphur on sodium acetate. This process has been modified by Goldschmidt (U.S.P. 1,195,205 (1906)) by mixing sulphur with the sodium acetate and passing in chlorine. In this way the sulphur chloride is formed in contact with the substance on which it is to react. The first product of the reaction is acetyl chloride. This reacts with the excess of sodium acetate at a higher temperature—about 80° C.—to form acetic anhydride. The acetic anhydride is separated from the solid residue by distillation *in vacuo*.

Compounds of Acetylene With Other Substances.—It was found that acetylene in the presence of mercury salt could abstract water not only from acetic acid, but also from most compounds containing a hydroxyl group. G. Boiteau (Fr. Pat. 477,560 (1914)) claims the manufacture of entirely new compounds by the action of acetylene on alcohols. Also by dehydrating the product obtained from methyl alcohol and acetylene, he obtains butadiene. It would appear, therefore, that this series of reactions alone opens a very wide field to the utilisation of acetylene.

Compounds With Ammonia.—By passing a mixture of ammonia and acetic acid vapour over alumina at 500° C. acetonitrile is formed, according to the following equation: $CH_3COOH + NH_3 = CH_3CN + 2H_2O$. The yield is 85 per cent. of theory. The nitriles, as is well known, are important substances in organic syntheses.

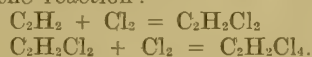
Esters of Acetic Acid.—It is doubtful whether the manufacture of the commercial grades of esters from high-grade acetic acid would be able to compete with the method of manufacture direct from calcium acetate as now practised. It is possible that where an ester of the higher alcohols was required of a fair degree of purity, acetic acid could be economically used.

It is perfectly obvious that this single property possessed by acetylene—that of adding on water in the presence of mercury salts—is possessed of vast potential industrial importance. Thus, while at the present time the main application of this reaction on a large scale has resulted in the commercial production of acetic acid, no one can prophesy how far the uses of acetylene as a synthetic medium will extend.

This power of adding on water is only one of a large number of additional reactions which can take place between acetylene and other compounds. The remainder of this article will be devoted to a discussion of these reactions.

CHLORINATION PRODUCTS OF ACETYLENE.

Acetylene combines very violently with chlorine, forming addition compounds. Care must be taken in controlling the reaction, otherwise it is liable to proceed with explosive violence. The main product of this reaction appears to be tetrachlorethane, $C_2H_2Cl_4$, although a little dichlorethylene, $C_2H_2Cl_2$, is formed at the same time. The following equations represent approximately the course of the reaction:



Practically all patents taken out for the manufacture of tetrachlorethane by this method are for the purpose of preventing, as far as possible, the explosive combination of these gases. One of the most valuable methods appears to be that of Voigt (U.S.P. 908,051), who allows the reaction to take place in the interior of a porous mass made of sand, pulverised earthenware, infusorial earth, etc. The fine pores abstract the heat of reaction with sufficient speed to prevent explosion, while at the same time the apparatus is provided with a water jacket through which cold water is continually passed. The crude product obtained in this way is purified by fractional distillation.

Tetrachlorethane is a colourless, heavy, refractive liquid with a boiling point of $147.2^\circ C$. It is a very essential constituent of solvent mixtures for cellulose acetate dope. It is stated to give to cellulose acetate a resilient quality that no other solvent gives. In fact, tetrachlorethane has in cellulose acetate much the same function as camphor in nitro-cellulose. Tetrachlorethane is also the starting point in the manufacture of other chlorinated hydrocarbons.

Dichlorethylene, $C_2H_2Cl_2$.—This is prepared by suspending tetrachlorethane in water, and submitting it to the action of zinc dust. Considerable heat is evolved, and dichlorethylene distils off at $55^\circ C$. This substance is used as a solvent for cellulose acetate in conjunction with alcohol and tetrachlorethane.

Trichlorethylene.—This compound is also prepared from tetrachlorethane by abstracting one molecule of hydrochloric acid thus: $CHCl_2 \cdot CHCl_2 = CHCl : CCl_2 + HCl$. This is effected by treating tetrachlorethane with weak alkalis, or by passing the vapour of the same compound over surfaces of barium chloride or thorium oxide heated to 300° – $390^\circ C$., when hydrochloric acid is split off.

Trichlorethylene has a boiling point of $88^\circ C$., and is a very efficient fat solvent. It has the advantage over tetrachlorethane of not attacking metal vessels. Trichlorethylene is also important as the starting point of a whole series of valuable organic products. By acting on trichlorethylene with caustic soda, lime, and alcohol there is formed dichlorovinyl ether: $C_2HCl_3 + C_2H_5ONa = C_2HCl_2OC_2H_5 + NaCl$. This compound is wonderfully reactive. One very important property is its com-

bination with water in the presence of a trace of HCl at ordinary temperatures to form chloroacetic ester, thus: $C_2HCl_2OC_2H_5 + H_2O = C_2H_2ClOOC_2H_5 + HCl$. Chloroacetic ester is a compound which has been much used as a starting point for synthetic work. Chief among the products which can be synthesised in this way is indigo. The commercial manufacture of indigo, using acetylene as a starting point, is therefore possible.

Pentachlorethane and Hexachlorethane.—These compounds can also be prepared from tetrachlorethane by the acting on it with chlorine under the influence of actinic light. They are both used as constituents of solvent mixtures for cellulose acetate and cellulose nitrate.

ADDITION PRODUCTS OF ACETYLENE.

Hydrogen.—If acetylene and hydrogen are led over reduced nickel at a reasonably low temperature, ethane and a little ethylene are formed. It is claimed that ethylene alone is formed (Ger. Pat. 253,160) when the acetylene is reduced in the presence of platinum or palladium, together with iron, nickel, cobalt, silver, magnesium, zinc, cadmium, or aluminium.

Ethylene is the source of many important compounds. Through its chlorination product, ethylene glycol can be prepared. With concentrated sulphuric acid we can form ethyl sulphuric acid, which, on treating with water, gives alcohol. On the other hand, ethylene, when condensed with acetone, gives isoprene directly, which makes the synthesis of rubber possible by this means.

Nitrogen.—It has been stated that a mixture of nitrogen and acetylene, when exposed to an electric discharge or actinic light, forms hydrocyanic acid, according to the equation $C_2H_2 + N_2 = 2HCN$.

This points out a method of nitrogen fixation hitherto untried on a large scale, although the cost of the acetylene may make the method too costly for commercial use.

Products Formed at High Temperatures.—Although acetylene will not combine with water to form acetaldehyde below $100^\circ C$. in the absence of mercury salts, nevertheless, if the acetylene, mixed with steam, is passed through a tube heated to about 400° to $600^\circ C$. in the presence of appropriate catalysts, acetaldehyde is formed according to U.S.P. 1,244,901. In this particular case the catalyst recommended is molybdic acid on asbestos.

Under similar circumstances, in the presence of partly reduced bauxite, it is found (British Pat. 109,983, 1916) that acetylene can add on H_2S to form thiophene, or ammonia to form acetonitriles, picoline, and other pyridine bases. The study of reactions of this type should form a very fruitful field for future research.

The great drawback to work with acetylene at high temperatures is the tendency to form polymerisation products, which, together with any impurities in the gas, soon render the catalyst inactive, thus making it necessary to regenerate it quite frequently. At the same time it does not seem possible to obtain the products desired in any reasonable state of purity, a number of different substances being formed at the same time.

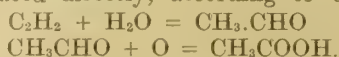
ACETYLENE BLACK AND HYDROGEN.

If acetylene is detonated under high pressure by means of the electric spark, a complete decomposition of the acetylene into its elements occurs, according to the equation $C_2H_2 = 2C + H_2$. This occurs at atmospheric pressure between 260° and $600^\circ C$. Many patents have been taken out covering this reaction. In a large number of cases provision is made for collecting the hydrogen produced. If oxides of carbon are introduced along with

the acetylene, these are reduced with the formation of water, no free hydrogen being produced in this case.

ELECTROLYTIC OXIDATION PRODUCTS OF ACETYLENE.

If acetylene is submitted to electrolytic oxidation in acid solution, in the presence of mercury salts, acetic acid is produced directly, according to the equation:



This method for the manufacture of acetic acid, so far, does not appear to have been utilised commercially, and it is very doubtful whether it can compete with the present synthetic process.

If electrolysis of the acetylene is allowed to take place in alkaline solution, on the other hand, salts of formic acid are produced. There is a possibility of reducing this formic acid to formaldehyde by reduction with hydrogen over reduced nickel. However, this process is not practicable at the present time, on account of the low yield of formaldehyde obtainable.

COMPOUNDS OF AROMATIC SERIES.

The polymerisation of acetylene to benzene by passage through a hot tube is a well-known reaction. However, as benzene can be produced much more cheaply as a by-product in the coal-distillation industry, this reaction is of no commercial significance.

Another possibility is the manufacture of phenol from acetylene by treating it with fuming sulphuric acid to obtain the sulphonic acid $(\text{C}_2\text{H}_2)_3(\text{SO}_4\text{H})_4$. Phenol is obtained from the potassium salt of this acid by treating it with potash and distilling the product. So far, this process has not been utilised on a commercial scale.

CONCLUSION.

Many of the reactions of acetylene have not been applied technically, and there is a very wide field in this direction for the utilisation of organic compounds which can only be manufactured at a high cost by other means. Even those processes for the utilisation of acetylene which have so far been patented are still mostly in an undeveloped state. It can therefore be seen that the future of acetylene, as the source of many important organic compounds, is particularly bright. In fact, acetylene should, in time, stand in the same technical relation to compounds of the aliphatic series as benzene at the present time stands in relation to compounds of the aromatic series. Looking further into the future, it can be seen that calcium carbide will come to be of ever-increasing importance to the chemical industry.

METALLURGICAL INDUSTRIES IN BELGIUM.

THE following is an abstract of a report issued by the Ministère de l'Industrie, du Travail, et du Ravitaillement of Belgium:—

Some of the coke ovens in Belgium remained in operation during the German occupation, and are in condition to continue work. Others which have been kept in good condition may resume operation within two or three months. Still others have not been kept in repair, and must undergo considerable overhauling, and will not be ready for resumption for six or seven months. The Germans destroyed only a small number of the ovens. From others they removed the distilling apparatus, but these may be used as ordinary ovens. Where considerable repairing or reconstruction of ovens is necessary fire-

brick will be needed. For ovens equipped with distilling apparatus there will be needed sulphuric acid for the manufacture of ammonium sulphate and heavy tar oils for the distillation of benzole. Some of the coke ovens, such as those at the Cockerill works, use a mixture of Belgian and foreign coal, the latter having a much larger content of volatile matter than the former. Plants producing composition coal fuels were generally spared by the Germans, who required them to furnish briquettes for use by the railroads.

The lead factory of the Dumont Brothers Co. at Sclaigheaux was almost entirely destroyed by the Germans. It is not known when this factory, which had been completely modernised before the war, can be rebuilt and put in working order. The Bleyberg plant, of little importance, remained completely inactive during the occupation. The Overpelt and Hoboken plants, belonging to companies largely owned by German capitalists, especially the latter plant, are only slightly injured, and can resume operation within a short time. A part of the equipment of the Baelen plant of the Vielle-Montagne Co. has been removed.

The zinc industry is situated in the Provinces of Liège, Limburg, and Antwerp. Aside from the Sclaigheaux plants, which have been destroyed for the most part, and the plant at Boom, whose equipment has been partly removed, the zinc plants have suffered relatively little, and may resume activity as soon as it is possible to procure the ore necessary. These ores came from foreign countries, especially Australia. The revival of the zinc industry is thus intimately connected with the activity of ocean, canal, and railway transportation.

INDIAN SESAMUM CROP.

THE first forecast of the Indian sesamum (til or jinjili) crop, 1919-20, issued by the Department of Statistics, India, is based upon reports received from eight provinces, which contain, on an average, 76 per cent. of the entire area under sesamum in British India. The returns in this forecast, however, exclude estimates for the United Provinces and for the late crop of Bengal.

A general comparison of the figures is made below with those for the corresponding period of last year. The total area so far reported is 1,520,000 acres, as against 1,291,000 acres (revised figure) for the same tracts at this date last year, or an increase of 18 per cent. Details of the area by provinces are as follows:

First Forecast, August.

Provinces.	1918-19.	1919-20.	Increase + or Decrease -
	Aores.	Aores.	Aores.
United Provinces*			
Madras	314,000	452,000	+ 138,000
Central Provinces and Berar	434,000	492,000	+ 58,000
Bombay and Sind (including Indian States)	161,000	260,000	+ 99,000
Bengal	169,000	167,000	- 2,000
Bihar and Orissa	138,000	83,000	- 55,000
Punjab	75,000	65,000	- 10,000
Ajmer-Merwara	—	1,000	+ 1,000
Total†	1,291,000	1,520,000	+ 229,000

*The estimated acreage is not reported until October in each year.

†Excluding the United Provinces.

‡As published in the October forecast (9,000 acres for early crop and 120,000 acres for late crop).

Seasonal conditions at sowing time have, on the whole, been favourable, except in parts of the United Provinces and Bengal, and the present condition of the crop is reported to be good.

SOME INORGANIC POISONS.

BY ALICE HAMILTON, M.D.*

ARSENIC.

OBSERVATIONS of industrial arsenical poisoning in the United States are scattered, and are not very detailed. Our most important arsenic industry is the manufacture of insecticides, Paris green (the acetoarsenite of copper), and lead arseniate. The two centres for this manufacture are Brooklyn and Chicago. While working for the New York State Division of Industrial Hygiene, Lester Roos examined fourteen men in two Paris-green factories and found three with inflamed eyes, two with ulcers, and four more with scars of old ulcers and furuncles, and two with marked anæmia. The Paris-green plants in Illinois employ a very fluctuating force of workmen, varying from about 12 in October to 561 in March. Few men remain in the work for long. It is one of the many industries in which a rapid labour turnover makes for the protection of the men against poisoning.

The reports of the Illinois Factory Inspection Department for the years 1912 to 1916 have several items on arsenical poisoning. These reports note that scrotal ulcers are pretty common among the men working in Paris green. Six cases of poisoning from Paris green and two from lead arseniate are noted one year; twenty cases another year from a force that varied between sixteen and 178. Two of these patients had ulceration; two, conjunctivitis and inflammation of throat and nose; the others, colic and constipation. I do not believe cases of poisoning from lead arseniate have ever been thoroughly enough worked up for one to say which element is the more important.

It is excessively hard to protect workers in Paris green. Two cases are on record of arsenical poisoning from the use of Paris green or arsenate of lead as a spray for fruit trees. The powder is very light and fluffy, and it has, so far, been impossible to carry out mechanical packing. No protection can be worn which makes the skin perspire, for perspiration only increases the danger of ulceration. Respirators do this by pressing on the skin and making it soft and thin. The best procedure seems to be to plug the nostrils lightly with cotton, to plug the ears in the same way, and to smear the face over with some bland ointment. A full shower bath ought to be taken at the end of work, and the work clothes should be clean each day.

Wholesale poisoning by the fumes of arseniuretted hydrogen has been reported several times, the victims being always persons confined in ill-ventilated parts of a ship, carrying in the hold a cargo of an alloy of iron and silicon—ferrosilicon. It is made by fusing together silicon (sand and quartz), coke, and iron in an electric furnace. Arsenic may be present in the quartz or in the iron, and in the presence of the coke it is converted into calcium arsenide, which in moist air is partly changed to arseniuretted hydrogen. If the silicon is present in the alloy in the proportion of less than 30 per cent. or more than 70 per cent., this does not occur; the dangerous points are between 40 per cent. and 60 per cent. silicon. Formerly we imported our ferrosilicon from Germany, but of late years we have made it at Niagara Falls. The

only instance of poisoning of this kind which can by any stretch be called American is that recounted by Kober as occurring on the *Vaderland* bound from Antwerp to New York with a cargo of ferrosilicon. Fifty steerage passengers came down with a mysterious sickness from which eleven died. The vessel was detained at quarantine under the suspicion of plague, but the discovery of the nature of the cargo explained the real cause of the sickness.

ANTIMONY.

The fact that the symptoms of antimonial poisoning are so like those of lead poisoning, makes it very hard to discover how great a part antimony plays in any case of occupational disease which occurs in a man exposed to both metals, as printers are. I could not find any evidence of antimonial poisoning in an examination of printers in 150 different shops, unless it was responsible for two bad cases of eczema of the hands and forearms of men working at the stereotype kettles.

The same difficulty is encountered in the second industry in which large quantities of antimony are used—the manufacture of rubber. Golden and crimson sulphides of antimony (really mixtures of the pentasulphide, the trisulphide, and the oxysulphide in different proportions) are used in great quantities and, so carelessly that one often sees men covered from head to foot with the reddish-brown powder. But these men, the compounders and those on the mixing mills, are also handling litharge and lead sulphate, and whatever symptoms they suffer from are much more likely to be caused by lead. In fact, toxicologists in general seem to think the sulphides of antimony quite harmless, only Kober believing that large quantities of the dust might cause poisoning in a workman. In order to throw some light on this question, the Bureau of Labour Statistics asked Professor A. J. Carlson, of the Physiological Department of the University of Chicago, to test the solubility of golden and crimson sulphides of antimony in human gastric juice. Dr. Carlson used commercial mixtures obtained from the B. F. Goodrich Co., of Akron. He found that about 8 per cent. of the antimony in the crimson and about 3 per cent. of the antimony in the golden sulphide were soluble in gastric juice, making it clear that these compounds are soluble in the human stomach. Dr. Carlson believes it to be probable that this solubility is sufficient to be a source of danger to men who are obliged to use these compounds in such a way as to expose them to a great deal of dust, or who handle food or tobacco when their hands are smeared with these sulphides of antimony.

Finally, antimony trisulphide is used in making fulminate caps, and, according to an expert of the Ordnance Department, some cases of possible antimonial poisoning were reported from that industry during the war, though it is impossible here also to separate the effects of the antimony from those of the fulminate. The symptoms enumerated by the ordnance expert—i.e., a local irritation of the skin and of the respiratory mucosa—might certainly be due to fulminate.

MERCURY.

Two quite extensive investigations into industrial mercurial poisoning have been published in the United States. The first investigation was published in 1912, and led to the discovery of ninety-four cases. Over 18

* Special Investigator of the U.S. Bureau of Labour Statistics, in a recent lecture at the Harvard Medical School.

per cent. of these came from thermometer makers. These people have to seal the glass tubes of the thermometers with heat. The glass often bursts and the mercury volatilises. In the Bausch and Lomb factory they have this well arranged. The workman slips his arms through openings in the furnace in which the tubes are sealed, and there is an exhaust to keep the air in the furnace from escaping.

Four of the patients from the Civic Federation list were making incandescent lamps. The risk comes here from the use of the Sprengel vacuum pumps, which may break and scatter mercury. These pumps are now being gradually replaced by rotary pumps, which are much less likely to break, but which have to be cleaned, and therefore there is still risk of poisoning. The pumps used for making Röntgen-ray tubes have even more mercury.

Mercurial poisoning in the making of fulminate is rare. I have heard of but one case that developed during the war, though, of course, there may have been more.

Another industry that involves the use of mercury amalgam is the MacArthur-Forrest cyanide process for the recovery of the precious metals. Mercury, according to Teleky, is sometimes used in the preliminary stage for this process, to form an amalgam with the gold and silver. Teleky has heard of no mercurial poisoning in this field, but of course we know that pretty widespread poisoning can go on in some of our more remote industrial centres where all the medical work is in the hands of company physicians, without the world at large knowing of it. This problem would make an interesting subject of research.

But the most notorious mercury trade is the making of felt hats and the preparation of fur for felt hats. In 1914 Dr. Louis Harris, of the New York City Department of Health, made a thorough study of conditions in the furriers' and hat-making trades in that city, and examined for mercurial poisoning large numbers of the employees. The men in the hatters' fur trade treat rabbits' fur with mercuric nitrate, a process known as carroting. Each person who subsequently handles the hairs is exposed to mercurial poisoning. Among 266 men in the New York shops, Harris found that 212 were exposed to mercurial poisoning in carroting the fur, in drying it in ovens, in cutting hair from the skins, and in sorting out the long hairs and packing the fine ones. Basing his diagnosis on evidence of gingivitis and violent muscular tremors, Harris decided that there were at least forty clear cases of mercurialism among these 212 men, and probably twenty more. No fewer than ninety-one had muscular tremors, and they were violent in seventeen.

It is interesting to note that the amounts of mercury used in felt-hat making are small, and that in the finished hat there is only 0.138 per cent. of mercury. Analysis of all the materials used, following them through the different stages, yielded as the highest content 0.17 per cent. The heat volatilising the small quantities of the mercury used in ill-ventilated rooms, is evidently largely responsible for the poisoning, and it is also evident that very small doses are enough to bring about serious results.

CARBON DISULPHIDE.

This is one of the trade poisons to the study of which Americans have made noteworthy contributions, though not in as great number as have the Germans, French, and

British. This is not because of neglect in the United States, but because we do not use carbon disulphide in industry as much as do foreign countries. Carbon disulphide is the substance which has made the rubber industry in Germany and France so notoriously dangerous, and though the British rubber industry seems to be carried on more like ours, still there are some quite shocking pictures of this kind of poisoning in British literature also.

In 1904, Jump and Cruice, of the University of Pennsylvania, published an interesting article on carbon-disulphide poisoning in artificial-silk workers. The history of one of these cases is so typical that it is worth quoting. The silk is made by treating cellulose first with caustic soda, then, in a closed tumbling vat, with carbon disulphide. At the completion of the reaction the carbon disulphide is largely, but not entirely, driven out with a blast of air. When the contents of the vat are dumped to be again treated with caustic soda, quite a little fume of carbon disulphide escapes. In cleaning these vats, too, the men are exposed to fumes. One of Jump and Cruice's patients said that when he went to work in the morning he felt exhilarated and jolly, though when the fumes were thick, as in cleaning a vat, he might be almost overcome and obliged to go out of doors. When he reached home in the evening he was morose and irritable, could eat nothing with pleasure because everything tasted of carbon disulphide. Presently he began to have severe headache, vertigo, weakness, first in the arms and then in the legs, until at last he could hardly climb stairs. He had muscular tremors, slight ataxia in the legs, a weakened grip, could not get up from his knees without help. His memory and his vision were impaired.

Hayhurst, in 1914, found only about 1 per cent. of the 30,000 rubber workers in Ohio exposed to carbon disulphide. This figure includes persons making rubber cement for the repair kits, to which carbon disulphide is commonly added.

PHOSPHORUS.

Phosphorus poisoning is much the most conspicuous and dreaded of the industrial poisons, and has caused more agitation, first for control and later for abolition, than all the others put together. Yet phosphorus does not affect more than a small proportion of persons exposed to it, and its mortality is only 15 to 20 per cent. It is, however, exceedingly painful, and so disfiguring that everyone can see the effects. Moreover, the offensive character of the discharge makes life with the victim almost impossible. I remember Miss Jane Addams telling me that in 1888 she went to a great mass meeting in London to protest against conditions in the match industry, and that there were a number of girls with horribly deformed faces on the stage to show the audience just what the effect of phosphorus was. I often think that if lead poisoning did all of its work on the face we should have been rid of it long ago.

I think you probably all know how we got rid of white phosphorus—by the passage in 1912 of the Esch law, which placed a prohibitive tax on white phosphorus matches. In 1913 their importation became illegal, and in 1914 their export. At the same time the Diamond Match Co., which held the patents for the manufacture of sesquisulphide matches, threw open to the whole

country the use of the process, thus making it possible for all to use the safe methods.

So far as I know, white phosphorus is used now very little in American industry. We do make phosphor bronzes, and an analysis of these bronzes shows that they contain from 0.068 per cent. to 0.813 per cent. of phosphorus. No case of poisoning has been reported from this industry in America, but it is well to bear it in mind. Kaup found a case in Austria, and, though the proportion of phosphorus in the bronze the man was working with was only 0.76 per cent., yet enough phosphuretted hydrogen was given off to poison him.

Ferrosilicon may give off phosphuretted hydrogen as well as arseniuretted, as reported by Glaister at the International Congress for Industrial Hygiene in 1910. We used white phosphorus last summer in the making of an incendiary projectile. I heard of no trouble from its use in this way, and probably it was not continued long enough for any cases of poisoning to develop. Occasionally one is told of phosphorus in connection with the manufacture of fireworks, a purpose for which it seems to be used in Italy.

TRADE WITH CONTINENTAL COUNTRIES.

A PARLIAMENTARY Paper published this week sets forth the conditions under which trading is permissible with certain countries, and notes are given on trading conditions as affected by the raising of the blockade. The Paper states that it may be expected there will be a considerable demand in the late enemy countries for all kinds of goods, and as this market is now open to all the world, it is no part of the policy of the Government to discourage British traders from competing therein; it is, indeed, desirable that British traders should make every effort to secure a proper footing in Central Europe.

Any goods may be sent to Germany without licence except goods on lists A and B of prohibited exports. It is understood that at present the import of all goods into unoccupied Germany is subject to import licence, for which the German consignee has to make application to the competent authority in Berlin. Any goods may be imported from Germany and paid for without licence except goods whose importation from all foreign countries is prohibited. Other transactions of a commercial or financial nature with firms in Germany are permissible without further licence, provided they do not involve any of the following matters:—

1. The payment of money arising out of pre-war transactions.
2. The delivery of or dealing with property held in this country for persons in Germany since before the outbreak of war.
3. The transfer of securities by or on behalf of a person in Germany.
4. The allotment or transfer of securities issued by a company to or for the benefit of a German subject.
5. The transfer of any debt or other obligation due to a person in Germany.

With regard to the territories previously included in the Austro-Hungarian dominions the British regulations are the same as those set out in the case of Germany, except that List D applies in the case of exports to Austria and Jugo-Slavia.

Except that List D of prohibited exports applies to Turkey and Lists D and E to Bulgaria, the British regulations are the same for those countries as for Germany.

It is mentioned that it is no longer necessary to obtain certificates from importing associations in Norway, Sweden, Denmark, Holland, and Switzerland. Export licences are required only for goods on Lists A and B of prohibited exports. So far as British regulations are concerned there are no special restrictions on trade with Finland, Esthonia, Lettland, and Lithuania, but, as in the case of other foreign countries, export licences are required for goods on Lists A and B, and general prohibitions of imports apply to these as to other countries.

Consular certificates of origin and interest are no longer required for goods imported into this country, while declarations of ultimate destination and disclosure of names of consignees will no longer be required to be made in respect of exports from the United Kingdom, except in a limited number of cases.

LEVER BROS. AND PRICE'S PATENT CANDLE COMPANY.

IN a circular to the shareholders regarding the offer of Lord Leverhulme to acquire the shares of Price's Patent Candle Co., Ltd., with its associated concerns, the directors of the Candle Company state that Lord Leverhulme approached them at the beginning of August. Setting forth the terms of the provisional contract, they state that a full half-year's dividend on the Lever Brothers' shares will be paid on January 1 next, and the interim dividend on the Candle Company's shares already declared would be paid. After selling their shares in accordance with the offer, the income to be received is put at say:—5 per cent. interest on £40, the cash consideration, £2; 15 per cent. on 32 "A" Cumulative Preference Ordinary shares in Lever Brothers, Ltd., of £1 each, £4 16s.; giving a total annual income per original Candle share sold of £6 16s., as compared with the dividend and bonus of £2 17s. 6d. per share paid by the Candle Company in each of the past two years.

The directors recommend the shareholders to take advantage of this offer, which must be accepted not later than October 9, and state that should a quotation on the London Stock Exchange for the new Lever shares not be granted within six months from the date of the sale Lord Leverhulme will, on demand, re-purchase these Lever shares at the price of £2 per share, payable in eight equal instalments at intervals of three months. The purchase will be completed on or before November 8 next.

Price's Patent Candle Co., Ltd., will preserve its identity, and its old traditions will be maintained. It is proposed to retain the present directorate and management, but Lord Leverhulme has undertaken to compensate in respect of loss of office any director who may desire to retire.

The circular adds: The negotiations which have led to this offer are outside the ordinary duties of directors, and in the belief that the shareholders would desire to recognise these services rendered to them by the directors and the general manager, whose exceptional services in this transaction entitle him also to special consideration,

it is proposed that the shareholders should surrender for their benefit one of the thirty-two 15 per cent. "A" Cumulative Preferred Ordinary share per Candle share sold.

GLYCERINE MANUFACTURE BY THE FERMENTATION OF SUGAR.

IT has long been known that the ordinary alcoholic fermentation of sugar yields about 3 per cent. of glycerine, and the study of the fermentation has shown that the conditions favouring a rapid fermentation, by the selection of a suitable yeast and by feeding the yeast with nitrogenous compounds, also favour the production of glycerine. Under ordinary conditions there is little object in increasing the glycerine percentage; when the explosive industry found a valuable material in glycerine, the fermentation process received further attention, and some glycerine was, in fact, isolated from the distillery residue before the war. But the fermentation process for the manufacture of glycerine was not worked out until the blockade deprived Germany of the imports of fats. It was rumoured during the war that the protol of the Protol Company was a fermentation glycerine due to the researches of Lüdecke and Connstein. Particulars were not published, but they have recently been given by Connstein in the *Wochenschrift für Brauerei*.

It would appear that as many as 63 factories were at one time engaged in this glycerine manufacture, but that only a few persevered with it. Yet an output of 1,000 tons per month is spoken of. The first important fact established by Lüdecke was that to produce glycerine the fermentation should proceed in the presence of an alkali, and that sodium sulphite, a relatively inexpensive alkaline substance, answers very well. This sulphite has the advantage of not injuring the yeast, which is very sensitive to some chemicals. A solution of 1 kg. of sugar in 10 litres of water, to which 400 grammes of the sulphite are added, together with the usual food for the yeast, alkali phosphates and sulphates, was completely fermented by 100 grammes of yeast in a few days. Quantitatively the products were 20 per cent. and more of purified glycerine, 27 per cent. of alcohol, and 3 per cent. of aldehyde. There is, of course, always considerable evolution of carbon dioxide. In general the glycerine percentage rises with the amount of sulphite present, whilst the alcohol percentage decreases at a roughly corresponding rate. To separate these products the yeast is filtered off; the alcohol and aldehyde are recovered by distillation; most of the salts are precipitated by adding calcium chloride and sodium carbonate to the liquid, and are therefore partly recovered as well, and the glycerine is finally obtained by distillation. This latter distillation is not free of difficulties, as is the case also when glycerine is manufactured in the ordinary way by the decomposition of fats; the new process had other serious difficulties to overcome. On the other hand, it is said that any sugar, and also molasses, and any kind of yeast will do, and that the fermentation temperature has practically no influence; the yeast, though modified, can be again used.

These statements do not quite agree with the results of experiments which were started in the United States by J. R. Eoff, W. V. Linder, and G. F. Beyer, of the Internal Revenue Bureau, when information about the German process had leaked out. The American experimenters recommend pure cultures of *saccharomyces*

ellipsoidus (var. Steinberg), and 5 per cent. of sodium carbonate gradually to be added to the sugar solution fermented at a temperature of 30° or 32° C., and they are, on the whole, more restricted as to the conditions of the fermentation. They worked with Porto Rico molasses, known as "black strap," but their glycerine was not pure, and the financial chances of the process did not look favourable. The cost was not mentioned in the German publication; probably protol is merely a war industry. At the same time, in Australia and Fiji molasses are at present discharged into the sea, and a recovery of both the alcohol and glycerine would alter the aspect of the problem.—*Engineering*.

"BURGUNDY MIXTURE."

THE chemistry of "Burgundy mixture" is particularly important, because to give it the greatest efficiency it should possess a maximum fungicidal power and a minimum potentiality for injuring foliage. The reaction of sodium carbonate and copper sulphate solutions has been studied by Pickering and by Ravaz, but, according to a paper contributed to the *August Journal* of the Chemical Society by Messrs. Robert L. Mond and C. Heberlein, the problem is more complex than they considered. The latter authors have studied the reactions of copper sulphate with varying proportions of sodium carbonate and of sodium hydrogen carbonate; have determined the amount of absorbed sodium carbonate and the ratio of copper oxide to carbon dioxide in the various precipitates, and the amount of basic copper sulphate in the mixtures; and have studied the solvent action of carbon dioxide and the change of the colloidal precipitate to a crystalline form.

As the result of their experiments Messrs. Mond and Heberlein conclude that three distinct copper compounds are formed when sodium carbonate and copper sulphate solutions are mixed: (1) Insoluble hydrated basic copper carbonate (the bulk of the precipitate); (2) insoluble hydrated basic copper sulphate; and (3) soluble basic copper sulphate in the form of a hydrosol; the proportions of which vary with the conditions of precipitation. One molecule of copper sulphate is completely transformed by 0.93 molecule of sodium carbonate instead of one molecule theoretically necessary. In a 1 per cent. mixture of copper sulphate and sodium carbonate (in the proportion 1:0.93 mol.) made at 15°, 9.6 per cent. of the copper is present as soluble basic sulphate, the basic carbonate contains copper oxide and carbon dioxide in the ratio 2.2:1, the insoluble basic sulphate contains copper oxide and sulphur trioxide in the ratio 15:1, the precipitate contains absorbed sodium carbonate in the proportion of 1 part to 74 of copper oxide, and 52.4 per cent. of the carbon dioxide is evolved. At higher temperatures more carbon dioxide is evolved, all being expelled on boiling.

The amount of basic sulphate formed decreases as the proportion of sodium carbonate increases, the proportion in solution (but not that of the basic carbonate) increasing with the amount of free carbon dioxide. At first the precipitate is wholly colloidal, but eventually it becomes crystalline, the colloidal condition apparently being conditional on the absorbed sodium carbonate. The transformation is accelerated by free copper sulphate, carbon dioxide, or sodium hydrogen carbonate, but retarded by sodium carbonate or 0.02 per cent. of glue.

ITEMS OF INTEREST.

PERSONAL.—Mr. J. S. W. Boyle has been appointed lecturer and assistant in chemistry in University College, Dundee, in succession to Dr. J. K. Wood.

HYDROGEN PEROXIDE MANUFACTURE IN NATAL.—Messrs. Kynoch, Ltd., of Umbogintwini, Natal, have recently erected an experimental plant for the production of hydrogen peroxide. The barium peroxide method was employed, the basic raw materials being South African barytes and locally produced sulphuric acid.

UNITED STATES PRODUCTION OF RADIUM.—The total production of radium in the United States up to the close of 1918 has been estimated at approximately 55 grammes, which is understood to be more than half of all the radium the world has produced. From recent survey work it is concluded that the carnotite of Colorado and Utah may yield at least 500 grammes.

ZINC AND ZINC DUST PRICES.—Zinc dust continues scarce, and the demand is brisk owing to the late arrival of Australian supplies. The price remains at £68. to £70. per ton, c.i.f. United Kingdom, for Australian high-grade (88-92%) metallic zinc. Australian electrolytic zinc (99.95% purity) is unchanged at £42. per ton, f.o.b. Australia, for direct shipment to New Zealand, India, South Africa, and the Far East.

NORWEGIAN COPPER MINES CLOSED.—The Sulitelma Copper Mines in Norway are confronted with the necessity of suspending operations, at least for the present time, owing to the falling prices of copper and the high cost of production. The company has on hand this year's entire output and part of last years, making a total of 600,000 tons; the number of workmen at the mines, which are exploited by a Swedish concern, is about 750.

COLUMN APPARATUS FOR TECHNICAL WORKING WITH GASES.—W. Bormann describes in the *Zeit. für Ange. Chemie*, of May 20 last, various forms of the Kubierschky column apparatus for washing, boiling, purifying, absorbing, and distilling gases, and for the recovery of the solvents used. These apparatus were first described in 1915, and seem to have undergone considerable development since then, and to have found wide and varied applications. They act in general on the counter-current principle, but are made in various modifications to adapt them to their special purposes.

LEVER BROTHERS' NEW ACQUISITION.—It is stated that Messrs. Lever Bros., Ltd., Port Sunlight, have just acquired the entire whaling business and outfit of the Southern Whale Fishing Company, Ltd., of which Messrs. R. Irvin and Sons, of North Shields and Aberdeen, are the managing directors and principal owners. This is the only English firm engaged in the industry in the Southern seas. By this latest purchase, which is said to have cost £750,000., Lever Brothers acquire a first-hand source of supply for material necessary in soap manufacture, and also in the production of margarine, which they carry on at their new Gretna works.

NEW ISSUE.—An issue of 300,000 7 per cent. cumulative participating preference shares of £1. each (free of income tax up to 6s. in the £) has been made by the South African Carbide and By-Products Company, a company formed with a capital of £307,500., divided into 300,000 7 per cent. participating preference shares of £1. each and 150,000 ordinary shares of 1s. each, by the Chemico Electric Company, for the purpose of manufacturing calcium carbide and of extracting motor spirit, tar oil, and other by-products from coal and shale at Ballengeich Collieries, Natal, South Africa. The company will also manufacture ammonium sulphate.

SILICA REFRACTORIES.—In Technical Paper No. 116 of the United States Bureau of Standards, Donald W. Ross arrives at the conclusion that, to prevent spalling, bricks should be kept between 1,250° and 1,350° C. for a long time, and gradually be raised to higher temperatures subsequently. Continuing the work of C. N. Fenner and of Spotts McDowell, at the Geophysical Laboratory and the Bureau, Ross investigated the changes in volume, porosity, specific gravity, and crystal form of the raw materials and of the leading commercial brands of silica bricks. Impervious, highly metamorphosed quartzites of tightly interlocking grains seem to give better bricks than porous quartzites with rounded grains. The true specific gravity of a silica brick, he considers, is a direct measure of the degree to which the brick has been burned, and from gravity and porosity the subsequent expansion of the brick can roughly be predicted. Other investigators are, rather doubtful about this estimate.

MAGNESIUM SULPHATE DEVELOPMENT IN CANADA.—The natural deposits of magnesium sulphate in British Columbia have received vigorous exploitation during the summer. Both the Stewart-Calvert Company, at Clinton, B.C., and the Basque Chemical Production Company, at Basque, B.C., are shipping. Eastern Canadian agents of these companies, says the *Canadian Chemical Journal*, are showing some very pure natural samples, and quite recently the Basque Company commenced shipping car-load lots of natural salts, guaranteed U.S.P. and B.P. grade. If freight rates allow, and the natural product is found satisfactory to the trade, a very valuable British Columbia industry has been established.

GERMAN CHEMICALS.—The prices of chemicals in Germany, and more especially of those used in connection with the manufacture of leather, have risen enormously; this is partly the fault of the "Zentralen" or Central Offices, which (in order to cover their working expenses) have repeatedly increased their purchase prices by 50 per cent. to 60 per cent., and of late even by 100 per cent. Even this latter figure has lately been exceeded! In the case of certain chemicals it is, as a matter of fact, now absolutely impossible to fix any prices at all, as these vary within very wide limits according to buyers and sellers in different localities. In other States matters are similar, although perhaps prices are not being so shamelessly forced up by middlemen. In Germany 1 kilogram of soda is about 5 marks, as against from 8 to 10 pfennige in pre-war days. There seems little prospect so far of any improvement.—*Leather World*.

USE OF MERCURY IODIDES.—According to a contemporary, a research into the behaviour of certain double iodides of mercury and other metals has been carried out by Mr. H. T. Pinnock, in order to determine which of these compounds is most suitable for use as a visible indicator of overheating in bearings and machinery. The double iodide of silver and mercury, AgI HgI₂, is a pale lemon yellow powder at ordinary temperatures, but changes to a vivid carmine at 90° to 100° C., the change in both directions being fairly sharp. With copper mercuric iodide, Cu₂I₂HgI₂, the change from vivid scarlet vermillion to a chocolate brown takes place at 60° to 70° C. It was found that a mixture of the two, consisting of 85 per cent. of the copper salt and 15 per cent. of the silver salt, was more sensitive and gave an exceedingly sharp transition from vermillion to almost black at 60° to 70° C. For application to bearings, etc., these compounds are mixed with white shellac spirit varnish, or, for higher temperatures, a medium such as is used in aluminium paints for steam pipes, in the proportion of 100 grammes compound to 70cc. of medium. This paint is best applied as a bull's eye or band on a zinc-white background. After the paint is dry, it should be protected with a coat of colourless oil-proof varnish.

STIMULATING AMERICAN PRODUCTION OF TUNGSTEN ORES AND COMPOUNDS.—The following is the substance of a Bill (H.R.4437) which has passed the United States House of Representatives, and is now understood to be before the Senate "to provide revenue for the Government to promote the production of tungsten ores and manufactures thereof in the United States." The Bill provides that on and after the day following its passage as an Act the following rates of duty shall be levied, collected, and paid upon the articles named therein, when imported from any foreign country into the United States, or into any of its possessions: (1) Crude tungsten, ores, and concentrates, \$10. per unit of tungstic trioxide therein contained, a unit being defined as 1 per cent. of a short ton of 2,000 pounds—namely, 20 pounds of tungstic trioxide; (2) metallic tungsten, tungsten powder, ferro-tungsten (lump and pulverised), ferro-tungsten powder, commercial tungstic acid, calcium tungstate, sodium tungstate, and all other salts of tungsten and other manufactured materials containing tungsten, including high-speed tungsten steel, all alloy steels containing tungsten, and all other compounds containing tungsten not specifically provided for, \$1. per pound of tungsten contained therein. The Bill also provides that there shall be levied, assessed, and collected upon all tungsten ore and concentrates which have been imported, prior to the passage of the measure, from any foreign country and held or kept within the United States, when such ore has been purchased by the owner thereof at a price less than \$17. per unit of tungsten trioxide therein contained, a tax equal to the difference between the purchase price so paid by the owner and the price named above. The provisions of the measure are not to be deemed to repeal any tariff now existing upon any substances or materials mentioned therein.

SOUTH WALES NOTES.

(SPECIALLY CONTRIBUTED.)

The stoppage of the railways has caused much inconvenience in the tinplate trade, but attention is being paid to the export side of the business, and delivery of boxes to the ships is being accomplished by motor vehicles. If the dispute is not settled in a few days the tinplate mills will have to cease operating owing to the shortage of fuel. The decision of the Joint Committee of the Industrial Council to grant 12½ per cent. to all sections of workmen apparently disposes of the prospect of any strike in this trade.

As regards the patent fuel trade, the position is not so serious, as at many of the factories there are stocks of small coal on hand sufficient to keep them going over several days. The works of the Pacific Patent Fuel Company, Ltd., Swansea, are now resuming operations after a stoppage of eighteen months owing to the factory being seriously damaged by fire. The export trade is still on the increase, some large cargoes leaving for Rouen, Bordeaux, and Antwerp.

The copper workers have had very little employment owing to the scarcity of ores. There has been a great reduction in the number of hands at all the factories.

Coke ovens were fully occupied, the call for coke and by-products being well maintained. The railway dispute will not seriously interfere with operations at the ovens, as there are good quantities of raw material readily accessible.

The spelter manufacturers are very busy, but in this business, as with the majority of other industries, the supplies of fuel are obtained by rail, and it is feared that should the railway dispute be prolonged the furnaces will have to be entirely closed down. A cargo of 3,350 tons of zinc ore has arrived from Carthage.

Lead ores are not arriving satisfactorily. One source of supply—viz., the Laxey mines in the Isle of Man—has been nearly cut off owing to the wages dispute at Laxey, and, judging from latest advices, it is questionable whether the mines will restart.

LEGAL INTELLIGENCE.

Carriage on Chemicals: Curious Dispute.

In the Bow County Court, on Friday, September 26, before Judge Graham, K.C., the Maryport and Carlisle Railway Company and the Midland Railway Company sued Messrs. Burrell and Company, chemical and paint manufacturers, of West Ferry Road, Milwall, to recover £27. 1s. 8d., being the carriage on two 400-bag consignments of barytes from Wighton, in Cumberland.

Mr. Cripps appeared for the plaintiffs, and explained that the consignment note said that the consignees were to pay the carriage. They were sent off by Mr. J. Kerwin Cockton, of the Potsgill Mines, on November 11 and 13, and delivery was taken on November 13, 14, and 15. Being a highly respectable firm, they were not asked to pay the carriage on delivery, and then when the account was sent in they stated they were not liable as they had purchased them from a firm named Rylands, free delivery into their works. So far as the plaintiffs were concerned, they had nothing to do with that, as their contract was that they carried them "consignees to pay."

Judge Graham: But that does not bind the consignee.

Mr. Cripps: Certainly.

Judge Graham: But why? Has the consignor the right to bind the consignees in this case?

Mr. Cripps: We cannot say. We have to place faith in the consignor. We accept them on the condition that the consignee pays the carriage.

Judge Graham: I cannot help what is in your mind; I have only to do with the right or no of the consignor to bind the consignee.

Wm. Fredk. Dawes, clerk to the Midland Railway Company at the Victoria Docks, proved the delivery of the goods.

The defendants at this stage said that they were prepared to pay the carriage all along if the company could prove that they had been properly advised that they were liable. Had they known, they might have even gone to the length of refusing to take delivery. They referred the company to Rylands on being asked for the carriage, but they refused to have anything to do with anyone but the consignees.

Mr. Dawes then proved from the postage-book that letters had been posted to the defendants on the dates when the goods were received, and pointed out that it was significant

that they took delivery at once, but could not have known they were there except for the advice.

The defendants denied receiving them, and said that at the time of the Armistice it had become the practice of the railway company to telephone through when goods arrived, and that was what happened on this occasion. Had they been asked for carriage on the 'phone, a cheque would have been sent, but nothing was asked for.

Judge Graham asked the defendants why they did not pay now that they had seen the documents, and defendants protested that they had only just seen the copies, and had never had the originals. They were willing to pay; but as they had been willing to do this all along on the production of the proof, they did not think they should have to pay the costs.

Judge Graham agreed to this, and gave a verdict for the plaintiffs, without costs.

REPORTS OF COMPANIES.

Lawes' Chemical Manure Company, Ltd.

The adjourned 45th and 46th ordinary general meetings and the 47th ordinary general meeting were held in London on Thursday, September 25, Mr. Edward G. Cubitt, J.P., presiding. The Chairman said that the available balance, after providing for depreciation and contingent fund, amounted to £30,929, out of which the directors recommended the payment of a dividend of 7 per cent. on the preference shares and the payment of a dividend of 10s. per share and a bonus of 2s. 6d. per share on the ordinary shares. Summarising important items for the three years, it would be seen that the debentures, which at the commencement of the period stood at £6,000., had been paid off, and, including the amounts allocated out of the previous year's figures, a total of £25,300 had been written off for depreciation. The company's investment in British Government stock and cash at bankers and in hand amounted to £39,902. With regard to the general position, they had had to meet requests for very substantial increases of pay to the workmen. Unfortunately, it had been necessary to contend with one or two sectional strikes on the part of small bodies of the men. As to the future, the general position in the country was so uncertain that it was impossible to give any definite forecast. The difficulty of getting adequate supplies of raw material had been very acute for some time past, and so far showed no signs of improvement. This was due to two main causes. The first was the reduced output of raw phosphates in North Africa, from which source the company had for many years drawn a large proportion of their supplies; also, the French Government were retaining a larger proportion for their own consumption. The second cause was the scarcity of tonnage to bring the necessary phosphates from America to fill the shortage. While serious complaints were being made of congestion at the ports by the importation of goods not immediately required, the fertiliser trade had not been able to induce the Shipping Controller to provide tonnage for raw phosphate, which in London, at any rate, would not increase the congestion, as delivery would be taken from the ship in the river direct into the manufacturers' premises. This curtailment was not only going to have a serious effect upon the home supplies of fertilisers for the coming season, but had prevented British manufacturers taking a share in the very large demand for export. The loss of the export trade had a doubly prejudicial effect; it reduced employment and had an adverse influence upon the national balance-sheet, and a golden opportunity was being lost.

Resolutions for the adoption of the accounts for the years ended June, 1917, 1918, and 1919 were unanimously approved.

John Lysaght, Ltd.

An extraordinary general meeting was held in London on Tuesday, at which resolutions were passed increasing the capital to £2,600,000., and agreeing to the distribution of a bonus of £4. per share by the capitalisation of £1,600,000. of undivided profits.

DIVIDENDS.

ANACONDA COPPER MINING COMPANY.—Dividend of \$1. per share. A year ago \$2. per share was paid.

BELLS UNITED ASBESTOS COMPANY, LTD.—Interim dividend of 1s. per share (10 per cent. per annum)

RECKITT AND SONS, LTD.—Interim dividend of 6d. per share on the £1. ordinary shares—the same as a year ago.

CORRESPONDENCE.

.. We do not hold ourselves responsible for the opinions expressed by our correspondents.

The Dyestuffs Licensing and Distribution Scheme.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—I am instructed by my committee to send you the enclosed copy of a petition to the Right Hon. D. Lloyd George, M.P., which is being organised by this Association.

After extensive correspondence (as published in your last issue), and having failed to obtain satisfaction from the Board of Trade, it has now been decided to take this step in the hope of obtaining the introduction of a system more acceptable to the trade generally.

Forms of the petition will be gladly supplied to members of the trade on application to this office.—Yours, etc.,

THE BRITISH CHEMICAL TRADE ASSOCIATION.

O. F. BROMFIELD, Asst. Sec.

80, Fenchurch Street, London, E.C. 3, September 27, 1919.

[Copy.]

To The Right Hon. D. Lloyd George, M.P.

Sir,—We, the undersigned, being manufacturers, merchants, and/or consumers of dyestuffs, beg respectfully to protest against the present constitution of the Licensing Sub-committee, and also against the appointment of Messrs. Fairclough, Dodd and Jones (under the name of the "Central Importing Agency") as the Government's agents in connection with the importation of dyestuffs into the United Kingdom.

Extreme dissatisfaction is felt by merchants, consumers, and manufacturers (outside Messrs. British Dyes, Ltd.) in regard to the Licensing Sub-committee, which, as at present constituted, directly represents two dye manufacturing concerns and two consuming combinations only. The merchant, the independent consumer, and the small manufacturer are not represented at all. It is submitted, therefore, that the Committee is ill-balanced and does not carry the confidence of the trade generally.

It is therefore requested:—

(1) That representation upon the Licensing Sub-committee shall be granted to representatives of the smaller manufacturers, of merchants, and of the independent consumers.

(2) That the so-called "Central Importing Agency" shall be abolished, and that if such an organisation is necessary at all, that the work should be done either by (a) a Government Department who have no trade interests, or (b) an association representing the trade as a whole, and which would afford equal protection, facilities, and information to all its members.

(3) That a deputation may be received to explain in greater detail the trade point of view on the matter referred to.

NEW COMPANIES

Greengate Colour Works, Ltd.—Private company. Capital £2,000., £1. shares. Manufacturers of coal tar or other dyestuffs or colours of all kinds, chemicals, printers' inks, paints and writing inks, etc. Solicitors: Bingham, Hall and Ritchie, 29, Princess Street, Manchester.

Henzell Oil Company, Ltd.—Private company. Capital £50,000., £1. shares. Object: To take over the oil refinery business and works at Forth Banks, Northumberland, carried on by T. Henzell as the "Henzell Oil Company." Office: Forth Banks, Newcastle-on-Tyne.

Shawinigan, Ltd.—Private company. Capital £10,000., £1. shares. Manufacturers of and dealers in mineral, metallic, and electro chemical substances of all kinds, wholesale and retail manufacturing chemists, druggists, drysalts, oil and colourmen, etc. Registered office: 1, Tudor Street, E.C.

Spermolin, Ltd.—Private company. Capital £14,000., £1. shares. Object: To take over the business of oil merchants carried on by J. W. B. Winter and D. B. Winter, as the "Spermolin Core Company," at Black Swan Passage, Halifax, and the business of oil merchants carried on by the said J. W. B. Winter, as "Pollard and Winter," at Black Swan Passage, Halifax. Solicitors: Schofield and Son, Princess Street, Halifax.

Western Counties Basic Slag Company, Ltd.—Private company. Capital £50,000., £1. shares. Object: To take over the business of slag manufacturers carried on by the Western Counties Basic Slag Company at Neath, Glam. Solicitor: J. H. Glover, 60, Castle Street, Liverpool.

GAZETTE NEWS.

LIMITED COMPANIES.—Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions, Orders, and Official and Other Notices.

Ammonia Soda Company, Ltd., Lostock Gralam.—Resolved August 28, confirmed September 15: That the company be wound up. C. M. Skinner, chartered accountant, of Jones Crowdsen and Youatt, 7, Norfolk Street, Manchester, liquidator. Meeting of creditors at liquidator's, September 30. Claims to liquidator by October 31.

British Waterproofing and Chemical Company, Ltd.—Meeting of creditors, 27, Brazenose Street, Manchester, September 29.

Peat, Coke, and Oil Syndicate, Ltd.—Claims to J. H. Glover, 6, Priory Place, Doncaster, liquidator, by October 31.

San Miguel Copper Mines, Ltd.—Meeting of creditors, Room No. 7, Salisbury House, E.C., October 2.

Wheal Bellan Tin Syndicate, Ltd.—Resolved August 27, confirmed September 19: That the company be wound up. F. J. Broomfield, 108, The Exchange, Mount Stuart Square, Cardiff, liquidator. Meeting of creditors at liquidator's, October 7, at 11 a.m.

DISSOLUTIONS OF PARTNERSHIP.

(Note.—When two dates are given in the following announcements, the first is the date of the dissolution. The date in parentheses is that of the official advertisement.)

Sieber and Co. (Thos Schofield and Jno. Hy. Todd), Lee Mill, Shawclough, Rochdale, chemical manufacturers, drysalts, and tallow refiners. August 31. Debts by T. Schofield, who continues at Old Market Chambers, Yorkshire Street, Rochdale. (September 19.)

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 4, Queen Anne's Gate Buildings, London, S.W.1, whence, unless otherwise stated, further information may be obtained.

Australia.

A manufacturers' agent and broker in Brisbane desires to get into touch with United Kingdom manufacturers of oilmen's stores and chemicals, with a view to undertaking their representation in Queensland. (Reference No. 673.)

A Sydney import and export agent desires to get into touch with United Kingdom manufacturers of dyes for leather and woollens and lubricating oils in bulk, with a view to undertaking their representation for the whole of Australia. (Reference No. 676.)

Canada.

The following inquiry has been received at the Canadian Government Trade Commissioner's Office, Portland House, 73, Basinghall Street, E.C.2, whence further information may be obtained.

A manufacturers' agent and importer in Vancouver desires quotations upon the following: 150 tons soda ash for immediate shipment; 500 tons monthly salt cake (sodium sulphate); 200 tons monthly bleaching powder (available chlorine 35-37 per cent.). He also wishes to be placed in touch with United Kingdom manufacturers of industrial chemicals and kindred lines for use in the manufacture of paint, soap, and laundry supplies, and fertiliser materials, with a view to obtaining their representation.

British West Indies.

A firm of importers are desirous of representing in Trinidad British manufacturers of carbonic acid gas, Portland cement, manures, and fertilisers. (Reference No. 689.)

Egypt.

A commercial agency established in Alexandria wishes to come into touch with dealers in colours, varnishes, and chemical products. (Reference No. 691.)

A large firm of importers, with branches in Cairo and Alexandria, are open to act as exclusive sales agents, in Egypt. Articles which the firm would be willing to place on their market are aniline dyes, caustic soda, chemicals, paints, varnishes.

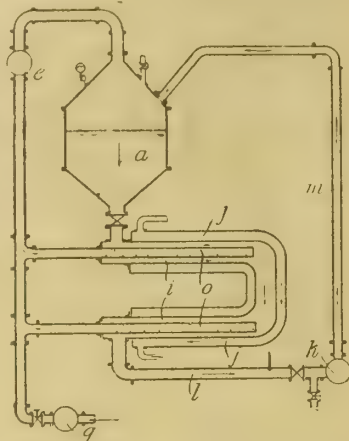
A firm in Cairo desire to receive catalogues, advertising matter, samples, and quotations of prices from United Kingdom manufacturers and exporters of paints, varnishes, and lubricating oils. (Reference No. 694.)

THE PATENT LIST.

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Hydrogenating Oils. G. Martin, Manchester. British Patent, 129,461, of 1918.

In hydrogenating oils, fats, and waxes, the oil, etc., together with a catalyst, is run through heated conduits into which hydrogen is injected through perforated pipes, and the oil and hydrogen are arranged to circulate in opposite directions. Oil, mixed with catalyst, flows from a vessel *a* through conduits *i* heated by steam jackets *j*, and is returned by pipe *l*, pump *k*, and pipe *m* to the vessel *a*. Hydrogen, injected into each conduit by perforated pipes *o*, rises through the conduits and vessel *a*, and is circulated by a pump *e*, fresh supplies being introduced by a pump *g*. The oil may be led to the conduits *i* in parallel.



Acetaldehyde. O. Imray, London. (A communication from the Society of Chemical Industry in Basle, Basle, Switzerland.) British Patent, 130,138, of 1918.

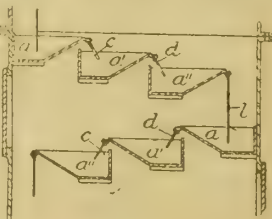
In the manufacture of acetaldehyde by passing acetylene into dilute sulphuric acid containing mercury salts, the catalyst is continuously regenerated in the reaction liquid by electrolytic oxidation; oxygen carriers, such as ferrous, cerium, or chromium salts, may be added to assist the oxidation. The anode may be of platinum arranged at the bottom of the vessel so that the metallic mercury formed comes in contact therewith, or metallic mercury may be poured in at the start to form the catalyst by oxidation; or the anode may be suspended in the liquid and an auxiliary anode arranged in contact with the mercury; or the stirring device may act as anode. The cathode may be of copper contained in a diaphragm cell.

Cellulose Acetates. W. J. Stevenson, London. British Patent, 130,029, of 1917.

Bleached sulphite paper pulp is used to form cellulose acetate by treating with acetic acid, acetic anhydride, and a catalyst such as zinc chloride, nitric acid, or dimethyl sulphate.

Distilling Ammoniacal Liquors, Etc. W. Wyld, Menston, near Leeds. British Patent, 129,765, of 1918.

In apparatus for distilling and similarly treating ammoniacal or other liquors, comprising a number of troughs each having a serrated flange, over which the liquor flows, dipping into the next trough, while steam, etc., pass up between the troughs, the flanges are made adjustable. In the arrangement shown, the troughs *a*, *a'*, *a''* are arranged in sets across a vertical shaft, and are formed with turned-over lips to which the flanges *d* are attached by bolts passing through elongated slots in the flanges. The last trough *a''* of each set is provided with a fixed elongated flange *l* dipping into the first trough *a* of the next set.



Thorium Oxide and Salts. Lindsay Light Company, Chicago, U.S.A. British Patent, 129,624. Convention date, July 8, 1918.

A process for the separation of thorium compounds from material containing the same depends upon the solubility of thorium fluoride in a hot or cold solution of an alkali carbonate, ammonium carbonate, or a mixture of sodium car-

bonate and sodium bicarbonate, a soluble double carbonate being apparently produced. Starting with an acid or neutral solution of thorium, rare-earth metals, iron, zirconium, and titanium—as obtained, for instance, from monazite sand,—hydrofluoric acid or a soluble fluoride is added to precipitate the thorium and rare-earth metals and to dissolve the precipitated zirconium, leaving the titanium and iron in solution. The filter-cake is now heated with the carbonate solution, when the thorium dissolves, leaving the bulk of the rare-earth metals and any phosphates present unattacked. The thorium is precipitated from the filtrate as the hydroxide, and the product purified in any known way.

Electrolysis. Q. Marino and C. Bowen, London. British Patent, 130,302, of 1918.

An electrolyte for depositing lead or antimony or an alloy of lead and antimony on steel or iron is prepared by adding a solution of a lead or antimony salt such as the acetate or chloride, or a mixture of salts, to a solution of ammonium tartrate, then adding caustic soda or potash until the mixture is clear and then salicylic acid corresponding to about 5 per cent. of the weight of the lead or antimony salt. The anode consists of a plate of lead or lead-antimony alloy, or of carbon or platinum if pure antimony is to be deposited.

Chlorine and Aluminium Chloride. R. Welford, London. British Patent, 130,164, of 1918.

In the treatment of clay for the production of alumina according to Specification 118,312, the gases or vapours evolved when the clay is heated with hydrochloric acid and when the solution is evaporated to obtain chlorides or chlorides and oxides, are employed to make chlorine by known methods; for instance, by drying, mixing, with air or oxygen, and treating with a catalyst. Bleaching products such as bleaching-powder may be made from the chlorine.

Separating Potash and Soda Compounds. Distillates, Ltd., and G. G. Jarman, Kirkheaton, near Huddersfield. British Patent, 130,173, of 1918.

Potassium carbonate or potassium hydrate is separated from its mixture with sodium carbonate or sodium hydrate respectively, by treating a solution of the mixture with fatty oil or other saponifiable matter in quantity sufficient only to combine with all the soda. The mass is boiled to effect saponification, and evaporated sufficiently to cause the soda soap to separate on cooling. The soap may be broken up by the addition of an acid, and the fatty matter reused.

Cellulose Esters. P. E. C. Goissedet, Paris. British Patent, 130,277, of 1919.

Alkyl- or aryl-carbamates of cellulose are prepared by reacting upon cellulose or cellulose derivatives containing hydroxyl radicals with an aliphatic or aromatic isocyanic ester such as phenyl isocyanate. The reaction may be carried out in presence of tertiary bases, such as pyridine, or other solvents. The carbamates are precipitated on pouring the mixture into water, and may be washed with petrol ether.

Nitric Acid. A. T. Cocking and Kynoch, Ltd., Witton, Birmingham. British Patent, 130,038, of 1918.

Dilute nitric acid is treated with ammonia, and the solution of ammonium nitrate is evaporated to obtain crystals, which are dried and then heated with excess of strong sulphuric acid under reduced pressure to obtain strong nitric acid and acid ammonium sulphate. The residue is treated with ammonia to obtain neutral ammonium sulphate.

Destructive Distillation. F. M. Perkin, and Nitrogen Products and Carbide Company, London. British Patent, 128,660, of 1917.

The process of destructive distillation described in Specification 114,937 is modified to yield a greater percentage of aromatic by-products, more especially of benzene, by mixing acetylene with the gas which is passed through the retorts to assist in the carbonisation. The acetylene may comprise from 2.5-10 parts to 100 parts of the other component of the mixture which is passed into the retort, and the gas with which it is mixed may be the gas which is formed in the retorts after this has been stripped of its condensable portion, or producer gas, or other suitable gas.

Ammonia. R. C. Parsons, H. C. Jenkins, and C. I. Syndicate, London. British Patent, 130,069, of 1918.

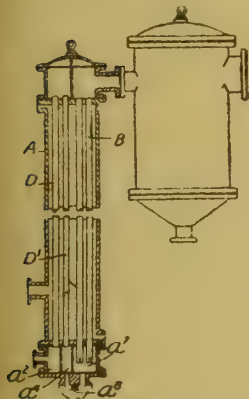
In the catalytic preparation of ammonia from atmospheric nitrogen and hydrogen derived from the electrolysis of a solution of an alkali chloride, the hydrogen is passed first through filters containing coke or unglazed porcelain which is constantly moistened with water which has been boiled to free it from dissolved air and oxygen, and then through filters containing dry coke or porcelain, all the filters being provided with locks against the ingress of air. The nitrogen is obtained from the air by liquefaction and selective distillation. The alkali chloride solution is treated before electrolysis with barium chloride to remove sulphates, and is then boiled to expel air and oxygen. The solution is then electrolysed in cells such as described in Specifications 25,415/13, 22,867/14, and 104,600, the cathodes being made of nickel or iron containing no carbon.

Explosives. T. C. James, Aberystwyth, and J. I. M. Jones, and R. I. Lewis. British Patent, 130,357, of 1918.

Consists in making trinitrodiphenylamines by condensation of trinitrophenylmethylnitramines with primary amines, and in nitrating these condensation products to obtain such materials as hexanitrodiphenylamine and pentanitromethyl-diphenylamine for use as or in explosives.

Evaporators. J. A. Reavell, and Kestner Evaporator and Engineering Company, London. British Patent, 130,181, of 1918.

In an evaporator of the "climbing or falling film" type, extra tubes, D, D¹ are provided inside the evaporator casing A for pre-heating the liquid before it enters the evaporating tubes B. In the arrangement shown, the liquid enters into the lower header and the upper header is divided into two compartments and the lower into three a², a⁴, and a⁷. The heating tubes D enter into the compartments a², a⁴, and the evaporating tubes B enter the compartment a⁷. The heated liquid passes from the compartment a⁴ to the compartment a⁷ through a regulating valve a⁸, so that the requisite control of the flow of liquid from the heating to the evaporating tubes can be effected.



Nickel Salts. H. W. C. Annable, Egham, Surrey, and Nickel Concentration, Ltd., London. British Patent, 129,667, of 1917.

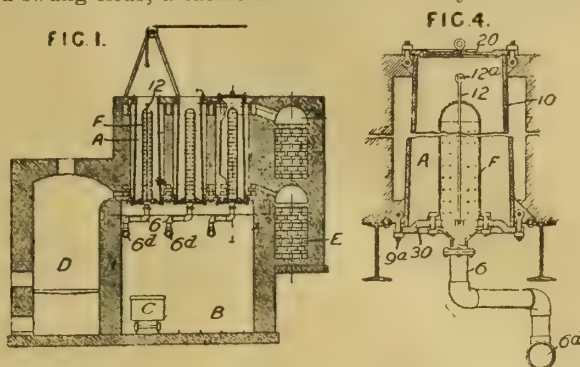
Nickel matte or sulphide or oxide nickel ore is heated with a chloride such as sodium chloride and, if there is a deficiency of sulphur, with a sulphiding-agent such as iron pyrites. The heating is effected in a neutral or non-oxidising atmosphere such as carbon dioxide, nitrogen, or steam, the temperature employed being 800-1000° C. The material is then oxidised in air at a temperature sufficient to decompose copper and iron sulphates but not nickel sulphate, and is finally treated with cold water, which dissolves the nickel sulphate. If copper is present in the residue, it is extracted by leaching with sulphuric acid.

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Shale Distillation. G. W. Wallace, East St. Louis, Illinois, U.S.A. British Patent, 129,996. Convention date, February 8, 1918.

Shale and the like is distilled in a series of externally heated retorts, the oils and gases evolved being withdrawn through central perforated pipes so that they pass through the cooler material immediately on being formed. Retorts A, Fig. 1, are heated by gas from a producer D, and the burnt gases pass through a regenerator E. Beneath the retorts is a chamber B into which trucks C can be run to receive the material discharged. The retort A, Fig. 4, comprises a metal or like shell 10 with cover-plate 20 and base-plate 30. A perforated pipe F is mounted on the base-plate

30 to which is also removably attached a suction pipe 6. In operation, the oils and gases are drawn through the cooler material immediately they are formed and led away by the pipe 6^d. To discharge the retort, the pipe 6 is disconnected and swung clear, a tackle is hooked into an eye 12^a on a rod



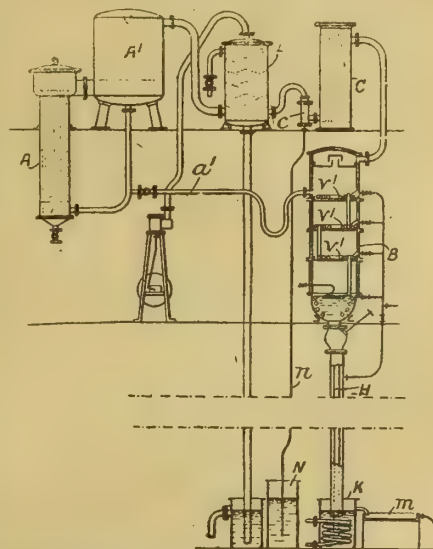
12, nuts 9^a are stacked off and the plate 30 with the pipe F is lowered away. If steam treatment is desirable, the base-plate may carry a header from which perforated pipes project into the retort.

Acetic Acid. H. Dreyfus, Basle, Switzerland. British Patent, 130,035. Convention date, February 22, 1917.

Acetic acid is obtained by oxidation of liquid acetaldehyde at temperatures of 0 to 10° C. by air or oxygen at substantially atmospheric pressure, while bringing the gas and liquid into intimate contact by strong mechanical agitation. The process is effected without catalysts, or in presence of catalysts consisting of ferric oxide, ferric acetate, or mixtures thereof.

Distilling Glycerine. E. Barbet et Fils et Cie, Paris. British Patent, 129,649. Convention date, July 11, 1918.

In separating glycerine from the residual liquor from the distillation of alcohol, the liquors, after filtration and concentration in multiple-effect apparatus, are given a final concentration in an evaporator A connected through a froth-receiving vessel A' with a barometric condenser L. The concentrated liquor flows by pipe a' into a columnar still B in which each plate and the lower section are heated by superheated steam in coils V¹, and the outside walls are either constructed of non-conducting material or are formed with jackets for passage of superheated steam. The vapours pass to a condenser C, from which condensed glycerine flows through a separator c and barometric pipe n to a vessel N, and steam, etc., pass into the barometric condenser L. The residue from the still B passes down a steam-jacketed pipe H, into a heated trough K, and is discharged into cooled gutters m, in which it solidifies.



Alkali Sulphides. E. Bergve, Notodden, Norway. British Patent, 129,620. Convention date, July 8, 1918.

Alkali sulphides and "sulpho-silicates" are obtained by furnacing alkali-bearing minerals with pyrites and silicon, the latter being supplied preferably in the form of ferro-silicon. The ferro-silicon is stated to reduce and absorb any iron contained in the minerals, and to sink with it to

the bottom of the furnace. The upper portion of the smelt contains the alkali salts, together with aluminiferous material practically free from iron. Provision may be made for drawing off the material at different heights of the furnace.

Paints and Varnishes. Koppers Company, Pittsburg, U.S.A. British Patent, 129,264. Convention date, June 29, 1918.

A solvent or vehicle for paints or varnishes is prepared by subjecting crude solvent naphtha, such as results from the recovery of benzole from gas or tar, or which is obtained from the scrubbing of water gas and oil gas or other oil-bearing gases, or other liquids containing coumarone, indene, etc., or other bodies capable of polymerisation, to a polymerisation process, such as by heating under pressure in an autoclave. The undistilled product obtained directly from the autoclave

may be used in the manufacture of varnishes, paints, lacquers, etc., replacing, partially or wholly, the rosin, fossil resins, or vegetable oils ordinarily used, or the product may be distilled as described in Specification 123,806. As a specific example of the preparation of a coating material, 800lb. of bituminous pitch or coal tar pitch is heated to about 200° C., allowed to cool to about 150° C., and treated with 70gals. of the above-mentioned solvent. Thinners, driers, fillers, etc., such as turpentine, linseed oil, China wood oil, Venetian red, red lead, zinc oleate, manganese resinate, barium sulphate, etc., may be admixed with the solvent. In the case of low boiling-point naphthas it is advisable to cut out the fraction boiling below 135° C., and in the case of high boiling-point naphthas containing naphthalene, heavy paraffins, etc., the fraction boiling above 200° C. should be removed.

MARKET REPORTS.

TAR AND AMMONIA PRODUCTS.

WEDNESDAY.

Benzole: London 90%, 2s.; North, 1s. 9d. to 1s. 10d.; 50%, 1s. 10d. to 1s. 11d.; North, 1s. 9d. to 1s. 10d. naked. Carboic acid, crude, 60%, East and West Coast, nominally 1s. 7d. to 1s. 8d.; crystals, 39-40%, 9d. to 9½d., f.o.b. Crude tar, London, 45s. to 50s.; Midlands, 44s. to 46s.; North, 45s. per ton, ex works. Pitch, 77s. 6d. to 80s.; East Coast, 67s. 6d. to 75s., f.o.b.; West Coast, 62s. 6d. to 65s., f.a.s. Solvent naphtha, naked, London, 90-190%, 2s. 5d.; North, 2s. 3d. to 2s. 4d.; 90-160%, naked, London, 2s. 5d.; North, 2s. 2d. to 2s. 3d. Crude naphtha naked, 30%, 9d.; North, 8d. to 8½d. Refined naphthaline, £16. to £18.; salts, £6. to £7. Toluol, naked, London, 2s. 6d.; North, 2s. 5d. Creosote, naked, London, 6½d.; North, 5½d. to 5¾d.; heavy oil, 6½d. Anthracene, 40-45%, 7d. per unit. Cresylic acid, 95%, 2s. 5d. to 2s. 6d.; 97-99%, 2s. 7d. to 2s. 8d., ex works, London, and f.o.b., other ports. Sulphate of ammonia; home trade, September, £19. 10s. per ton.; October, £20. 10s., basis 24½%. Nitrate of soda, £22. to £22. 10s.

LONDON METAL MARKET.

THURSDAY.

Copper: Standard brands, £103. to £103. 5s. cash; £101. 5s. to £101. 15s. three months; electrolytic, £110. to £120. Tin: Standard, £271. 10s. to £272. cash; £270. 10s. to £271. three months; Straits, £273.; English, £271. Lead: Soft foreign, £25. 12s. 6d.; English, £26. 15s. Spelter, £41. 10s.; hard, £28. to £30. Antimony, English regulus, 90%, £45. Aluminium £150. Nickel £205. delivered, packages extra. Quicksilver £23. 10s. to £24. Bismuth 12s. 6d. Platinum 442s. per oz. Wolfram 32s. 6d. per unit.

MANCHESTER CHEMICAL MARKET.

THURSDAY.

Business is considerably affected by the railway strike, and delivery of goods practically at a standstill. Quotations generally for the principal products remain unaltered, and there is an active demand both for home and export trade. Bleaching powder continues quiet at £15. per ton, on rails. Refined bicarbonate of soda, bags, £8. per ton. Roasted saltcake firm at 60s. per ton, carriage paid. Chlorate of soda easy at 6d. per lb. Potash, 1s. per lb. Makers' quotations for bichromates are unchanged at 1s. 6d. and 11d. for potash and soda respectively. Recovered rock sulphur, £16. 10s., on rails. There is no sign of improvement in export demand for copper sulphate, and price is nominal at £41., f.o.b. Commercial hyposulphite of soda steady at £16. 10s. per ton. Phosphate of soda, £26. per ton. Concentrated sodium sulphide firmer at £24., drums, at maker's works. White powdered arsenic continues very scarce, and £60. quoted for small lots available. Yellow prussiate of potash 1s. 9d. per lb. Soda firm at 10d. per lb. Lead salts are quiet: English white, £83.; brown, £69. Nitrate, £56. per ton. Acetate of soda steady at £50., but in only small request. English brown and grey acetate of lime are steady at recent rates. Miscible wood naphtha scarce, and firm at 10s. 6d. per gallon. Nitrite of soda scarce on the spot, and price unaltered at £60. per ton. Green copperas is moving off better, but there is no improvement in price. Oxalic acid steady at 1s. 2½d. per lb., delivered.

SWANSEA MARKET REPORT.

THURSDAY.

Tinplate prices remain very strong, with a keen inquiry for export trade; a good volume of business is being done at 37s. to 37s. 3d. per standard box, f.o.b. There is a steadier feeling in the copper quotations, which include for the most part forward trading at about £100. 15s. per ton. Tin has been neglected. Spanish lead, £25. 12s. 6d. per ton; English, £26. 15s. Spelter, £41. 10s. per ton, f.o.b. Nitrate of soda steady at late prices. Seed oils scarce and firmly held at nominal prices. Palm oil easier: Lagos, £83.; softs, £81. 10s.; Benin, £80.; and hards, £79. Petroleum in strong demand at late prices, and very firm. Turpentine quiet at 129s. 6d. per cwt. Oxalic acid quiet at 1s. 2½d. per lb. Pitch dearer at 55s. 6d. per ton, ex ship.

LIVERPOOL CHEMICAL MARKET.

THURSDAY.

Business in chemicals has been disturbed by the railway strike, but the facilities for moving goods by motor-lorry and by boat on canal and river have admitted of a very fair movement of stock to towns within a reasonable range for such means of conveyance. Traders appear to be adapting themselves quickly and well to the new conditions, so that the dislocation by the stoppage of the railway services is not likely to be nearly as serious as was feared by many people. The motor vehicles will have saved the situation, and will have given manufacturers a much-needed element of independence in their ability to receive and to forward goods. Bleaching powder has been in fair request, and is £17. per ton free on rail or conveyance, in buyers' packages, with £15. to £18. per ton in buyers' packages being quoted for export lots. Chloride of calcium has been quiet, and is £8. to £11. per ton in casks, f.o.r. Caustic soda has been in fairly active inquiry, and is £24. per ton for 76%, £22. per ton for 70 to 72%, and £19. per ton for 60 to 62%. Nitrate of soda has been in moderate demand, and is £21. to £22. per ton. Saltcake has been in very fair request, and is £6. 10s. per ton in casks, f.o.b. Soda crystals have been in brisk demand, and are £5. 10s. per ton in 2cwt. bags, f.o.r. at works. Bicarbonate of soda has been rather freely inquired for, and is £7. 5s. to £10. per ton, according to terms of delivery. Borax continues in fairly active demand, with supplies for early delivery light. Higher prices are being asked, and may be given as: Ordinary, £45. per ton; powdered, £46. per ton, in bags. Ammonia alkali has been called for rather freely, and is now quoted at £6. 15s. per ton, f.o.r. at works. Hyposulphite has been quiet, and is £16. per ton for ordinary, and £21. per ton for pea crystals, in 1cwt. kegs. Sulphite of sodium has been but little in request, and is £10. per ton for ordinary, and £16. to £18. per ton for pea crystals, in 1cwt. kegs. Bichromate of soda has been in moderate demand, and is 9d. per lb. Phosphate of soda has been inactive, and is £25. per ton. Sulphide of sodium has met with but little inquiry, and is £20. per ton in casks, and £22. per ton in drums. Chlorate of potash has again been in fair request, and is 1s. to 1s. 2d. per lb. Permanganate of potash has been quieter, and is 3s. 3d. per lb. Sulphate of potash has been but little called for, and is £30. per ton. Carbonate of potash has been in very fair inquiry, but has been scarce. The price is £95. per ton for 80 to 85%. Caustic potash has been called for rather freely, and is £120. per ton. Nitrate of potash has been more inquired for, and is £60. per ton for refined, and £40. per ton for ordinary. Canadian

potashes have received but little attention. Montreal first quality are £200. to £220. per ton, and second quality £190. to £210. Bichromate of potash has been in fair request, and is 1s. 6d. to 1s. 7d. per lb. Yellow prussiate of potash has been steadily called for, and is 1s. 9d. to 1s. 10d. per lb. Sal ammoniac has been in moderate request. Prices have been raised, and are now £90. per ton for lump, £80. per ton for seconds, and £5. per ton extra for ground. Sulphate of ammonia has been quiet, and is £20. 10s. per ton for October, £20. 15s. for November, £21. for December, £21. 7s. 6d. for January, 1920, £21. 15s. for February, and £22. per ton for March to May, 1920. Carbonate of ammonia has been quiet, and is 6½d. per lb. Muriate has been but little in request, and is £50. to £55. per ton, according to quality. Magnesia has been steadily called for. Carbonate is £2. 5s. per cwt., and sulphate, £10. to £16. per ton, according to grade. Alum has been in steady request, and has been in very sparse supply for early deliveries. It is £18. 10s. per ton for the home trade, and £18. 10s. to £19. 10s. per ton for export. Aluminoferric has been very quiet, and is £8. 10s. to £12. per ton, according to quality. Sulphate of alumina has had a moderate inquiry, and is £12. to £17. per ton, according to grade. Sulphur has been steadily called for, and English flowers are still scarce. They are £32. per ton. Roll is £28. per ton, and rock £22. per ton, in bags, f.o.r. Sicilian grades are: Flowers, £28. per ton; roll, £22. 10s. per ton; and rock, £17. 15s. per ton. Cream of tartar has moved but slowly, and is slightly dearer. It is from £11. 15s. to £12. per cwt. Tartaric acid has been in fair request, and is 3s. 1d. to 3s. 2d. per lb. Boracic acid has been rather more in request, and is £72. per ton for crystals and £74. per ton for powdered. Oxalic acid has been but little called for, and is 1s. 2d. to 1s. 3d. per lb.,

according to requirements for delivery. Citric acid has again been in fair request, and is 4s. 4d. per lb. White acetate of lead has been inactive, and is £85. per ton. Arsenic has been in moderate demand. White powdered is £58. to £60. per ton. Sulphate of copper has received but little attention, and is £41. to £42. per ton for home trade uses, and £42. to £43. per ton for export.

TYNE CHEMICAL REPORT.

TUESDAY

Market is without change, but the railway strike has entirely upset all arrangements, deliveries by rail being impossible. Export shipping business is also practically at a deadlock. Prices nominally, per ton, net: Bleaching powders, softs, £17.; caustic soda, 74-77%, £23. 5s.; do., 70%, £22.; do., 60%, £20.; recovered sulphur, 2cwt. bags, £23.; hypo-sulphite of soda, 5-7cwt. casks, £19.; do., 1cwt. kegs, £25.; sulphite of soda, 5-7cwt. casks, £12.; do., 1cwt. kegs, £20.; silicate of soda, 75° Tw., £9. 12s. 6d.; do., 100° Tw., £10.; do., 140° Tw., £10. 10s.; soda crystals, 2cwt. bags, £5. 10s.; sulphate of soda (saltcake), in bulk, £4.; pure white sulphate of alumina, £19. 10s.; blanc fixe, £22.; sulphide of sodium, crystals, £18.; do., defined concentrated, 60-62%, £25.; hydrate of barium, crystals, £56.

COALS.—The sudden railway strike has had the effect of bringing all business to a standstill, and should the strike last more than a few days it will lay the bulk of the collieries idle. Nominally, prices remain unchanged:—Best Northumbrian steam, 100s. per ton; do., seconds, 90s. to 95s.; Northumbrian small coals, 75s. to 80s.; do., seconds, 70s. to 75s.; best Durham gas coals, 80s. to 85s.; do., seconds, 65s. to 75s.; Durham bunker coals, 70s. to 80s.; do., seconds, 65s. to 70s.; foundry coke, 100s.; gas coke, 95s. to 100s.

IMPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

BRISTOL

Publication of Official Returns
Suspended.

GLASGOW.

Week ending September 27.

ACETATE OF LIME—
Philadelphia, 330 bgs.

BARIUM SULPHATE—
Antwerp, 10 t.

BARYTES—
Portland, 80 brls.

DYESTUFFS—
Cutch
Rangoon, 500 bxs.

FISH OIL—
Portland, 1,001 brls.

GLYCERINE—
Genoa, 201 drms.

LEAD SULPHATE—
New York, 81 brls.

PARAFFIN WAX—
New York, 906 brls.; Portland,
876 brls.

ROSIN—
New York, 999 brls.

SOAP—
New York, 320 brls.; Portland,
300 brls.

WAX—
Philadelphia, 125 brls.

WHITE LEAD—
New York, 113 c's., 27 brls.;
Portland, 235 c's.; Philadelphia,
81 brls.

GOOLE.

Week ending September 27.

IRON PYRITES—
Lisbon, 502 t.

OXALIC ACID—
Rotterdam, 12 cks.

SOAP—
Seville, 260 cs.

GRANGEMOUTH.

Week ending September 27.

SODIUM NITRATE—
Drammen, 18 cks.

GRIMSBY.

Week ending September 27.

NIL.

HULL.

Week ending September 27.

ACETONE—
New York, 29 drms.

BARYTES—
Ghent and Antwerp, 302 bgs.,
1 brl.

BORAX—
New York, 3,982 sks.

BORIC ACID—
New York, 100 bgs., 150 sks.,
650 cks., 300 kgs.

CARBON BLACK—
New York, 48 cs.

COAL PRODUCTS—
Nitrobenzol
New York, 10 drms.

DYESTUFFS—
Myrabolans
Bombay and Port Said, 2,600 t.

FORMALDEHYDE—
New York, 153 brls.

MANGANESE ORE—
Bombay and Port Said, 735 t.

ROSIN—
Bordeaux, 76 cks., 100 brls.

LEITH.

Week ending September 27.

NIL.

LIVERPOOL.

Week ending September 27.

ACETIC ACID—
Shanghai, 20 brls.

ACID—

New York, 137 brls.

BARYTES—

New York, 229 brls.

BISMUTH ORE—

Arica, 205 bgs.; Hong Kong,
40 bgs.

CARNAUBA WAX—

Pernambuco, 6 bgs.

DEXTRINE—

Boston, 79 bgs.; Newport News,
430 bgs.

DYESTUFFS

Cutch
Singapore, 1,049 bxs., 1,000 cs.

Gambier
Singapore, 2,246 bgs., 3,741 cs.,
133 pkgs.

Logwood Extract
Kingston, 1,169 cks.

Quebracho Extract
Buenos Ayres, 7,004 bgs.

Tanning Extract
Gothenburg, 24 cks.; New York,
702 brls.

GELATINE—

New York, 59 cs.

HYDROQUINONE—

New York, 2 kgs.

LITHIUM CARBONATE—

New York, 5 brls.

LITHOPONE—

New York, 212 brls.

PARAFFIN WAX—

New York, 1,216 brls.; Singapore,
3,504 bgs.

PHENACETIN—

New York, 1 kg.

POTASSIUM PERMANGANATE—

St. Johns, 20 cs.

ROSIN—

Brunswick, 8,500 brls.; Savan-
nah, 1,000 brls.

SOAP—

Alexandria, 8 cs.; Malaga, 680
bxs.; Norfolk, Va., 1,000 brls.;
New York, 93 brls.

SODIUM BROMIDE—

New York, 10 cs.

STEARINE—

New York, 168 bgs.; St. Johns,
2 tins, 25 cks.; River Plate,
62 cks.

WOOD OIL—

Hong Kong, 500 cs.; Shanghai,
441 cks.

LONDON.

Week ending September 27.

ACETIC ACID—
Holland, 32 pkgs.

ALUMINA CHLORIDE—
U.S.A., £80.

BARIUM CARBONATE—
U.S.A., £1,030.

BARYTES—
Belgium, 326 bgs.; Spain, 600 bgs

BEES WAX—

Aden, 436 pkgs.; Anglo Egyp-
tian Soudan, 496 pkgs.; Asiatic
Turkey, 1 bg.; B.W.I., 12 brls.;
Egypt, 2,090 bgs.

CAMPHOR—

China, 350 cs.; Japan, 175 cs.

CARBON BLACK—

U.S.A., 172 cs.

CHEMICALS (otherwise undescribed)
U.S.A., £19.

CHROME ORE—

Rhodesia, 250 t.

COAL PRODUCTS—

Benzonaphthol
Switzerland, £123.

COBALT OXIDE—

Canada, 45 brls.

DYESTUFFS—

Aniline Dye
Switzerland, 259 pkgs.

Argols

France, 816 pkgs.

Fustic Extract

U.S.A., 20 bxs.

Indigo

British India, 8 chsts.

Log Dyewood Extract

U.S.A., 10 t.

Myrabolans

British India, 1,784 pkgs.

DYESTUFFS—

Sumac
Switzerland, 14 pkgs.
Tanner's Bark
Cape, 158 t.; Natal, 261 t.
Turmeric
British India, 20 pkgs.

FISH OIL—

Cape, 6,556 cks.; Japan, 8,800 cs.

FORMALDEHYDE—

U.S.A., £123.

GALLIC ACID—

Switzerland, £248.

GELATINE—

Belgium, £1,200.; Holland, £162.

GLUE—

U.S.A., £115.

INFUSORIAL EARTH—

U.S.A., £150.

IRON OXIDE—

Spain, 180 cks.

KIESELGUHR—

Spain, £630.

MAGNESIUM CHLORIDE—

Holland, £140.

MANGANESE DIOXIDE—

Sweden, 15 bgs.

MINERAL WAX—

Holland, 42 pkgs.

OCHRE—

Spain, 20 brls., 130 cks.

PARAFFIN WAX—

British India, 150 t.; Germany, 35 t.; U.S.A., 340 t. 19 c.

PHOSPHATE OF LIME—

Tunis, 5,850 t.

PLUMBAGO—

Japan, 180 cks.; U.S.A., 6 brls.

POTASSIUM IODIDE—

Japan, 20 cs.

QUININE SULPHATE—

Java, 620,016 ozs.

ROSIN—

France, 1,773 cks.; Portugal, 256 cks.; Spain, 641 cks.; U.S.A., 1,500 brls.

SOAP—

France, £295.; Italy, £1,030.; Spain, £46.; U.S.A., £14,736.

SOAP STOCK—

Channel Islands, £16.

SODA ASH—

U.S.A., 18 t. 15 c.

STEARINE—

N.S.W., 66 cks.

SULPHUR—

U.S.A., 3 c.

TALLOW—

N.S.W., 85 t.; N.Z., 30 t. 6 c.; U.S.A., 9 t.

TANNIC ACID—

Switzerland, £203.

TAR—

Russia, 2,389 brls.; Sweden, 52 brls.

TARTARIC ACID—

Italy, 4 pkgs.

TERPINEOL—

France, £126.; U.S.A., £1,868.

THEOBROMINE SODA—

Holland, £38.

ULTRAMARINE—

Belgium, 2 cks.

VEGETABLE WAX—

Japan, 10 cs.

WAX—

Aden, 891 pkgs.; Nyasaland, 11 pkgs.

WHITE LEAD—

Belgium, 56 cks.; U.S.A., 112 cks.

ZINC OXIDE—

Belgium, 40 cks.; U.S.A., 219 brls.

MANCHESTER.

Week ending September 27.

CARBIDE—

Montreal and Quebec, 300 drms.

OXALIC ACID—

Rotterdam, 15 cks.

SOAP—

Alexandria, 47 cs.

MIDDLESBROUGH.

Week ending September 27.

OCHRE—

Rouen, 10 t.

NEWCASTLE-ON-TYNE

Week ending September 27.

COPPER PRECIPITATE—

Huelva, 118 t.

PHOSPHATE—

Susa, 4,050 t.

N. & S. SHIELDS.

Week ending September 27.

NIL.

STOCKTON-ON-TEES.

Week ending September 27.

NIL.

SWANSEA.

Week ending September 27.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

BRISTOL.

Publication of Official Returns
Suspended.

GLASGOW.

Week ending September 27.

AMMONIUM CARBONATE—

Rio de Janeiro, 1 t. 8 c.

CHEMICALS (otherwise undescribed)

Colombo, 3 t. 12 c.; Montreal, 1 t. 19 c.; Rio de Janeiro, 110 pkgs.

COAL PRODUCTS (otherwise undescribed)

Calcutta, £100.; Madras, £40.; Monte Video, 9 t. 7 c.; New York, £325.

CREAM OF TARTAR—

New York, 20 cks.

GLUE, SIZE, AND GELATINE—

Rio de Janeiro, 1 t.

SHEEP DIP—

Monte Video, 5 t. 10 c.; Rio de Janeiro, 14 t. 19 c.

SUPERPHOSPHATE—

Jersey, 5 t.

WAX—

Colombo, £21.

GOOLE.

Week ending September 27.

NIL.

GRANGEMOUTH.

Week ending September 27.

NIL.

GRIMSBY.

Week ending September 20.

NIL.

HULL.

Week ending September 23.

AMMONIUM SULPHATE

Dunkirk, 3,587 bgs.

BORAX—

Antwerp, 200 bgs.

CHEMICALS (otherwise undescribed)

Amsterdam, 2 cs.; Antwerp, 104 bgs., 40 cs.; Dunkirk, 4 cks.; Helsingfors, 13 bgs.; Kotka, 10 bgs.; Lisbon, 5 cs., 8 cks., 20 kgs., 15 brls.; Rouen, 80 bgs.; Stockholm, 3 cs., 38 cks., 2 drms.; Wyburg, 20 bgs., 12 kgs.

GLUE—

Helsingfors, 6 bgs.

MAGNESIA—

New York, 40 cs.

OCHRE—

New York, 50 cks.

PARAFFIN WAX—

Amsterdam, 4 cs.

PARATOLUIDINE—

New York, 3 cs.

PITCH—

Antwerp, 158 t.

SALT—

Reval, 1,358 bgs.

SOAP—

Antwerp, 1 brl., 3 kgs., 145 cks.; Dunkirk, 17 cs.; Helsingfors, 1 cs.; Rouen, 400 cs.; Rotterdam, 200 cs.

SODA—

Helsingfors, 200 drms., 100 pkgs.

TALLOW—

Amsterdam, 13 cs.

TAR—

Dunkirk, 5 drms., 100 cks.; Rotterdam, 20 brls.; Wyburg, 132 brls.

LEITH.

Week ending September 27.

AMMONIUM SULPHATE—

Dunkirk, 500 t.

CAUSTIC SODA—

Iceland, 12 t., £13.

CREAM OF TARTAR—

Iceland, £4.

POTASSIUM BICHROMATE—

Dunkirk, 3 t. 2 c.; Gothenburg, 2 t. 2 c.; Rouen, 4 t. 1 c.

SODA—

Iceland, 10 t., £3.

SODIUM BICHROMATE—

Rouen, 110 t. 17 c.

LIVERPOOL.

Week ending September 25.

ALUM—

Antofagasta, 1 c., £9.; Bahia, 10 c., £11.; Buenos Ayres, 10 t., £175.; Lisbon, 4 t. 8 c., £50.; Piraeus, 3 c., £3.; Stamboul, 5 c., £25.; Volo, 2 t. 6 c., £39.

ALUM (CALCINED)—

Havana, 3 c., £15.; Lisbon, 2 c., £10.; Pernambuco, 1 c., £20.

ALUM (CHROME)—

Stanley (Falklands), 1 t., £75.

ALUMINA HYDRATE—

Lisbon, 2 c., £5.

ALUMINA SULPHATE—

Antwerp, 1 t., £15.; Barcelona, 5 t., £125.; Christiania, 10 t. 2 c., £125.; Gothenburg, 10 t., £80.; Helsingfors, 50 t., £600.; Lisbon, 5 t.; Stamboul, 10 c., £12.

ALUMINO-FERRIC—

Calcutta, 39 t. 14 c., £526.

AMMONIA—

Buenos Ayres, 16 c., £95.; Mollendo, 3 c., £30.

AMMONIA ALUM—

Rouen, 10 t., £175.; San Francisco, 20 t. 10 c., £359.

AMMONIUM BROMIDE—

Genoa, 1 c., £14.

AMMONIUM CARBONATE—

Barcelona, 12 c., £40.; Bilbao, 1 t., £71.; Constantinople, 5 c., £16.; Genoa, 2 t. 2 c., £140.; Lisbon, 6 c., £18.; Marseilles, 2 t. 9 c., £147.; Marnagao, 1 t., £93.; Montreal, 7 t., £154.; Mollendo, 5 c., £40.; Monte Video, 5 c., £17.; New York, 3 t. 15 c., £219.; Oporto, 1 c., £5.; Pernambuco, 1 t. 5 c., £109.; Teneriffe, 1 c., £10.

AMMONIUM CHLORIDE—

Oporto, 2 c., £12.; Taleahumo, 2 c., £15.

AMMONIUM MURIATE—

Amsterdam, 2 t. 2 c., £102.; Baltimore, 20 t. 5 c., £596.; Constantinople, 3 t. 6 c., £143.

AMMONIUM MURIATE—

Galatz, 4 t. 15 c., £290.; Genoa, 4 t. 17 c., £242.; Melbourne, 7 t. 19 c., £367.; Montreal, 2 t. 18 c., £129.; Rouen, 2 t., £127.; Sydney, 1 t., £47.

AMMONIUM PHOSPHATE—

Barcelona, 2 t., £135.

AMMONIUM SALICYLATE—

Mollendo, 1 c., £8.

ANTIMONY SULPHIDE—

Lisbon, 2 c., £7.

ARSENIC—

Calcutta, 7 t., £470.; Cape Town, 2 t. 4 c., £72.; Lisbon, 1 t., £61.; Monte Video, 2 t. 10 c., £150.; Oporto, 1 c., £2.; Valencia, 1 t., £31.

BARIUM CHROMATE—

Constantinople, 2 c., £23.

BLEACHING POWDER—

Calcutta, 1 t. 10 c., £39.; Christiania, 6 t. 10 c., £180.; Constantinople, 1 t. 1 c., £21.; La Guaira, 4 c., £10.; Lisbon, 56 t. 8 c., £731.; Santiago, 19 t. 19 c., £399.; Shanghai, 60 t., £1040.; Valencia, 1 t., £19.

BORAX—

Antwerp, 13 t., £633.; Bombay, 5 t., £196.; Gibraltar, 3 c., £7.; Rouen, 9 t. 18 c., £384.

BORIC ACID—

Dantzig, 2 t., £160.; Lisbon, 10 c., £44.

CALCIUM CARBIDE—

Accra, 12 c., £18.

CALCIUM CARBONATE—

Marseilles, 1 t., £34.

CALCIUM CHLORIDE—

Punta Arenas, 14 t., £99.; Rangoon, 4 t. 3 c., £36.

CAUSTIC SODA—

Adelaide, 90 drms.; Aden, 60 drms.; Alexandria, 984 drms.; Bombay, 475 drms.; Galatz, 234 drms.; Gelfe, 75 drms.; Genoa, 252 drms.; Melbourne, 504 pkgs.; Salonica, 200 drms.

CHEMICALS (otherwise undescribed)

Antwerp, 5 t., £214.; Cologne, 1 t. 16 c., £127.

CHINA CLAY—

Calcutta, 35 t.

CHLORIDE OF LIME—

Rio de Janeiro, 5 t., £88.

CITRIC ACID—

Odense, 2 c., £50.

COAL PRODUCTS (otherwise undcs.)

Halifax, 2 c., £90.

COAL PRODUCTS—

Aniline Dye

Abo, 2 c., £82.; Alexandria, 1 c., £58.; Amsterdam, 4 c., £68.; Antwerp, 7 t. 19 c., £3,598.; Barcelona, 10 c., £112.; Bombay, 14 t. 15 c., £3,790.; Boston, 1 t. 10 c., £1,358.; Constantinople, 10 c., £66.; Copenhagen, 24 t., £760.; Genoa, 13 t. 17 c., £7,724.; Gothenburg, 1 c., £13.; Montreal, 20 t. 5 c., £5,856.; New Orleans, 1 c., £80.; Piraeus, 2 t., £350.; Rio de Janeiro, 5 t. 1 c., £2,073.; Rouen, 4 c., £95.; Shanghai, 1 t. 1 c., £895.

Carbolic Acid

Alexandria, £8.; Bombay, 2 c., £29.; Bucharest, 19 c., £25.; Kobe, 15 t. 9 c., £815.; Oporto, 2 qrs., £3.; Piraeus, 10 c., £99.; Osaka, 19 t. 11 c., £1,643.

Creoline

Punta Arenas, £2.

Cresote

Colombo, 1 t. 12 c., £36.; Takubar, 190 t. 12 c., £2,365.

Cresylic Acid

Boston, 17 t. 13 c., £526.

Dyes

Dunedin, 5 c., £80.

Naphthalene

Aden, 13 t. 4 c., £190.; East London, 1 t. 7 c., £111.; Lagos, 2 c., £8.; Lisbon, 2 t. 1 c., £45.; Oporto, 10 c., £13.; Rosario, 1 c., £2.; Stamboul, 10 c., £24.

Pitch

Alexandria, 10 t., £50.

Tar

Cape Coast, 6 c., £2.; Saltpond, 250 galls., £9.; Stanley (Falklands), 1 t. 2 c., £27.; Punta Arenas, 1 t. 19 c., £63.

COPPER ACETATE—

Oporto, 22 lbs., £6.

COPPER SULPHATE—

Monte Video, 18 t. 7 c., £786.

CREAM OF TARTAR—

Aalcory, 2 c., £26.; Buenos Ayres, 2 c., £10.

DISINFECTANTS (otherwise undcs.)

Boston, 9 c., £16.; Bucharest, 3 t. 4 c., £75.; Calcutta, 6 t. 18 c., £261.; Cape Town, 1 t. 2 c., £56.; Gothenburg, 2 t. 18 c., £149.; Halifax, 4 c., £9.; Lagos, 2 c., £13.; Oporto, 4 c., £9.; Rangoon, 1 t. 8 c., £80.; Saltpond, 4 c., £5.; Victoria, B.C., 2 c., £4.

FERRO MANGANESE—

B'timore, 1,250 t.; Barcelona, 2 t.

FISH OIL—

Copenhagen, 32 brls.

GLUE—

Kobe, 300 bgs.

GLUE, SIZE, AND GELATINE—

Alexandria, 10 bgs.; Barcelona, 4 pkgs.; Bombay, 10 pkgs.; New York, 101 pkgs.; Oporto, 4 pkgs.; Shanghai, 95 bgs.

GLYCERINE—

Lisbon, 30 cs.

HEMATINE—

Calcutta, 2 c., £13.; Christiania, 3 c., £37.

MAGNESIUM CARBONATE—

Abo, 2 c., £5.

MAGNESIUM CHLORIDE—

Bangkok, 12 t. 10 c., £249.; Barcelona, 2 t., £40.; Bilbao, 10 t. 16 c., £135.; Bombay, 27 t. 13 c., £441.; Calcutta, 6 t. 7 c., £106.; Canton, 4 c., £5.; Hong Kong, 1 t. 15 c., £37.; Rangoon, 5 c., £5.

MAGNESIUM SULPHATE—

Cape Coast, 1 c., £8.

MURIATIC ACID—

Manaos, 1 c., £6.; Piraeus, 2 c., £13.

NICKEL SULPHATE—

Buenos Ayres, 9 c., £26.

NITRIC ACID—

Medellin, 2 qrs., £4.; Piraeus, 3 c., £18.; Zanzibar, 7 c., £10.

PHENIC ACID—

Oporto, 1 c., £8.

PHOSPHORUS—

Kobe, 4 t. 9 c., £866.; Medan, Deli, 25 lbs., £3.; Shanghai, 4 t. 10 c., £875.

PITCH—

Coronel, 2 t. 14 c., £67.; Punta Arenas, 9 c., £55.

POTASSIUM BICROMATE—

Barcelona, 3 t. 7 c., £542.; Constantinople, 1 t. 15 c., £309.; Oporto, 7 c., £58.; Piraeus, 5 c., £40.; Smyrna, 17 c., £125.

POTASSIUM BINOXALATE—

Abo, 2 c., £22.

POTASSIUM BROMIDE—

Antofagasta, 2 qrs., £20.

POTASSIUM CHLORATE—

Constantinople, 1 t., £118.; Kobe, 50 t., £3,294.; Mollendo, 2 c., £40.; Shanghai, 40 t., £2,630.

POTASSIUM IODIDE—

Opobo, 7 c., £783.

POTASSIUM NITRATE—

Teneriffe, 1 c., £15.

POTASSIUM PRUSSATE—

Oporto, 2 c., £27.

SALAMMONIAC—

Calcutta, 2 t. 5 c., £159.; Constantinople, 5 t., £353.; Funchal, 1 c., £5.; Manaos, 1 qt., £2.; New York, 3 t., £216.; Piraeus, 9 c., £35.; Rangoon, 1 t. 1 c., £75.

SALICYLIC ACID—

Copenhagen, 1 t., £300.; Piraeus, 4 c., £37.

SALT—

Buenos Ayres, 10 t.; Christiania, 100 t.; Lagos, 40 t.

SALTCAKE—

Drammen, 178 t.; Lisbon, 155 pkgs.

SALTPETRE—

Pernambuco, 30 t., £1,890.

SHEEP DIP—

Buenos Ayres, 30 t. 11 c., £1,048.; East London, 5 t. 14 c., £344.; Monte Video, 9 c., £17.; Punta Arenas, 109 t. 3 c., £5,113.; San Francisco, 5 t. 11 c., £236.

SOAP—

Abidjan, 51 cs.; Aboma, 300 bgs.; Accra, 252 bgs.; Addis Ababa, 4 cs.; Aden, 2,108 bgs.; Alexandria, 959 bgs.; Antigua, 20 cs.; Antwerp, 12 bgs.; Bangkok, 506 bgs.; Batavia, 2 bgs.; Belawan Deli, 500 bgs.; Bergen, 2 bgs.; Buenos Ayres, 17 bgs.; Bombay, 519 bgs.; Burutu, 20 bgs.; Calabar, 23 bgs.; Calcutta, 54 bgs.; Callao, 300 cs.; Cape Coast Castle, 1 cs.; Casablanca, 845 bgs.; Cheribon, 150 bgs.; Christiania, 1,823 bgs.; Colombo, 376 bgs.; Colon, 1,030 bgs.; Demerara, 1,030 bgs.; Dominica, 8 tcs.; Durban, 7 bgs.; East London, 30 bgs.; Famagusta, 663 bgs.; Galatz, 151 cs.; Genoa, 115 cs.; Hong Kong, 9 cs.; Huelva, 3 drms.; Karachi, 26 pkgs., 191 cs.; Las Palmas, 1,195 bgs.; 564 cs.; Lagos, 82 bgs.; Larache, 650 bgs.; Lisbon, 10 cs.; Limassol, 23 bgs.; Lome, 10 cs.; Limon, 134 cs.; Madras, 6 t. 9 c.; Malta, 120 cs., 883 bgs.; Melilla, 400 bgs.; Montreal, 20 cs.; Nairobi, 10 bgs.; Nantes, 50 bgs.; Nassau, 5 pkgs.; New York, 112 bgs.; Oporto, 11 bgs.; Orotavia, 56 bgs.; Penang, 25 bgs.; Port of Spain, 1,060 bgs.; Rangoon, 1,711 bgs.; Sabang, 50 cs.; St. Johns, N.F., 1 bx.; St. Mechells, 5 cs.; Salonica, 654 bgs.; Saltpond, 3 bgs.; Samarang, 375 bgs.; San Miguel, 3 cs.; Secondee, 802 bgs.;

SOAP—

Shanghai, 1,680 bxs.; Sherbo, 10 cs.; Sierra Leone, 25 bxs.; Singapore, 700 bxs.; Smyrna, 75 bxs.; Soerabaya, 260 bxs.; Sydney, 1 bx.; Tangiers, 114 bxs.; Teneriffe, 302 bxs.; Valparaiso, 41 bxs.; Wellington, 65 pkgs.; Zanzibar, 200 bxs.

SODA ASH—

Copenhagen, 5,250 bgs.; Gothenburg, 1,861 bgs., 200 drms.; Helsingfors, 850 bgs.; Kobe, 8,893 bgs.; Lisbon, 100 pkgs.; Moji, 1,082 bgs.; Oporto, 352 drms.; Salonica, 190 drms.; Smyrna, 20 drms.; Yokohama, 4,805 bgs.

SODA CRYSTALS—

Algoa Bay, 6 kgs.; Casablanca, 20 kgs.; Gibraltar, 110 brls.; Oporto, 31 pkgs.; Salonica, 34 pkgs.; Smyrna, 15 drms., 5 pkgs.

SODIUM BICARBONATE—

Alexandria, 67 kgs.; Amsterdam, 73 bgs.; Constantinople, 440 cks.; Durban, 15 kgs.; Genoa, 213 pkgs.; Kobe, 1,814 pkgs.; La Libertad, 10 pkgs.; Lisbon, 220 pkgs.; Moji, 645 pkgs.; Oporto, 3 pkgs.; Stamboul, 450 bgs.; Yokohama, 1,614 pkgs.

SODIUM SILICATE—

Christiania, 30 cks.; Galatz, 64 cks.; Lisbon, 1,500 pkgs.; Montreal, 32 cks.; Monte Video, 100 cks.

SODIUM SULPHIDE—

Adelaide, 44 drms.; Genoa, 1,777 drms.

STEARINE—

Genoa, 28 cks.; Havre, 77 cs.; St. Nazaire, 260 bgs.

SULPHATE OF LIME—

Lisbon, 6 c., £10.

SULPHUR—

Colombo, 10 c., £17.; Copenhagen, 3 t., £127.

SULPHURIC ACID—

Montreal, 20 galls., £5.; Mombasa, 1 t. 4 c., £19.; Piraeus, 5 c., £13.; Suez, 274 t. 7 c., £4,521.; Valparaiso, 9 c., £17.; Zanzibar, 1 t. 10 c., £29.

TALLOW—

Genoa, 560 cks.

TAR (WOOD)—

Malacca, 6 t. 1 c., £73.

TARTARIC ACID—

Bombay, 1 t. 5 c., £425.; Montreal, 2 t., £649.

WAX—

Genoa, 32 bgs.

WHITE LEAD—

Lisbon, 2 pkgs.

ZINC CHLORIDE—

Alexandria, 9 t. 10 c., £499.; Batavia, 5 t., £267.; Bombay, 10 t. 10 c., £159.; Calcutta, 2 t. 7 c., £102.

ZINC SULPHATE—

Bombay, 15 c., £18.

LONDON.

Week ending September 24.

ACETIC ACID—

Brisbane, 9 cs., £29.; Dunedin, 15 cs., £45.; Ghent (F.), 6 brls., £80.; Galatz (F.), 18 cks., £300.; Genoa (F.), 103 pkgs., £1,516.; Helsingfors (F.) 18 cks., £232.; Pt. Sudan, 7 cs., £18.; Rangoon, 2 cs., £8.; Rio de Janeiro, 5 cs., £24.; Wanganui, 11 cs., £35.

ACETO SALICYLIC ACID—

Calcutta, 4 cs., £50.; Constantinople (F.), 1 cs., £46.; Mauritius, 1 cs., £29.; Samarang, 1 cs. (pt.), £20.; Singapore, 1 cs. (pt.), £6.; Stockholm, 6 cs., £140.; Shanghai, 1 cs. (pt.), £6.; Sydney, 3 cs., £92.

ALUM—

Batavia, 5 c., £7.; Singapore, 10 c., £14.; Trinidad, 4 c., £7.

ALUMINA SULPHATE—

Pernambuco, 5 cs., £10.; Rangoon, 10 c., £23.

AMMONIA—

Athens, 65 drms., £261.; Bombay, 10 cs., £20.; Boulogne, 42 drms., £390.; Buenos Ayres, 8 cs., £16.; Calcutta, 4 cs., £8.; Cape Town, 57 cs., £102.; Colombo, 19 pkgs., £42.; Demerara, 4 cs., £12.; Durban, 10 cs., £19.; Kilindini, 3 cs., £6.; Madeira, 6 drms., £8.; Paris, 85 drms., £941.; Pt. Elizabeth, 30 cs., £58.; Rio de Janeiro, 36 cs., £85.; Trinidad, 5 cs., £9.

AMMONIA (ANHYDROUS)—

Soerabaya, 1 cpl., £13.

AMMONIUM BROMIDE—

Bombay, 3 cs., £50.; Colombo, 1 cs. (pt.), £8.; Durban, 1 cs., £16.

AMMONIUM CARBONATE—

Batavia, 7 c., £40.; Buenos Ayres, 11 c., £42.; Calcutta, 1 t., £72.; Cape Town, 2 c., £10.; Cologne, 10 c., £31.; Demerara, 9 c., £40.; Durban, 5 c., £16.; Osaka, 5 t., £303.; Pernambuco, 4 c., £25.; Porto Alegre, 2 c., £12.; Rio de Janeiro, 2 t., £211.

AMMONIUM CHLORIDE—

Wellington, 2 cks., £8.

AMMONIUM CITRATE—

Calcutta, 3 cs., £50.

AMMONIUM IODIDE—

Calcutta, 1 cs. (pt.), £8.

AMMONIUM MURIATE—

Christchurch, 4 c., £13.; Italy, 1 c., £3.; Pernambuco, 1 c., £6.

AMMONIUM PHOSPHATE—

Piraeus, 4 cks., £26.

AMYL ACETATE—

Antwerp, 2 drms., £90.; Brussels, 1 dr., £108.; Hong Kong, 15 cs., £88.

ANTIMONY REGULUS—

Calcutta, £22.; Copenhagen, 4 t.

ANTIMONY SULPHATE—

Kobe, 14 cks., £470.; Montreal, 14 cks., £246.; Santos, 50 cks., £158.; Yokohama, 16 cks., £351.

ANTIMONY SULPHIDE—

Brussels, 14 cks., £145.

ARSENIC—

Helsingfors, 1 t. 3 c., £34.; Napier, 3 t., £135.; Pernambuco, 11 c., £98.; Santos, 1 t., £58.

BARIUM CHLORIDE—

Santos, 1 ck. (pt.), £8.

BARIUM CHROMATE—

Switzerland, 8 cks., £165.

BARIUM NITRATE—

Santos, 2 cks., £9.

BARIUM SULPHATE—

Christchurch, 1 ck., £7.; Oporto, 8 cks., £32.

BASIC SLAG—

Landnau, 49 t. 5 c., £172.; Medan, 100 t., £375.; Oporto, 49 t. 16 c., £192.

BEE'S WAX—

Cologne, 1 t. 5 c.

BENZOIC ACID—

Wellington, 1 kg., £15.

BIPHOSPHATE OF LIME—

New York, 3 cs., £10.

BISMUTH AND AMMONIUM CITRATE—

Auckland, 2 cs., £9.

BISMUTH CARBONATE—

Christchurch, 1 cs. (pt.), £22.

BISMUTH CITRATE—

Christchurch, 1 cs. (pt.), £5.

BISMUTH SUBGALLATE—

Dantzig, 1 cs., £126.

BISMUTH SUBNITRATE—

Colombo, 1 cs. (pt.), £10.; Dantzig, 1 cs., £147.

BISULPHITE OF LIME—

Pt. Elizabeth, 6 cs., £23.

BITUMINOUS SOLUTION—

Hong Kong, 140 drms., £332.

BORAX—

Albany, 10 c., £21.; Bangkok, 10 c., £21.; Calcutta, 2 c., £8.; Colombo, 5 c., £11.; Dantzig, 10 c., £26.; Fremantle, 6 c., £12.; Gothenburg, 9 t., £355.; Jamaica, 10 c., £31.; Paris, 20 t., £780.; Rio de Janeiro, 2 c., £8.

BORIC ACID—

Auckland, 4 c., £36.; Batavia, 3 c., £12.; Colombo, 4 c., £15.; Dantzig, 10 c., £45.; Dundee (F.), 4 c., £15.; East London, 1 c., £6.; Helsingfors, 5 c., £18.; Pernambuco, 1 c., £6.; Rio de Janeiro, 8 c., £49.; Tientsin, 2 c., £8.; Wellington, 6 c., £35.

CALCIUM CARBIDE—

Madras, 10 c., £12.; Rotterdam, 5 t., £119.

CALCIUM CHLORIDE—

Melilla, 2 t. 2 c., £250.

CALCIUM HYPOPHOSPHITE—

Genoa, 4 cs. (pt.), £76.; Gothenburg, 1 cs., £25.

CAMPHOR—

Buenos Ayres. a qty.

CARBON SULPHIDE—

Brussels, 3 cs. (pt.), £55.

CARNAUBA WAX—

Cologne, 17 c.; Rotterdam, 1 t.

CAUSTIC POTASH—

Perth, 1 cs., £15.

CAUSTIC SODA—

Auckland, 1 c., £6.; Rotterdam, 45 t., £855.

CERESINE WAX—

Cologne, 8 c.; Genoa, 1 t.; Melbourne, 5 t.; Rotterdam, 5 t. 18 c.; Salaverry, 15 c.

CHEMICALS (otherwise undescribed)

Athens, 3 cs., £42.; Brussels, 1 cs., £13.; Calcutta, 3 pkgs., £68.; Chefoo, 1 cs. (pt.), £10.; Calais, 3 cs., £201.; Colombo, 1 cs., £7.; Cyprus, 1 cs., £7.; Dundee, 1 cs., £11.; Durban (F.), 4 cs. (pt.), £7.; Durban, 6 cs., £259.; Foochow, 1 cs., £18.; Hong Kong, 9 pkgs., £115.; Kilindini, 2 cs., £19.; Mazagan, 1 cs., £15.; Mauritius, 6 cs., £16.; Monte Video, 1 cs., £51.; New York, 3 cs. (pt.), £56.; Oporto (F.), 1 cs., £25.; Otogo, 3 cs., £114.; Pernambuco, 3 cs., £8.; Pt. Swettenham, 2 pkgs., £19.; Santiago, Chile, 3 cs., £19.; Soerabaya, 2 cs., £52.; Samarang, 2 pkgs., £60.; Sydney, 1 cs., £5.; Wellington, 10 pkgs., £166.

CHRYSOPIANIC ACID—

Paris, 1 cs., £88.

CITRIC ACID—

Auckland, 5 c., £115.; Bahia, 4 c., £126.; Calcutta (F.), 1 cs., £10.; Cape Town, 1 t. 12 c., £700.; Colombo, 1 cs. (pt.), £6.; Dantzig, 2 c., £46.; East London, 2 c., £40.; Fremantle (F.), 1 cs., £9.; Montreal, 2 t., £904.; New York (F.), 2 t. 18 c., £1,326.; Novorossisk, 1 c., £28.; Penang, 5 c., £131.; Porto Alegre, 2 c., £62.; Rangoon, 2 c., £52.; Singapore, 8 c., £209.; Sydney, 1 c., £26.; Tientsin, 1 cs. (pt.), £6.; Toronto, 10 c., £226.

COAL PRODUCTS—

Alizarine
Bombay, 150 cks., £4,773.; New York, 7 cks., £220.

Aniline Dye

Amsterdam, 3 kgs., £165.; Auckland, 3 cs. (pt.), £67.; Bilbao, 1 pkg., £11.; Boulogne, 40 pkgs., £2,707.; Calcutta, 6 cks., £572.; Dundee, 3 pkgs., £165.; Genoa, 7 pkgs., £223.; Hong Kong, 1 cs., £90.; Leghorn, 5 cs., £213.; Lisbon, 1 cs., £50.; Melbourne, 4 cs. (pt.), £232.; New York, 23 pkgs. (pt.), £190.; Paris, 44 pkgs., £3,694.; Perth, 1 cs. (pt.), £5.; Rangoon, 3 cs. (pt.), £10.; Shanghai, 1 cs., £52.; Singapore, 1 cs., £50.; Sydney, 1 cs., £63.

Betanaphthol

Calcutta (F.), 3 cs. (pt.), £44.

COAL PRODUCTS—**Bitumen**

Buenos Ayres, 16 drms., £10.

Carbolic Acid

Adelaide, 2 cs., £6.; Batavia, 1 cs., £15.; Rio de Janeiro, 2 cs., £10.; Tientsin, 1 cs. (pt.), £7.; Yokohama, 80 drms., £840.

Cresosote

Bombay, 110 drms., £102.; Cape Town, 1 ck., £6.; Gothenburg, 750 brls., £1,294.; Montreal, 40 cks., £151.

Cresylic Acid

Antwerp, 14 pkgs., £66.; Cape Town, 195 drms., £40.

Dehydrated Tar

Durban, 150 cks., £255.

Meta Cresol

Havre, 2 drms., £63.

Mineral Pitch

Antwerp (F.), 24 cs., £11.

Naphthalene

Bahia, 2 cks., £12.; Penang, 5 cks., £12.; Rio de Janeiro, 6 cs., £45.; Sydney, 25 cs., £200.; Toronto, 45 cks., £152.; Valencia, 10 cks., £45.

Nigrosine

Genoa, 9 pkgs., £525.

Nitro Naphthalene

Lisbon, 5 kgs., £40.

Pitch

Alexandria, 436 pkgs., £522.; Mauritius, 6 brls., £6.; Port Said, 150 brls., £220.

Tar

Beira, 30 drms., £10.; Delagoa Bay, 330 drms., £13.; Madeira, 48 drms., £21.; Pt. Elizabeth, 250 drms., £20.

COBALT LINOLEATE—

Melbourne, 3 cs., £17.

COBALT OXIDE—

Brussels, 1 cs., £23.; Calcutta, 10 cs., £350.; Genoa, 4 cs., £157.

COBALT SULPHATE—

Brussels, 4 cs., £77.

COPPER CHLORIDE—

Antwerp, 4 cks., £160.

COPPER SULPHATE—

East London, 9 c., £26.; Helsingfors, 2 c., £6.; Karachi, 1 t., £40.; Sydney, 1 t., £40.

CREAM OF TARTAR—

Albany, 5 c., £61.; Cairns (F.), 11 c., £156.; Calcutta (F.), 3 cs., £15.; Durban (F.), 1 c., £8.; East London, 1 ck., £6.; Fremantle, 2 c., £25.; Helsingfors, 2 c., £18.; Madras (F.), 1 c., £15.; Pernambuco, 1 ck. (pt.), £8.; Pt. Elizabeth (F.), 6 c., £96.; Yokohama (F.), 6 t., £1,396.

DISINFECTANTS (otherwise undescribed)

Amsterdam, 4 c., £12.; Antigua, 11 c., £21.; Auckland, 1 t. 17 c., £205.; Barbados, 9 c., £17.; Bangkok, 2 t. 18 c., £107.; Batavia, 1 t. 8 c., £60.; Bordeaux (F.), 18 c., £112.; Buenos Ayres, 17 c., £100.; Calcutta, 12 t. 2 c., £601.; Canterbury, 2 c., £18.; Colombo, 4 c., £17.; Dundee, 15 c., £83.; Durban, 2 c., £20.; East London, 4 c., £9.; Galatz, 5 c., £51.; Gothenburg, 1 t., £65.; Hankow, 12 c., £30.; Hong Kong, 13 t. 6 c., £527.; Ipoh, 4 c., £16.; Jamaica, 2 t. 6 c., £94.; Kilindini, 4 c., £10.; Lytleton, 1 t. 12 c., £109.; Oporto, 8 c., £13.; Otogo, 2 c., £19.; Paris, 4 t. 12 c., £125.; Penang, 8 t. 2 c., £346.; Pt. Elizabeth, 1 t. 4 c., £49.; Pt. Swettenham, 4 t. 15 c., £139.; Rangoon, 6 t. 10 c., £70.; Rio de Janeiro, 10 c., £118.; Singapore, 1 t. 1 c., £50.; Tala, 14 c., £45.; Wellington, 4 c., £8.

ETHER (ACETIC)—

Calcutta, 1 cs., £6.

ETHER (BUTYRIC)—

Cape Town, 1 cs. (pt.), £9.; Durban, 1 cs. (pt.), £7.

ETHER (SULPHURIC)—

Rangoon, 1 cs., £5.

ETHYL CHLORIDE—

Durban, 1 cs., £7.; Oporto, 20 drms., £257.

FATTY ACIDS—

Gothenburg, 1 t.

GALLIC ACID—

Kobe (F.), 4 brls., £168.

GELATINE—

Mollendo, 1 c.

GLUE, SIZE, AND GELATINE—

Adelaide, 1 t. 7 c.; Amsterdam, 1 t. 1 c.; Antwerp, 2 t.; Auckland, 5 t. 14 c.; Bangkok, 11 c.; Brisbane, 12 c.; Buenos Ayres, 1 c.; Calcutta, 8 c.; Cologne, 1 t.; Copenhagen, 4 t. 8 c.; Cape Town, 5 c.; Durban, 15 c.; East London, 1 c.; Gibraltar, 1 c.; Hong Kong, 1 t.; Karachi, 1 c.; Kobe, 25 t.; Madras, 1 c.; Melbourne, 4 c.; New York, 4 c.; Ostend, 1 t. 9 c.; Paris, 1 c.; Pt. Elizabeth, 2 t. 2 c.; Rio de Janeiro, 1 c.; Rotterdam, 25 t.; Shanghai, 2 c.

GLYCERINE—

Amoy, 3 c., £22.; Bombay, 1 c., £7.; Calcutta, 8 c., £56.; Durban, 3 c., £23.; Paris, 1 t. 3 c., £120.; Pt. Elizabeth, 7 c., £40.; Rio de Janeiro, 2 t. 4 c., £360.; Sao Paulo, 10 c., £94.; Toronto, 2 cs., £6.

HYDROCYANIC ACID—

Rangoon, 1 c., £9.; Trinidad, 4 c., £14.

HYDROFLUORIC ACID—

Tokio, 5 cs., £17.

HYDROGEN PEROXIDE—

Brussels, 2 cks., £26.; Calcutta, 1 cs., £6.; Colombo, 1 cs., £5.; Dundee, 1 cs., £12.; Gibraltar, 2 cs., £15.; Jamaica, 1 cs., £6.

HYPOPHOSPHITE OF LIME—

Cape Town, 1 cs. (pt.), £11.

INFUSORIAL EARTH—

San Francisco, 4 c., £6.

IODINE—

Lisbon, 1 cs. (pt.), £30.

IODINE (RESUBLIMED)—

Calcutta, 1 ck. (pt.), £26.; Dantzig, 5 cs., £402.; Penang, 2 cs. (pt.), £56.

IRON & AMMONIUM CITRATE—

Auckland, 1 cs. (pt.), £5.; Colombo, 1 cs., £6.; Buenos Ayres, 1 cs. (pt.), £6.; Montreal, 4 cs., £221.; Soerabaya, 8 cs., £110.; Sydney, 1 cs. (pt.), £12.

IRON PERCHLORIDE—

Adelaide, 3 cs., £12.; Singapore, 4 cs., £45.

LACTIC ACID—

Helsingfors, 46 pkgs., £240.

LEAD ACETATE—

Bombay, 17 cks., 1 cs., £365. Calcutta, 3 kgs., £10.

LEAD IODIDE—

Brisbane, 1 cs. (pt.), £10.

LITHIUM BENZOATE—

Lisbon, 1 cs., £9.

MAGNESIA (CALCINED)—

Bahia, 1 cs., £21.; Porto Alegre, 1 cs. (pt.), £9.; Rio de Janeiro, 3 cs. (pt.), £50.; Sao Paulo, 4 cs., £55.

MAGNESIUM BENZOATE—

Pernambuco, 1 cs. (pt.), £5.

MAGNESIUM CARBONATE—

Helsingfors, 5 cs., £13.; Melbourne, 2 cs., £6.; Rio de Janeiro, 6 cs., £46.

MAGNESIUM CITRATE—

Barcelona, 5 cs., £60.; Malta, 1 cs., £7.

MAGNESIUM SULPHATE—

Albany, 5 c., £10.; Batavia, 10 c., £17.; Brisbane, 3 t. 12 c., £140.; Buenos Ayres, 3 c., £10.; Casablanca, 5 c., £10.; Fremantle, 2 t. 1 c., £62.; Invercargill, 19 c., £39.; Madras, 7 c., £20.; Montreal, 2 t. 10 c., £51.; Pernambuco, 12 c., £16.; Tangier, 10 c., £19.; Toronto, 1 t., £20.; Wellington, 15 c., £30.

MERCURY BICHLORIDE—

Paris, 4 cs., £300.

MERCURY CHLORATE—

Amsterdam, 1 cs. (pt.), £14.

MERCURY OXIDE—

Constantinople, 1 cs., £93.; Paris, 12 cs., £840.

METHYL SALICYLATE—

Cape Town (F.), 1 cs., £11.

MINERAL WAX—

Lisbon, 15 c.

MYRBANE OIL—

Antwerp, 22 drms., £908.

NICKEL SALTS—

Christchurch, 3 cs., £11.

NICKEL SULPHATE—

Kobe, 220 cs., £670.; Yokohama, 80 cs., £220.

NITRIC ACID—

Rangoon, 1 c., £14.

OXALIC ACID—

Rouen (F.), 4 cks., £150.; Soerabaya, 4 cs., £11.

PARAFFIN WAX—

Bordeaux, 5 t.; Oporto, 1 t.

PHOSPHORIC ACID—

Montreal, 16 pkgs., 2 cs., £341.; Naples, 1 cs., £15.; Paris, 40 cbs., £350.; Perth, 1 cs., £8.; Rio de Janeiro (F.), 1 pkg., £18.

PHOSPHORUS—

Athens, 2 cs., £31.

PHOSPHORUS (AMORPHOUS)—

Rio de Janeiro, 4 cs., £59.; San Francisco, 2 cs., £32.

PHOSPHORUS PENTACHLORIDE

Amsterdam, 3 cs., £29.

PLUMBAGO—

Calcutta, 3 t. 5 c.; Gothenburg, 1 t. 11 c.

POTASH—

Wellington, 1 dr., £6.

POTASSIUM ACETATE—

Calcutta, 1 cs. (pt.), £5.

POTASSIUM AND MANGANESE HYPOPHOSPHITE—

Genoa, 2 cs. (pt.), £19.

POTASSIUM BICARBONATE—

Auckland, 1 cs., £5.; Calcutta, 1 cs. (pt.), £8.

POTASSIUM BICROMATE—

Amsterdam, 1 cs. (pt.), £6.; Athens, 2 cks., £128.; Batavia, 2 kgs., £39.; San Francisco, 1 kg., £19.

POTASSIUM BROMIDE—

Calcutta, 1 cs. (pt.), £22.; Durban, 1 cs., £20.; Rio de Janeiro, 1 ck., £28.

POTASSIUM CARBONATE—

Canterbury, 1 cs., £5.; Paris (F.), 56 cs., £425.

POTASSIUM CHLORIDE—

Buenos Ayres, 2 cs., £26.; New York, 16 cs. (pt.), £17.

POTASSIUM CITRATE—

Auckland, 1 cs., £14.; Calcutta, 1 cs. (pt.), £7.; Colombo, 1 cs. (pt.), £14.

POTASSIUM CYANIDE—

Arica, 4 c., £55.; Colombo, 1 cs., £6.; Wellington, 1 cs., £8.

POTASSIUM HYDROXIDE—

New York, 16 cs. (pt.), £11.

POTASSIUM IODIDE—

Calcutta, 1 ck. (pt.), £87.; Gothenburg, 1 c., £170.; Jamaica, 1 cs. (pt.), £35.; Mauritius, 1 cs. (pt.), £9.; Mombasa, 1 cs. (pt.), £12.; Naples, 2 cs., £85.; Penang, 2 cs. (pt.), £48.

POTASSIUM METABISULPHITE—

Oporto, 2 cs., £18.; Piraeus, 20 cks., £192.

POTASSIUM OXALATE—

Rio de Janeiro, 1 cs., £17.

POTASSIUM PERMANGANATE—

Calcutta, 2 cs., £40.; Wellington (F.), 1 cs. (pt.), £5.

POTASSIUM SULPHATE—

New York, 16 cs. (pt.), £6.; Rio de Janeiro, 1 ck., £38.

POTASSIUM TARTRATE—

Gothenburg, 2 kgs., £17.

PRUSSIAN BLUE—

Singapore, 5 cks., £87.

- QUININE**—
Bombay, 100 ozs.
- ROCHELLE SALTS**—
Bermuda, 4 cs. (pt.), £7.
- SALICYLIC ACID**—
Durban, 1 kg., £10.; Helsingfors, 2 cks., £20.; Napier, 1 cs., £17.; Penang, 1 cs. (pt.), £6.; Rangoon, 2 cs., £15.; Singapore, 2 cs., £21.
- SALT**—
Boulogne, £115.; Brisbane, 4 t.; Colombo, 4 t.
- SALTPETRE**—
Bordeaux (F.), 118 t., £5,000.; Bahia, 14 c., £52.; Beira, 2 c., £7.; Bermuda, 1 c., £7.; Boulogne, 5 t., £325.; Cape Town, 10 c., £30.; Colombo, 3 c., £17.; Canterbury, 5 c., £17.; Calcutta, 1 c., £9.; Lisbon, 1 t. 16 c., £95.; Melbourne, 5 t. 2 c., £255.; Oporto, 9 t. 13 c., £517.; New York (F.), 50 t., £1,929.; Pernambuco, 12 t. 14 c., £803.; Rio de Janeiro, 9 c., £29.; Rotterdam, 2 t. 1 c., £107.; Santos, 20 t., £1,200.; Sao Paulo, 1 t., £59.; Tientsin, 1 c., £6.; Treport, 1 t. 6 c., £75.; Trinidad, 2 c., £7.; Wellington, 5 c., £15.
- SHEEP DIP**—
Buenos Ayres, 56 t. 5 c., £2,245.; Pt. Elizabeth, 5 t. 14 c., £256.
- SILVER NITRATE**—
Antwerp, 2 cs., £1,210.; Brisbane, 1 cs. (pt.), £16.; Buenos Ayres, 1 cs. (pt.), £12.; Dunedin, 1 cs. (pt.), £19.; Durban, 1 cs., £18.; Colombo, 1 cs. (pt.), £9.; Rangoon, 1 cs. (pt.), £25.
- SOAP**—
Aden, 1 c.; Antwerp, 85 t. 1 c.; Alexandria, 13 c.; Auckland, 15 c.; Amsterdam, 2 t. 19 c.; Antwerp, 20 t. 13 c.; Boulogne, 56 t. 14 c.; Bangkok, 7 c.; Brisbane, 4 c.; Barcelona, 7 c.; Batavia, 17 c.; Bombay, 3 t. 4 c.; Brisbane, 6 c.; Buenos Ayres, 1 t. 1 c.; Cape Town, 1 c.; Calcutta, 1 t. 3 c.; Christchurch, 9 c.; Colombo, 1 t. 6 c.; Constantinople, 19 t. 2 c.; Copenhagen, 10 t. 5 c.; Dantzig, 9 c.; Demerara, 1 c.; Dunedin, 12 c.; Dieppe, 1 c.; Dunkirk, 5 t. 16 c.; Durban, 10 c.; East London, 11 c.; Ghent, 1 c.; Gibraltar, 8 c.; Gothenburg, 1 t. 5 c.; Hong Kong, 17 c.; Helsingfors, 40 t. 9 c.; Haifa, 3 c.; Hong Kong, 2 c.; Hobart, 1 c.; Ipo, 1 c.; Italy, 2 t. 4 c.; Jamaica, 3 c.; Jaffa, 2 c.; Karachi, 18 c.; Kilindini, 2 c.; Madras, 1½ c.; Malmo, 1 t. 10 c.; Mauritius, 16 c.; Melbourne, 1½ c.; Mombasa, 1 c.; Montreal, 6 c.; New York, 12 c.; Ostend, 1 t. 11 c.; Paris, 17 t. 11 c.; Pt. Elizabeth, 3 c.; Rio de Janeiro, 4 c.; Salonica, 1 c.; Shanghai, 1 t. 1 c.; Singapore, 4 c.; Wellington, 5 c.
- SODA**—
Batavia, 5 c., £8.; Pt. Sudan, 7 t., £169.
- SODA ASH**—
Cologne, 185 t., £2,738.
- SODA COMPOUND**—
Alexandria, 15 t., £559.
- SODIUM ARSENITE**—
Cyprus, 8 t., £376.; Durban, 4 t. 1 c., £220.
- SODIUM BENZOATE**—
Cape Town, 3 cs. (pt.), £13.; Mauritius, 1 cs., £14.; Porto Alegre, 1 cs., £17.
- SODIUM BICARBONATE**—
Calcutta, 2 c., £7.; Cape Town, 2 c., £6.; Durban, 6 c., £10.; Fremantle, 1 t. 11 c., £47.; Helsingfors, 3 t. 11 c., £40.; Montreal, 1 t., £45.
- SODIUM BISULPHATE**—
Boulogne, 5 c., £8.; Genoa, 7 drms., £34.; Penang, 2 t. 10 c., £64.
- SODIUM BROMIDE**—
Bombay, 2 cs., £28.
- SODIUM CARBONATE**—
Santiago, Chile, 3 c., £10.; Samarang, 2 cks. (pt.), £6.; Shanghai, 15 c., £8.; Singapore, 3 cks., £13.
- SODIUM CITRATE**—
Melbourne, 1 cs., £7.
- SODIUM HYPO**—
Antwerp, 2 t., £37.; Beyrou, 1 t., £43.
- SODIUM HYPOCHLORIDE**—
Rotterdam, 1 c., £13.
- SODIUM HYPOPHOSPHITE**—
Cape Town, 1 cs. (pt.), £13.; Genoa, 3 cs. (pt.), £50.
- SODIUM HYPOSULPHITE**—
Antwerp, 1 t., £25.; Athens, 8 c., £11.; Bordeaux, 5 t., £90.; Brussels, 1 t., £21.; Samarang, 10 c., £14.; Santiago, Chile, 1 t. 5 c., £33.
- SODIUM IODIDE**—
Naples, 2 cs., £92.
- SODIUM OXALATE**—
Invercargill, 4 cks., £323.; Santos, 1 ck. (pt.), £5.
- SODIUM PHOSPHATE**—
Bombay, 1 t., £29.; Rio de Janeiro, 1 cs., £11.
- SODIUM PRUSSIAN**—
Kobe, 5 t. 13 c., £399.; Philadelphia, 12 t. 1 c., £960.; Yokohama, 10 t. 3 c., £709.
- SODIUM PYROPHOSPHATE**—
Leghorn, 1 t., £70.
- SODIUM SALICYLATE**—
Calcutta, 3 kgs., 1 cs. (pt.), £47.; Colombo, 2 cs., £21.; Durban, 2 cs., £42.; Sydney, 1 cs. (pt.), £6.
- SODIUM SILICATE**—
Cape Town, 8 c., £11.
- SODIUM SULPHATE (GLAUBER SALTS)**—
Lisbon, 5 t. 9 c., £70.
- SODIUM SULPHITE**—
Durban, 12 c., £10.; Kobe, 10 c., £23.; Santiago, Chile, 1 c., £5.; Singapore, 1 t., £24.
- SODIUM STANNATE**—
Dieppe, 1 ck., £64.
- SODIUM SULPHOCARBONATE**—
Calcutta, 1 cs. (pt.), £6.
- SODIUM TARTRATE**—
Melbourne, 1 cs., £8.; Montreal, 2 cks., £70.; Toronto, 5 c., £28.
- STEARINE**—
Wiborg, 15 t.
- STRONTIUM NITRATE**—
Bombay, 20 cs., £99.; Oporto, 2 kgs., £13.
- SULPHUR**—
Amsterdam, 2 c., £8.; Batavia, 2 c., £5.; Dantzig, 2 t. 19 c., £102.; Gothenburg (F.), 5 t., £145.; Gothenburg, 4 c., £20.; Oporto, 2 t. 4 c., £75.; Pernambuco, 3 t. 12 c., £127.; Rio de Janeiro (F.), 10 c., £15.; Yokohama, 1 t., £31.
- SULPHUR (FLOWERS)**—
Piraeus, 10 c., £17.; Rotterdam (F.), 2 t., £53.
- SULPHUR (ROLL)**—
Lisbon, 5 t. 10 c., £146.
- SULPHUR PRECIPITATE**—
Soerabaya, 3 c., £16.; Sydney, 1 c., £4.
- SULPHURIC ACID**—
Calcutta, 1 c., £6.; Colombo, 15 c., £36.; Rangoon, 2 c., £14.; Trinidad, 1 c., £6.
- SULPHUROUS ACID**—
Pt. Elizabeth, 1 ck., £3.
- TALLOW**—
Genoa, 14 t. 19 c.
- TANNIC ACID**—
Antwerp (F.), 1 kg., £13.; Barcelona (F.), 4 cks., £100.; Calcutta, 1 cs., £19.; Calcutta (F.), 1 cs. (pt.), £14.
- TARTARIC ACID**—
Ashburton, 2 c., £39.; Bombay, 8 c., £160.; Calcutta, 1 c., £15.;
- TARTARIC ACID**—
Calcutta (F.), 1 cs., £8.; Durban, 11 c., £200.; Durban, 1 c., £12.; Montreal, 40 c., £620.; New York, 13 t., £1,392.; Rio de Janeiro, 1 c., £25.
- TIN OXIDE**—
Brussels, 4 cks., £155.
- WAX**—
Adelaide, 3 t.; Colombo, £420.
- WHITE LEAD**—
Adelaide, £36.; A'sterdam, £47.; Antwerp, £974.; Auckland, £96.; Beira, £224.; Bombay, £61.; B'deaux, £498.; Boulogne, £489.; Calcutta, £287.; C'church, £55.; Colombo, £14.; Dunedin, £22.; Durban, £49.; E. London, £11.; Lyttleton, £118.; M'bourne, £60.; New York, £3.; Penang, £29.; Pt. Elizabeth, £21.; Rotterdam, £330.; Shanghai, £71.; Timaru, £60.
- ZINC SULPHATE**—
Bombay, 20 cks., £24.
- ZINC SULPHIDE**—
New York, 2 cks., £84.
- MANCHESTER.**
Week ending September 27.
- ACETIC ACID**—
Gothenburg, 8 cs.
- ALUM**—
Quebec, 7 bxs.
- ALUM (CHROME)**—
Bordeaux, 2 cks.
- ALUMINA SULPHATE**—
Bordeaux, 395 bgs.
- AMMONIUM CARBONATE**—
Christiania, 75 pkgs.; Gothenburg, 100 kgs.
- BARIUM CHLORIDE**—
Havre, 1 cs.
- BARIUM SULPHOCYANIDE**—
New York, 4 cs.
- BLEACHING POWDER**—
Gothenburg, 26 cs.
- BORAX**—
Antwerp, 54 bgs.
- COAL PRODUCTS (otherwise undes.)**—
Antwerp, £4,591.; Gothenburg, £1,063.; Havre, £38.
- COAL PRODUCTS**—
Carbolic Acid
New York, 13 pkgs.
- COPPER SULPHATE**—
Ghent, 51 sks.
- DISINFECTANTS (otherwise undes.)**—
Sydney, 697 pkgs.; Treport, 4 cs.
- DYES/STUFFS**—
Tanning Liquid
Antwerp, 60 brls.
- GLYCERINE**—
Bordeaux, 102 cs.
- HYDROSULPHATE**—
Gothenburg, 11 drms.
- MAGNESIUM CARBONATE**—
Bordeaux, 25 kgs.
- SALT**—
Gothenburg, 8,448 pkgs.; Quebec, 3,200 pkgs.
- SALT/CAKE**—
Christiania, 986 t.
- SALTPETRE**—
Bordeaux, 2,500 bgs.
- SIZE**—
Antwerp, 2 cks.; Gothenburg, 1 ck.; Treport, 42 cks.
- SOAP**—
Gothenburg, 267 cs.
- SODA ASH**—
Gothenburg, 2,490 bgs.
- SODIUM BICARBONATE**—
Gothenburg, 10 bgs.
- SODIUM HYPOSULPHATE**—
Bordeaux, 50 bgs.
- SODIUM PHOSPHATE**—
Treport, 244 bgs.
- SODIUM PRUSSIAN**—
New York, 76 cks.
- SODIUM SULPHIDE**—
Bordeaux, 38 drms.
- SULPHUR (FLOWERS)**—
Treport, 70 bgs.
- TARTARIC ACID**—
Gothenburg, 6 kgs.
- MIDDLESBROUGH**
Week ending September 27.
- AMMONIUM NITRATE**—
Ceylon, 30 t., £961.
- BARIUM NITRATE**—
Antwerp, 2 t., £90.
- BORAX CRYSTALS**—
Rouen, 4 t. 14 c., £300.
- COAL PRODUCTS**—
Pitch
Aviles, 1,196 t. 11 c., £3,739.; Antwerp, 1,036 t., £3,236.; Rotterdam, 378 t., £1,190.
- MAGNESIUM CARBONATE**—
Dunkirk, 10 t., £391.; Rouen, 9 t. 17 c., £592.
- TAR OIL**—
Dunkirk, 742 galls., £75.
- NEWCASTLE-ON-TYNE**
Week ending September 27.
- ACID**—
Rotterdam, 2 cs.
- ANTIMONY**—
Rotterdam, 400 t.
- BITUMASTIC SOLUTION**—
Guayaquil, 8 t.
- BLEACHING POWDER**—
Copenhagen, 4 t. 18 c.; Rotterdam, 24 t. 17 c.
- CAUSTIC SODA**—
Gothenburg, 1 t.; Rotterdam, 43 t. 3 c.
- FERRO MANGANESE**—
Bilbao, 199 t.
- GELATINE**—
Bergen, 1 c.; Copenhagen, 18 c.
- MAGNESIA**—
Antwerp, 2 t. 2 c.
- MAGNESIUM CARBONATE**—
Antwerp, 2 t.
- NICKEL SULPHATE**—
Bergen, 6 c.
- PITCH**—
Dunkirk, 5 t.
- PLUMBAGO**—
Bilbao, 6 t.
- POTASSIUM BICHRIMATE**—
Rotterdam, 1 t.
- RED LEAD**—
Antwerp, 2 t.; Copenhagen, 5 t.; Dunkirk, 14 t. 13 c.; Gothenburg, 15 t. 19 c.
- SOAP**—
Antwerp, 20 t.
- SODA CRYSTALS**—
Rotterdam, 60 t.
- SODIUM SULPHITE**—
Rotterdam, 5 t. 3 c.
- SULPHUR**—
Gothenburg, 10 t.
- WHITE LEAD**—
Antwerp, 24 t.; Dunkirk, 2 t. 19 c.; Gothenburg, 12 t. 12 c.
- ZINC WHITE**—
Rotterdam, 1 t. 1 c.
- N. & S. SHIELDS.**
Week ending September 27.
- CHEMICALS (otherwise undescribed)**—
Christiania, 12 t. 4 c.
- STOCKTON-ON-TEES.**
Week ending September 27.
- NIL.**
- SWANSEA**
Week ending September 27.
- NIL.**

PRICES CURRENT.

THURSDAY, Oct. 2nd, 1919.

PREPARED BY MESSRS. HIGGINBOTTOM AND CO., 21, SPRING GARDENS, MANCHESTER.

The values stated are F.O.R. at makers' works, or at usual ports of shipment in U.K., unless otherwise specified.
The prices in different localities may vary.

Acids:—		£ s. d.	
*Acetic	40% and 60% ... per cwt.	30/-	& 45/-
"	Glacial ... per ton	85	0 0
Arsenic, S.G. 2,000°	... per ton	70	0 0
Boric, Crystals	... per lb.	72	0 0
*Fluoric	... per lb.	0	0 7
*Muriatic (Tower Salts), 28° Tw.	... per carboy	0	6 6
*Nitric, 80° Tw.	... per ton	32	0 0
Oxalic	... per lb.	0	1 2½
Phosphoric, 1,750°	... per ton	0	1 9
*Sulphuric (fuming, 70%)	... per ton	—	—
"	(Pyrites, 168°) ...	7	18 9
"	(" 140°) ...	4	10 0
"	(free from arsenic, 144°) ...	5	7 4
Tannic (commercial)	... per lb.	0	2 6
Tartaric (crystals)	... per lb.	0	3 2
*Acetone	... per ton	80	0 0
*Alum, loose lump (delivered)	... per ton	17	0 0
Alumina Sulphate (pure)	... per ton	17	0 0
Aluminoferic (in slabs)	... per ton	8	10 0
Aluminium (Ingot Metal, 98/99%)	... per ton	150	0 0
*Ammonia, Anhydrous	... per lb.	0	1 10
"	880 ... per ton	33	0 0
"	920 ... per ton	20	0 0
"	Carbonate ... per lb.	0	10 6½
"	Muriate (grey) ... per ton	47	10 9
"	(salammoniac) 1st & 2nd, per cwt.	80/-	& 75/-
"	Nitrate ... per ton	60	0 0
"	Phosphate ... per ton	110	0 0
"	Sulphate (grey), London, net	—	—
"	" " Hull ...	—	—
"	" " Manchester.	—	—
*Aniline Oil (pure)	... per lb.	0	1 2
Aniline Salt	... per lb.	0	1 2
Antimony	... per ton	45	0 0
"	(tartar emetic), 43/44% ... per lb.	0	3 4
"	(golden sulphide) ... per lb.	0	1 3
Arsenic, white powdered	... per ton	60	0 0
Barium Chloride (in casks)	... per ton	23	10 0
"	Carbonate (native), 92/94% ...	11	10 0
"	Sulphate (native levigated) ...	£7 to £14	
Baryta Chlorate	... per lb.	0	1 3
*Bisulphide of Carbon	... per ton	55	0 0
Bleaching Powder, 35%	... per ton	15	0 0
"	Liquor, 7% ...	6	0 0
Casein (commercial)	... per ton	90	0 0
Chromium Acetate (crystals)	... per lb.	0	1 0
Calcium Chloride	... per ton	8	0 0
China Clay (at Runcorn), in bulk	... per ton	70/-	to 90/-
Coal-tar Products and Dyes:—			
Alizarine (artificial), 20%	... per lb.	0	2 0
Magenta	... per lb.	18/-	to 35/-
Anthracene, 40/50% A, f.o.b., L'don, per unit.	... per unit.	0	0 7
Benzol, 90's (naked)	... per gal.	0	2 0
"	50/90's ...	0	1 10½
Carbolic Acid (crude, 60°)	... per lb.	0	1 7½
"	(crystallised, 40°) ... per lb.	0	0 9½
"	Acid (pale liquid, 97/98%) ... per gal.	0	2 9
*Creosote (ordinary), naked	... per ton	0	0 6½
*Crude Naphtha, 30% at 120°C.	... per ton	0	0 9
*Grease Oils, 18° Tw. (naked)	... per ton	6	10 0
Pitch, f.o.b., Liverpool or Garston	... per ton	3	2 9
*Solvent Naphtha, 90% at 160°	... per gal.	0	2 5
Copper	... per ton	103	0 0
"	Sulphate ...	41	0 0
Dross Salts	... per ton	39	0 0
*Glycerine (crude), 80%	... per ton	72	0 0
"	(industrial, S.G. 1,260) ...	110	0 0
*Iodine	... per oz.	0	1 0
*Iron Nitrate, 80° Tw.	... per ton	12	0 0
"	Sulphate (copperas), delivered ...	4	10 0
"	Sulphide ...	9	0 0
Lead (Foreign Pig)	... per ton	25	12 6
"	Litharge Flake ...	45	0 0
"	Acetate (white) ...	83	0 0
"	(brown) ...	69	0 0
Lead, Carbonate (White lead), pure	... per ton	50	0 0
"	Nitrate ...	56	0 0
Lime, Acetate (brown)	... per ton	11	0 0
"	(grey), 80% ...	17	0 0
Magnesium Chloride	... per ton	15	10 0
"	Carbonate (light) ... per cwt.	2	5 0
"	Calcined Magnesite ... per ton	21	10 0
"	Sulphate (Epsom Salts) (coml.) ...	11	0 0
"	(druggists) ...	18	0 0
Manganese, Sulphate	... per ton	75	0 0
"	Borate ...	95	0 0
*Methylated Spirit, 64° (industrial)	... per gal.	0	5 7
*Naphtha (Wood), Solvent	... per ton	0	10 0
"	Miscible, 60° p. ...	0	10 0
Oils:—			
*Cottonseed	... per ton	95	0 0
*Linseed	... per ton	90	0 0
Stearine, 115-120° M.P.	... per ton	105	0 0
Potassium, Bichromate	... per lb.	0	1 6
"	Carbonate, 80/82% ... per to	95	0 0
"	Chlorate ... per lb.	0	1 0
"	Hydrate (Caustic Potash) 90% per ton	160	0 0
"	" 75/80% ...	140	0 0
"	Potash Hydrate Liquid, 38° B: ...	70	0 0
"	Nitrate (refined) ...	55	0 0
"	Permanganate (commercial) per lb.	0	3 3
"	Prussiate (yellow) ...	0	1 9
"	(red) ...	0	5 0
"	Sulphate, 90% (ex ship) ... per ton	25	0 0
"	Muriate, 80% ...	25	0 0
Silver (metal)	... per oz.	0	5 3
Sodium (metal)	... per lb.	0	1 0
"	Acetate ... per ton	51	0 0
"	Arseniate, 45% ...	60	0 0
"	Borate (Borax), Crystals ...	39	0 0
"	Bicarbonates (1 cwt. kegs) ...	10	0 0
"	Bichromate ... per lb.	0	0 11
"	Carb. (Caustic Soda-ash), 48% per ton	12	10 0
"	(Alkali), 58% (bags) ... f.o.r.	6	0 0
"	(Soda Crystals), (bags) ... wks.	4	2 6
"	Chlorate ... per lb.	0	0 6
"	Cyanide (100% basis) for export ...	0	0 10
"	Hydrate (76% C. Soda) (f.o.r.) ... per ton	24	0 0
"	" (74% C. Soda) ...	23	5 0
"	" (70% C. Soda) ...	22	0 0
"	" (60% C. Soda) ...	21	0 0
"	(pure liquid, 90° Tw.) ...	10	2 6
"	77/78% Powdered (99%) Hydrate ...	24	10 0
"	Hyposulphite (commercial) ...	16	10 0
"	Manganate, 25% ...	65	0 0
"	Nitrate, 96%, refd., f.o.r., L'pool ...	21	0 0
"	Nitrite, 100% ...	60	0 0
"	Phosphate ...	26	0 0
"	Prussiate ... per lb.	0	0 10
"	Silicate (glass) Alkaline ... per ton	12	5 0
"	(liquid, 100° Tw.) ...	9	10 0
"	Sulphate (Saltcake), delivered ...	3	0 0
"	(Glauber's Salt) ...	4	0 0
"	Sulphide (conc.), 60/65% casks ...	24	0 0
"	Sulphite ...	10	0 0
Sulphocyanide, Ammonium, 95%	... per lb.	0	2 0
"	Barium, 95% ...	0	1 4
"	Potassium ...	0	2 4
"	Calcium, 70% ... per lb.	0	1 4
Sulphur, (Flowers)	... Sicilian per ton	21	0 0
"	(Roll Brimstone) ...	21	0 0
"	Brimstone (best thirds) ...	21	0 0
"	(ex ship) ...	14	10 0
Tallow	... per ton	100	0 0
Tin Crystals	... per lb.	0	1 10
"	English Ingots ... per ton	271	0 0
Titanium, Potass. Oxalate	... per lb.	0	1 6
Titanous Chloride	... per cwt.	4	10 0
Zinc (Spelter)	... per ton	41	10 0
"	Powder, 83/92% ...	70	0 0
"	Chloride (solution, 102° Tw.) ...	23	10 0
"	Sulphate, Crystal ...	22	0 0

* Packages extra or returnable; otherwise, prices usually include packages.

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Readers are invited to forward items of intelligence, company reports and balance-sheets, or cuttings from local newspapers of interest to the trades concerned.

Articles, reports, and correspondence on all matters of interest to the chemical and allied industries, home and foreign, are solicited. Correspondents should condense their matter as much as possible, write on one side only of the paper, and in all cases give their names and addresses, not necessarily for publication. Sketches should be sent on separate sheets.

CURRENT TOPICS

TRANSPORT PROBLEMS.

THE manner in which the essential traffic of the country was maintained during the period of the railway strike—short though it happily was,—leaves behind it a vivid reminder of the difficulties both as regards facilities and charges which face the trading community now, and will continue to do so in the near future. The chemical industries, involved in a process of reconstruction and establishment upon an altogether new and wider basis, will, in the newer branches, feel the effects of the shortcomings of our present transport system far more than the old-established industries, for it is clear that we shall shortly be met with an increase of something like 50 per cent. in the existing freight rates. The bitterness of that knowledge is intended to be sweetened by the consolation that it will be necessary only during the transition period, when the Ministry of Ways and Communications is endeavouring to bring order out of chaos, and to replace an existing wasteful system, hitherto almost solely railways, by something more modern and comprehensive. Unfortunately, as we have seen with wages, these so-called temporary increases have a distasteful habit of becoming permanent, and Ministers, having succeeded in increasing the rates for the carriage of goods over our railway systems, will be in a very strong position, and will have no lack of reasons for maintaining them, if only for the reason that he would be a clever man who definitely could say that the period of transition had come to an end. It is quite clear that the country is sick of subsidies, and therefore we feel that any suggestion of giving preferential treatment to the unstable key industries, to which a measure of fiscal protection has been given already by the Government, would not meet with a very courteous reception. The railway strike has shown the possibilities of road traction, and it

seems now that within economical distances it will probably pay manufacturing firms to undertake themselves the carriage of their goods by road. To some extent, and in the town centres, that has already been done, but we have experience to guide us now, which foretells an early recourse to this mode of transport over much longer distances and with much greater bulk of goods. One of the leading authorities on railway questions has recently said that it would be impossible to establish financial equilibrium merely by increasing rates, and that drastic economies in working expenses are essential. As an abstract theory, of course, that is sound enough, and might have some chance of being tested if the railways had not become what is, in fact, a Government monopoly. Moreover, any chance of testing such a theory seems to be precluded, because—and the fact appears to have been quite forgotten—there have been no published accounts concerning British railways since 1913. Meanwhile, we are given a few figures in Parliament of the millions sterling which are being lost annually over the operation of the British railways, which many people are not at all inclined to accept as gospel. The economies which standardisation of railway rolling-stock and co-ordination of working will bring about are too obvious to need mention, but it seems the settled policy to increase the rates now, and perhaps at some future time to reduce them slightly and then placard the fact that the administration has done certain wonderful things for the traders of the country. As the advantages from the two causes we have mentioned should be large and immediate, it would be well to await the result before adding to the already heavy industrial difficulties by making a large increase on railway rates, after the fashion of the 6s. per ton increase in coal. Meantime, it is the duty of traders themselves to develop other forms of traction, over the management of which they can perhaps have some control.

LABOUR CONDITIONS IN THE CHEMICAL INDUSTRY.

An announcement has been made giving briefly the results of the activities of the Chemical Trade Shift Inquiry Committee, composed of representatives of employers and workmen, and formed for the purpose of inquiring into the position of shiftmen as affected by recent reductions in working hours. On behalf of the workmen it is stated that the conversion from twelve- to eight-hour shifts has been attended by a reduction in earnings of varying amounts, and that no concession was made to shiftmen to correspond with the grant of the 47-hour week to day workers. It was urged, in the first place, that the loss of earnings suffered by the shiftmen should be restored, and, secondly, that the shiftmen should be granted one day off per week, or, alternately, that they should receive a monetary advance. In the case of the day workers, it was asserted that in some cases the introduction of the 47-hour week had resulted in a loss of earnings, and the claim was put forward that that loss should be made good. The workmen's representatives on the committee suggested that minimum

rates of 1s. 6d. and 1s. 8d. per hour for day workers and shiftmen respectively should be fixed. These proposals are to be submitted by the employers' representatives at an early meeting of the Chemical Employers' Federation. The Joint Industrial Council for the Chemical Industry have arrived at an agreement on the question of annual holidays for chemical workers. Subject to continuous and satisfactory service from April 1 of this year, to March 31, 1920, a week's holiday, with full pay, is to be granted to all workpeople.

On this subject attention may be called to the address of Mr. John Allan to the members of the Manchester Section of the Society of Chemical Industry last week. To British chemical manufacturers not the least interesting portion of Mr. Allan's address was his reference to the cost of labour in the German chemical industries. Between a 66-hour week, which was not uncommon before the war, and the eight-hour day, there is a vast difference, but such has been the war-time experience of German chemical manufacturers. In addition, the cost of labour has gone up from 0.65 mark per hour to 1.7 mark, an increase of 90 per cent. The total increase, taking into account the reduced hours of working, is no less than 160 per cent. On the top of this, moreover, there is a very considerable reduction in output per worker, variously estimated at from 25 to 50 per cent., compared with the pre-war output. It will thus be seen that conditions in Germany closely approximate to those prevailing in this country, and British chemical manufacturers have little to fear on this score. On the other hand, and Mr. Allan rightly emphasised the point, the extensions to the German chemical works during the period of the war have been made in no haphazard manner, and the important question of their suitability for peace production has received full consideration.

AUSTRALIAN IMPORTS OF CHEMICALS.

ACCORDING to the report on the trade of Australia in 1918, the imports of chemicals during the year 1917-1918 were valued at £2,480,297., of which £978,260., or 39.4 per cent. originated from the United Kingdom. In the preceding twelve months the total imports were valued at £2,058,415., and in 1913, £1,525,681. The imports of paints and varnishes were valued at £423,397., compared with £666,983. in 1916-1917, the principal decrease being in paints prepared for use, the values for which were £137,264. in 1917-1918, and £362,941. in 1916-1917. This falling-off was due partly to shipping difficulties and partly to the greatly increased local production. The writer of the report (Mr. S. W. B. McGregor) states that the creation of an alkali industry is receiving the attention of the Commonwealth Government, under whose auspices a committee of chemists and users of alkali was formed to investigate the subject. A representative of a leading British firm recently visited Australia, and placed his knowledge at the disposal of the committee. The committee has collected a quantity of useful information, but has not yet made a selection from the number of sites inspected.

SODIUM PEROXIDE.

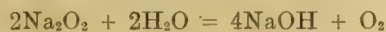
ITS PROPERTIES AND MICROSCOPICAL CHARACTERS.

By JAMES SCOTT.

SODIUM peroxide has, during comparatively recent years, become very widely adopted in the various branches of textile and kindred industries as a powerful bleacher for fibres of all varieties, of both animal and vegetable origin. It is superior, for many reasons, into the details of which it is not proposed to enter, to the commoner, old-fashioned bleaching agents, and therefore deserves a few remarks. In handling the subject from a microscopical standpoint it may be necessary to repeat a few particulars already known to some readers, but mention of them will make this article comprehensive.

Sodium peroxide, Na_2O_2 , was discovered in 1810 by Thenard and Gay-Lussac. It is prepared on the large scale by igniting metallic sodium in a current of oxygen in aluminium vessels, and is a pale yellow, nominally

Speaking of its practical effectiveness, it must be stated that sodium peroxide is thirteen times stronger in available oxygen than is hydrogen peroxide of ten volumes strength, and eleven times stronger than is the latter of twelve volumes strength. In other words, 11b. of sodium peroxide is equal to 1.3 or 1.1 gallons of ten or twelve volume peroxide respectively. Its bleaching properties depend entirely on the process of oxidation, and the results obtained by its use are consequently reliable and absolutely stable, instead of being of a fugitive character, as is so often the case in connection with chloraceous, sulphurous, and many other bleachers. Typical reactions of sodium peroxide are the following:



No. 1.—One twenty-fourth inch of a layer of sodium peroxide, many of the grains of which have rapidly disintegrated into compound globules; magnified.



No. 2.—One twenty-fourth inch of a layer of sodium peroxide almost instantly reforming under the influence of water; magnified.



No. 3.—One twenty-fourth inch of a layer of sodium peroxide being treated with absolute alcohol. In the complete state sodium hydroxide is formed. Magnified.

amorphous, anhydrous powder, which forms, in conjunction with water, the crystalhydrate, $\text{Na}_2\text{O}_2 \cdot 8\text{H}_2\text{O}$. Its constitution is analogous with that of hydrogen peroxide, so that it is a true superoxide. When dissolved in water it yields hydrogen peroxide and sodium hydroxide.

It is curious to note the old chemists' views on the oxides of sodium. I quote the following sentence from a volume published several years ago: "There are two well-defined compounds of sodium and oxygen—the protoxide, anhydrous soda, NaO ; and the binoxide, NaO_2 , or perhaps tetroxide, NaO_4 ; they are formed by burning sodium in air or oxygen gas." There is no need for comment.

Some chemists prefer to regard the peroxides as having two definite constitutions, the one kind being ordinary peroxides, or simply compounds of an element with a certain proportion of oxygen, and the other—to which group sodium peroxide belongs—being peroxidates, or compounds of an element with hydrogen peroxide, of which latter they are really salts. But this classification does not appear to find much favour, and obviously might lead to general technical confusion.

No other peroxide applicable to bleaching processes is so rich in readily available oxygen as is sodium peroxide. In every 100lb. there are 19.07lb. of available oxygen.

An exceptionally fine, almost vapour-like, dust-cloud rises when bulk quantities of sodium peroxide are disturbed. If sodium peroxide is kept well sealed up from the air, and is meantime stored in a cool position, it remains quite unchanged for very long periods, but owing to its peculiar tendencies it is liable, if carelessly manipulated, to attract moisture and disintegrate. It is hardly safe to allow any of it to stop long in contact with paper, straw, wood, etc., more especially if dampness is prevalent, because its very active oxygen is capable of reacting with water and spontaneously setting such substances aflame. At the same time, one may deliberately make several experiments in this direction without being successful in procuring results of the kind mentioned.

Strictly speaking, sodium peroxide is neither combustible nor inflammable, but if it is brought into contact with incandescent or burning matter it instantly ignites. I held a lighted match to a small piece of the powder and within a few seconds the peroxide fizzled up into a red-hot ball. Naturally, it is to be expected that manufacturers who use sodium peroxide will guard against such possibilities.

Although sodium peroxide is regularly referred to as amorphous, its minute particles possess a semi-crystalline

formation, which is evident upon magnifying the substance.

In my experiments with sodium peroxide I encountered many interesting phenomena. By gently heating a pinch of it upon glass it rapidly changed to a deep yellow colour, and thence to a dark brown one. If the powder is subsequently cooled these colours fade away and the very pale, almost white, tint is restored. A lavender shade temporarily develops during the cooling if the preliminary heating has been strong. When the application of heat is continued long enough the substance fuses, and yields a film crowded with minute globules. This film—a white one—eventually cracks minutely as it cools, and thereby obtains an almost semi-crystalline structure.

Considering that the substance *destroys* colour in other substances it is certainly peculiar that those named are occasioned in these special instances. Like the so-called (and probably *partial*) oxide films on tempered steel—they form rainbow tints,—these spectacles are difficult to explain to the satisfaction of everyone. When a pinch of sodium peroxide is spread on glass its grains quickly dillesce, each separate one, however small it is, becoming liquefied on its own account, with a corresponding increase in the size of the modified object. A remarkable spectacle can be witnessed as multitudes of ordinarily invisible globules of gas escape, and are replaced by others, until equilibrium is obtained. I noticed that the powder which was in direct contact with the glass liquefied first, that which stood away by itself keeping fairly dry for some time.

In No. 1 illustration is shown a typical view of sodium peroxide without added moisture. The mass of minute grains slipped and fell about as they liquefied. The fluid globules eventually solidified into transparent crystalline formations through the evaporation of excess water and demonstration of caustic-carbonate. When a little sodium peroxide is sufficiently moistened with water the crystallohydrates previously alluded to are quickly formed in the fluidised portion of the mass, and appear as minute, flat, transparent crystals of the kind shown magnified in No. 2 illustration. They were accompanied, or preceded, by the development of rosetted clusters (modified globules) and irregular films of broken crystals and bubbles.

Upon *saturating* sodium peroxide with water, hosts of these crystals, along with crowds of ever-changed gas globules, turned and twisted about. This solution, when heated, discharged a mist composed of tiny globules, which settled all round in the vicinity, and subsequently crystallised. The distance to which these ordinarily invisible globules are expelled from the original mass is surprising, but I suppose further reference to this phase of the subject would hardly be relevant.

When sodium peroxide is treated with absolute alcohol at 0° C. (or a solution of hydrogen chloride in alcohol) it forms sodyl hydroxide, a white powder. Some idea of the reaction can be obtained by placing a small quantity of sodium peroxide on glass and dropping some absolute alcohol upon it. The dissolved peroxide is converted into a flaky crystalline substance which appears as shown in No. 3 illustration. The objects, by being tilted up on end among themselves, show rosetted edges. They may redissolve in the surrounding liquid, or unite into a continuous layer or skin. Indeed, they undergo almost inexplicable changes.

If sodium peroxide is placed in a test tube and the alcohol is poured over it, the resultant solution leaves

a sheet of arborescent crystals upon being evaporated. If the excess of deposit is shaken up into the alcohol and some of the milky fluid is poured on to the glass holder, results of like character appear. The alcoholic solution gradually becomes bright yellow, and thence passes into a red one.

NITRATE OF SODA CONSUMPTION IN THE SULPHURIC-ACID CHAMBER PROCESS.

AT the annual meeting of the American Chemical Society, held recently at Philadelphia, Mr. A. M. Fairlie read a paper before the Fertiliser Division on "The Conservation of Nitrate of Soda in the Chamber Process for the Manufacture of Sulphuric Acid."

The author pointed out the lack of uniformity in stating the amount of nitrate of soda consumed in the manufacture of sulphuric acid. The consumption may be calculated on the basis of the sulphur contained in the ore, the sulphur burned out of the ore, or the sulphur in the sulphuric acid produced. In European countries it has been customary to express the nitre consumption in terms of nitric acid of various strengths. The consumption should be expressed in terms of percentage of the nitre consumed on the basis of the sulphur in the acid made. The average consumption of nitre is probably close to 4 per cent. Three and a half per cent. is considered good practice at present, but this is really not a low consumption.

In various acid plants, said the author, the equivalent amount of nitrate in circulation in the chamber system, based on the amount of sulphur in the acid made, will range from about 20 per cent. for brimstone gas to about 50 per cent. for dirty copper blast-furnace gas. Assuming an average of 25 per cent., this means a loss of 3½ lb. out of every 25 lb., or 14 per cent. of the nitre employed in the chamber system.

The nitre, in addition to that in the nitrous vitriol used in the Glover tower, may be added in the following ways: By potting nitrate and sulphuric acid; by introducing nitric acid into the top of the Glover tower; by spraying nitric acid or nitrate in solution into the first chamber, or occasionally in other ways.

Control of the chamber process is effected (a) by observing the differences between chamber temperatures at different points in the system; (b) by observation of the colour of the gases in the chambers or flues; (c) by a combination of both methods.

The best recovery of nitre in the Gay-Lussac tower is obtained when the nitrogen oxides in the gas mixture entering the tower are such that the proportions of nitric oxide and of nitrogen peroxide are such that the combination gives nitrogen trioxide with no excess of either of the constituent gases. In order to secure and maintain this desirable combination of the two oxides of nitrogen, a small quantity of sulphur dioxide is necessary in the gas mixture escaping from the last chamber—just sufficient to keep the required amount of the nitrogen compound reduced to the nitric oxide form. Obviously, continuous analytical control of the gases is indispensable for accurate operation.

The Gay-Lussac tower is not an efficient part of the system from the standpoint of economy in nitre consumption. It is costly, and it involves the handling of enormous quantities of acid both to and from the tower, especially when it is multiplied by two or three, even though a third tower has been found profitable in some plants.

INDUSTRIAL POISONING IN CHEMICAL MANUFACTURE.*

Review of War Years.

By T. M. LEGGE, C.B.E., M.D.†

IN this report for the year 1918, opportunity is taken of reviewing briefly the incidence of poisoning and industrial disease during the last four years—the period of the war. The figures for notification of poisoning by lead, phosphorus, arsenic, and mercury during these years are now published for the first time in the table below. They have great interest, reflecting as they do how important branches of industry were directly or indirectly affected by the dislocation of work, showing an increase of cases in one, and a decrease in another. The figures have the great advantage of being comparative, so that a steady decrease occurring in an industry over a number of years points to a radical change, the

made the processes in which they were employed much safer than they used to be. The number of women attacked was 25 in 1915, 30 in 1916, 45 in 1917, and 20 in 1918, as compared with 68 in 1913, and 70 in 1912. In all cases where special rules or regulations were relaxed to allow of the employment of women, conditions were specified as regards their employment. Thus, in white lead works, only women over 35 years of age were allowed at work in the white beds, none were to be employed for more than eight hours a day, including mealtimes, and food was to be provided before commencing work. Similarly, in paint and colour works, separate and suitable provision was required as to mess-room, cloakroom, washing accommodation, etc. In nearly all instances employers accepted these conditions in the spirit as well as the letter.

From an early date in the war, lead was controlled by the Ministry of Munitions. On its use for Government work, including smelting, conversion into shrapnel, the

DISEASE AND INDUSTRIES.	REPORTED CASES.*							
	1918.	1917.	1916.	1915.	Average. 1912—1914.	Average. 1909—1911.	Average. 1906—1908.	Average. 1903—1905.
Lead poisoning	144 ¹¹	317 ²¹	348 ²¹	381 ²¹	522 ³³	576 ³⁵	619 ³⁰	601 ²³
1. Smelting of metals	15 ¹	46 ¹	39 ⁴	47 ¹	39 ⁴	49 ⁴	45 ²	31 ¹
2. Brass works	1	3 ¹	3	—	7	7	9	10 ¹
3. Sheet lead and lead piping	—	3	3	3	6	8 ¹	9	9
4. Plumbing and soldering	24 ²	34	12	17 ²	32 ³	30 ¹	21 ²	24 ²
5. Printing	8 ¹	6 ³	12	27 ³	27 ¹	29 ²	24 ²	16 ²
6. File cutting	2	4 ¹	8 ²	2	13	12 ¹	11 ¹	19 ²
7. Tinning	2	2	4	3	11	17	18	13
8. White lead	—	17	18 ¹	40	27 ¹	36 ²	86 ³	105 ¹
9. Red lead	2	13	15	8	5	11	8	9
10. China and earthenware	11 ¹	15 ⁷	23 ⁷	26 ⁴	56 ¹⁰	76 ⁷	109 ⁸	96 ³
10a. Litho-transfers	—	—	—	—	1	1	6	—
11. Glass cutting and polishing	1	—	—	—	2 ¹	3 ¹	4 ¹	2
12. Vitreous enamelling	—	1	5	5 ¹	8	14	6	3
13. Electric accumulators	16	27 ¹	44 ¹	64	41	27 ¹	24	29
14. Paints and colours	3	10	22	12	21	26 ¹	32	43 ¹
15. Coach building	12 ³	21 ²	33	39 ⁵	71 ⁴	90 ⁶	75 ⁴	60 ⁴
16. Ship building	9 ²	19	25 ³	18 ²	32 ³	28 ³	21 ¹	35 ¹
17. Paint used in other industries	15	20 ¹	20	16 ²	45 ²	50 ¹	44 ²	41 ²
18. Other industries	23 ¹	76 ⁴	61 ³	54 ¹	77 ²	62 ³	67 ³	54 ¹
Phosphorus poisoning	3	3	2	3	—	1	1	1 ¹
Arsenic poisoning	3 ¹	30 ⁵	—	3	4	7	12 ¹	4
Mercurial poisoning	9	17	18	6	14	10	7	6
Toxic Jaundice	34 ¹⁰	190 ⁴⁴	206 ⁵⁷	—	—	—	—	—

*The principal numbers relate to cases, the small figures to deaths. Fatal cases not reported in previous years are included as both cases and deaths.

result either of improved methods of working, or diminution in scope. A stationary position, on the other hand, indicates that ameliorative measures for the time being have reached their limit.

LEAD.

The principal factor to be considered in estimating the position, so far at any rate as lead poisoning is concerned, is whether or not locally applied exhaust ventilation for the removal of dust and fumes is practicable. If it can be applied, great improvement is possible; if it cannot, there will either be an increase in the cases of poisoning, or the numbers will remain stationary. This is borne out by the figures for 1915 to 1918, but they have during this period been considerably affected by other circumstances. The calling up of men led to the increased employment of women in lead industries.

Lead usually takes several months or years to show its effects, and there has been no increase in the number of women reported as suffering. This may be due to the fact that they had not worked long enough, but it may equally be true to say that the greater precautions taken in the removal of lead dust by exhaust ventilation have

manufacture of electric accumulators, sheet lead, and lead piping required for the manufacture of acids, etc., no limits were placed, but wherever private orders were in question the supply was restricted. The heavy pressure placed on firms where smelting of lead was carried on is shown in the figures. Of the total 147 cases, 32 were contracted in the extraction of spelter. The comparatively very high figures for plumbing and soldering were undoubtedly due to the great amount of lead burning required in erecting acid chambers, vats, etc., in large munition factories. The conditions under which the men engaged had to carry on their work, exposed to acid fumes and other defective conditions, were often trying.

Figures referring to white lead, red lead, and paints and colours, may be grouped together. The absence of a single reported case of white lead in 1918 is remarkable, seeing that in 1899 there were 399. The manufacture was rationed to about 50 per cent. of the pre-war output. The works were closed entirely in 1917 for six months, but in 1918 activity in them was considerable—when quantities were manufactured equal to about 60 per cent. of that in pre-war time. Red lead was in great demand, and the figures in 1916 and 1917 show it. In considering the use of lead in the various industries, it has

* Abstracted from the Annual Report for 1918 of the Chief Inspector of Factories and Workshops.

† H. M. Medical Inspector of Factories.

to be borne in mind that not only were we producing material for our own country, but that France and the Allied States relied on us.

Sustained effort will be required to prevent, as far as possible, the cases of lead poisoning from increasing again in peace time. On the practical side little more is to be learnt as to how lead poisoning is caused, and it can be taken as axiomatic that all risk lies in inhalation of dust and fume. These removed or prevented there will be no lead poisoning. At the same time, none of the subsidiary means for minimising effects of lead can be neglected, such as cleanliness of the person, periodic medical examination to detect early signs, so that attention may be directed to points in the process from which dust or fume must be coming off, labour-saving devices, movement study, and industrial research in the effort to find effective substitutes making unnecessary the continued use of the metal.

PHOSPHORUS.

"Phossy jaw" underwent recrudescence in 1915-1918, during which time 11 cases were reported from the one factory in which the manufacture of phosphorus is carried on. Until these cases, an apparent immunity, extending over many years, had been enjoyed. Although the number of individual workers brought into contact with phosphorus for one and another war purpose has been considerable, only one case has been reported in processes other than the manufacture. With this exception, all had worked for years in phosphorus processes. In the factory in question, examination of the dental condition by a surgeon and reference by him to a dentist of those whom he considered needed treatment had been relied on in past years, instead of examination by a dentist in the first instance, which would, in my opinion, have been the wiser course. After the first case (which proved fatal) in 1914, the firm engaged the services of a dentist with the intention, since carried out, of putting the teeth of all those coming into contact with phosphorus into a sound condition, and linking up the work of the dentist with that of a consulting surgeon of the highest standing in case of need. The dentist attends two afternoons a week in the well-equipped dental surgery on the works and quarterly examination of all the workers has been arranged for. This examination has led to the detection of the cases of necrosis, the presence of which was shown after the removal of the decayed teeth. No case has been reported since July, 1918. Dealing with these cases Mr. Thomas (Walsall) reports as follows:

"With three exceptions all the cases reported as suffering from phosphorus poisoning have been employed in connection with the condenser plant. The condenser plant is situated at the back of the furnaces, and the whole is contained in one large lofty building. Men employed in the phosphorus process can be divided into two sections—furnace men and condenser men. It is noteworthy that among the furnace men no cases have been reported. These men do not handle phosphorus, but are subject to the pentoxide fumes of burning phosphorus when any slight leak occurs on the furnace. Although in the same building as the condensers, the fumes from the condenser side do not appear to reach these men to any extent. This is probably due to the heated air rising from the furnace acting as a kind of screen. A much larger number of men are employed in handling phosphorus and phosphorus mud on the condenser side.

"In emptying the condensers the crude phosphorus is syphoned off while in the molten state and run under

water into cast-iron moulds, where it solidifies. After the phosphorus is drawn off, the residues, known as phosphorus mud, are also syphoned off and removed for further treatment.

"During the syphoning and subsequent handling of the crude phosphorus and mud, fumes consisting of the lower oxides of phosphorus arise, and similar fumes come from the mud which has splashed on to the wet floor. It was hardly practicable to remove these fumes by exhaust ventilation as there were so many points of origin. The efforts of the firm were concentrated on improving the condensers and the drainage of floors. Concrete was largely used in place of wood for the condensers, and the floors between condensers were relaid. This improved the conditions, as splashes of phosphorus or mud could easily be swilled away. In addition, the sides of the building were opened up, so as to obtain better general ventilation. With improved condensers improved methods of working were introduced, so as to reduce the amount of handling and consequent exposure to air of the crude phosphorus and phosphorus mud. The amount of fume in the air became noticeably less, but there was still room for improvement. Further experiments were made which have proved that in the future it will be possible to draw off the phosphorus and phosphorus muds from the condensers in such a way that fumes can only escape at one or two points. These points of escape can easily be dealt with by means of exhaust ventilation.

"Two cases of phosphorus poisoning occurred in the amorphous phosphorus department. In this department yellow phosphorus is converted into the amorphous or red variety. The amount of fume in this process is not great, and as the fumes are given off at definite points, they can be dealt with by means of exhaust ventilation. A satisfactory system of exhaust ventilation is now working."

ARSENIC.

The increase of reported cases from three in 1915 to 30 in 1917 was due partly to the increased number of cases (nine), of which an account is given later, from arseniuretted hydrogen gas poisoning, but mainly from the manufacture (for purposes of chemical warfare), of arsenic trichloride by the action of sulphuric acid on a mixture of common salt and arsenic, from whence it distilled over and was condensed as an oily liquid and filled into drums. The plant was difficult to keep free from leaks, and the arsenic chloride permeated the air near the place where the men were working. The effect was to produce an intense irritation, showing itself in eczematous ulceration of the face, nose, hands, and other parts of the body to which the vapour might gain access, especially those parts liable to excessive sweating. The mucous membrane of the eyes, nose, throat, and bronchial tubes was attacked in the same way.

In one case death was due to an accident in the manipulation of the apparatus which led to a burn on the leg extending from the knee to the ankle and half-way round the leg, in a man, aged 46. Professor Delépine, who made the post-mortem examination, and examined the tissues, reported that death was due to absorption of arsenic. It was impossible to determine to what extent arsenic absorption had taken place through the skin, but Professor Delépine expressed the opinion that the amount of arsenic found in all the organs examined indicated that some soluble compound of arsenic had been freely distributed through the body, in all probability by the blood and lymph. Examination

of the hair and urine of other men working on the same plant showed the presence of material quantities of arsenic and indications of degenerative changes in the kidneys. Had the process been continued, further examinations of the urine would have been called for in order to determine the question of the advisability of the men continuing their employment. The symptoms of arsenic trichloride are thus shown to resemble those with which we are familiar from contact with the dusts and salts of arsenic, namely, ulceration of the skin, and quite different from those produced by inhalation of arseniuretted hydrogen gas, cases of which have particular interest owing to their unexpectedness. The pathological changes in the liver and kidneys, however, have a certain similarity which deserves attention.

Two other cases of ulceration of the skin occurred in men who were manipulating sludge containing arsenic from acid coolers in the manufacture of sulphuric acid.

ARSENIURETTED HYDROGEN.

Prior to the year 1914, poisoning by arseniuretted hydrogen gas occurred chiefly in the manufacture of salts of zinc and in chemical works among workmen engaged in removing acid residue from tanks or stills by means of galvanised iron pails and metal shovels. In the years 1900-1913 isolated cases also occurred in such industries as the manufacture of wall papers and the bronzing of art metal. Cases of a similar character have continued to be reported, and during the years 1914-1918 the following industries were concerned: Oil works, cleaning out tanks, two cases, one fatal; chemical works, cleaning out tanks, four cases, two fatal; chemical works, manufacture of zinc salts, two cases, one fatal; chemical works, zinc purification process, two cases, one fatal; brass foundry, bronzing of art metal, two cases.

During the years 1917 and 1918, increase in the manufacture of intermediate dyestuffs has led to a series of other cases, five in number, with two deaths; and the probable extension of this industry adds to their importance. The processes implicated have been those in which zinc dust and hydrochloric acid are used either together in a reduction process or the acid added, at a later stage in the manufacture, as a solvent for the zinc hydrate, formed at the previous stage, and any unconverted metallic zinc. When the first cases were investigated question arose as to the possibility of hydrogen being liberated from an alkaline solution, but subsequent investigation proved this beyond doubt.

The occurrence of these cases of arseniuretted hydrogen poisoning has been due, in some measure, to the high arsenic contents of the acid used during these years. One of the fatal cases occurred on a plant (zinc purification) which had been in operation for 20 years.

The risk of poisoning may in the future be minimised by the use of de-arsenicated acid, but the presence of arsenic in the metal still necessitates the greatest care being exercised in any manufacture where hydrogen gas is liberated in the presence of arsenic. The cases investigated show that even when a process is carried on in the open there is danger to the workmen, or where an exhaust draught is provided for the vessel in which the reaction takes place, this precaution, may, under certain circumstances, be insufficient to protect the workers. Two severe cases occurred in the manufacture of an intermediate dyestuff at a covered vessel provided with such an exhaust, where the anemometer reading, taken at the manhole through which the acid was added, showed an exhaust equivalent to 180-200 linear feet per minute. The explanation of such cases may be that a sudden

evolution of gas, produced in some instances by a too rapid addition of the acid, neutralises the effect of the exhaust and allows the gas to escape into the face of the workman. Complete enclosure of the vessel, in which a slight negative pressure is maintained, with separate feed holes provided with valves, appears to offer the best solution of the difficulty, or where this is impracticable—i.e., where a metal vessel cannot be used,—an exhaust draught must be maintained at the feed holes considerably greater than that referred to above.

The exact interval of time which elapses between exposure to the gas and the onset of symptoms is difficult to determine, owing to the absence of any distinctive physical feature by which the gas can be readily detected. The smell of garlic attributed to the gas has never been observed by any of the persons affected. Generally several hours would appear to intervene before the first symptoms manifest themselves. In one case where frothing of the contents of the vessel occurred, and thus was taken to indicate the escape of gas the man employed became affected after six hours. A point of considerable interest in connection with these cases is the difference in the severity of the symptoms produced by the gas on individuals who are apparently equally exposed. Where two men were doing the same work at the same time, one was very dangerously ill, while the other escaped with no symptoms. The explanation of this phenomenon is difficult.

Periodic examination of the urine of the men engaged on processes involving exposure to the inhalation of arseniuretted hydrogen gas, is unlikely to prove of much value as a preventive measure. Excretion of an excess of arsenic in the urine may be an indication of the ready elimination of the metal from the system preventing a cumulative effect, or on the other hand, as seems more probable, from the results of the examination of the urine of those severely affected, the elimination of arsenic is high where the excretory cells have been damaged, that is, when the symptoms have developed. Safety in working such processes, therefore, depends at present upon the efficiency of the measures taken to prevent the escape of the poisonous gas.

MERCURIAL POISONING.

The figures for mercurial poisoning show an increase in the years 1916 and 1917—caused by the greatly increased use of fulminate of mercury in filling detonators. Only a few of the cases from this cause, however, show the recognised symptoms of mercurial absorption—salivation, tremor, and "nervousness." The great majority were cases of dermatitis or eczematous ulceration of the face, neck, hands, and forearms, associated with conjunctivitis and inflammation of the nasal and laryngeal mucous membrane. The finer the powder the more irritating it is to the eyes and nostrils. The condition is very quickly set up—the reports on the cases frequently showing as short a time of employment as two or three weeks. The cases are but samples, and there must be few who come in contact with the fine powder who do not suffer more or less from its effects. Unfortunately, the highly explosive nature of the substance renders it quite impracticable to require mechanical means of ventilation, and, indeed, operations have to be conducted so carefully that no dust is visible. Use of a 10 per cent. solution of sodium hyposulphite (1lb. to a gallon of water) aids in the prevention of the ulcers and rash, and the workpeople were directed to dip their hands in a basin containing the hyposulphite solution before breakfast, dinner, and leaving at night. Similarly, in

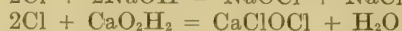
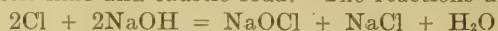
the conjunctivitis, use of a 2 per cent. solution as an eye-wash has been found beneficial. An interesting point brought out by Dr. J. B. G. Skelton, assistant to Dr. O'Donovan at the Ministry of Munitions, who was asked to make an intensive study of the conditions in the factory where most trouble was experienced, is that the supply of a towel to each worker seems to have been more important in reducing incidence than anything else.

(To be concluded.)

ELECTROLYTIC BLEACH.

By A. G. BETTS.

AN American patent has been taken out by the writer in reference to the hypochlorites used in bleaching which are technically limited to the chlorine compounds of caustic lime and caustic soda. The reactions are:



The product then contains equimolecular quantities of hypochlorite and chloride. The second reaction is that taking place when chlorine is absorbed in slacked lime, the universal method of making bleaching powder.

The chloride of lime is dissolved in water as well as possible, and there is a good deal of insoluble matter or sludge, which is somewhat objectionable. The bleach is essentially an oxidising solution, the function of the oxygen being to burn or oxidise the colouring matters and non-celluloses: $\text{CaClOCl} = \text{CaCl}_2 + \text{O}$. This bleach solution is always alkaline owing to the presence of free lime in the bleaching powder, which renders the bleaching slower and less active. The solution can, of course, be exactly neutralised with sulphuric acid, but this is objectionable in some ways, and is not generally done. If the solution is partly neutralised, not much is accomplished, and if overdone the results are not only bad, but unpleasant.

The use of a lime bleach has certain objections, such as the precipitation of insoluble lime compounds in the fibres, making them harsh, so when the cost permits the lime bleach is first converted to soda bleach with soda ash, carefully using some sodium bicarbonate to correct alkalinity.

To explain electrolytic bleach and its manufacture, if a solution of common salt, sodium chloride, is electrolysed with an insoluble anode, that is graphite or platinum, and graphite, platinum or iron, cathode, using 4 or 5 volts per cell, primarily the salt is decomposed by the electric current thus: $\text{NaCl} = \text{Na} + \text{Cl}$. The sodium is liberated at the cathode, but not as metallic sodium, on account of the presence of water with which sodium reacts thus: $\text{Na} + \text{H}_2\text{O} = \text{NaOH} + \text{H}$, evolving hydrogen gas, which bubbles away, and a solution of caustic soda results at the cathode. As chlorine is somewhat soluble in water, a solution of chlorine simultaneously appears at the anode. The two solutions mix almost immediately because of the motion of the solution, which is actively maintained by the streams of hydrogen bubbles and reacts thus: $2\text{NaOH} + 2\text{Cl} = \text{NaOCl} + \text{NaCl} + \text{H}_2\text{O}$. As this mixing must go on continuously, no diaphragms are permissible as in electric caustic-soda plants, making the plant much simpler and cheaper.

The product is a solution of sodium hypochlorite and unchanged salt, and if a neutral solution is used the product is neutral. As the treatment of the solution is continued for conversion of salt to hypochlorite, un-

fortunately the hypochlorite itself reacts to a greater and greater extent as its strength increases, both at the cathode and to a less extent at the anode, so that to realise a reasonable efficiency of the electric current and get output from the cells the process has to be cut off, while much salt remains undecomposed, or practically the salt solution has to be fed to the cells at a sufficiently rapid rate so that the overflow contains quite a little less hypochlorite than would be desired, except in cases where salt is very cheap, when the salt consumption would not make so much difference.

Principally the loss of the hypochlorite arises because it is again reduced by the electric current back to salt, and there is also a comparatively smaller loss of hypochlorite by oxidation to the useless chlorate at the anode. The hydrogen bubbles coming off at the cathode have no reducing effect, but the reduction takes place at the cathode surface. There have been certain ways of preventing this cathode reduction, but they have no value for electrolytic bleach. One method is to use platinum cathodes and add to the solutions sodium chromate or bichromate, which acts very perfectly in preventing reduction, but the platinum, of course, is very expensive, and the chromates impart a very persistent yellow colour. The other method, of adding calcium chloride to the solutions, which plasters the cathodes with a deposit of calcium hydrate, is very imperfect, and causes more loss by increasing the voltage, and hence power consumption, more than it is worth, and also causes a good deal of hypochlorite to go over into chlorate.

The writer made the discovery that if a magnesium cathode is used there is practically no cathode reduction, owing to the formation automatically of a film of magnesia hydrate on its surface, which prevents the hypochlorite from reaching the actual cathode surface. By the use of this cathode it is possible to increase the current efficiency, percentage of salt converted to hypochlorite, and strength of the solution in available chlorine. The electrolytic bleach made with magnesium cathodes is necessarily and automatically completely neutral, and it has been found that neutral electrolytic bleach is materially more active and efficient than bleaches prepared by chemical methods.

In general, in making electrolytic bleach the salt used should be free from calcium and magnesium salts, and if present they should be removed by soda treatment, and heavy metals—iron, lead, copper, etc.—should be avoided in construction, which should rather be of concrete with wood solution pipes, or, better, of tile or stoneware.

The preparation of electrolytic bleach is an extremely simple process, requiring merely to cause a solution of salt water to flow to the cells, which are themselves simple, and the overflow passes to the bleach storage tank.

The plant is much simpler and cheaper than electrolytic caustic soda and lime bleach plant, and has much to recommend it, except in cases where salt and power are expensive. The actual cost of production of bleach by electrolysis will, of course, vary from place to place, according to the scale on which operations are conducted, cost of power, cost of salt, etc. One important thing about it is that it can be used advantageously on a small scale as well as on a large one, because no skilled labour and supervision are required to operate the process.

The loss of magnesium is very small. Magnesium is somewhat attacked by salt water, although the action is very slow; but while the electric current is passing, the magnesium is actually covered with a thin film of the electrolytically produced caustic which protects it.—*Dyer and Calico Printer.*

THE GERMAN CHEMICAL WORKS.

MR. JOHN ALLAN, the newly elected chairman of the Manchester Section of the Society of Chemical Industry, delivered an extremely interesting opening address at the first meeting of the Section, held at the Grand Hotel, Manchester, on Friday of last week, the title being "Notes on the Rhineland Chemical Works." As a member of the mission which, on behalf of the Association of British Chemical Manufacturers, recently inspected the large chemical works in the occupied area of Germany, Mr. Allan was singularly well qualified to deal with this subject.

The speaker, in the introductory portion of his address, stated that much had been said of the greatness of the chemical works and the marvellous efficiency of their management, but whilst he had no desire to under-rate the developments in applied chemistry that had originated in Germany, he asserted that the German manufacturers had no monopoly in the ability to initiate such enterprises and bring them to fruition. Not the least important of the many causes which had contributed to the position of the German chemical industry was the possession of the Rhine valley, along which were situated many of the greatest of Germany's chemical works. The river provided a means of transport for raw materials and finished products, water supply for manufacturing operations, and a means of disposing of trade effluents. In close proximity was to be found, in the readily available deposits of brown coal, a supply of fuel at little more than nominal cost.

BANKING FACILITIES.

After briefly sketching the outstanding events in the history of the German chemical industry, Mr. Allan referred at some length to the facilities offered by German banks to manufacturers. German industrial enterprise, he said, owed a great part of its success to the close association with the national banking interest. The directors of the banks saw to it that any appeal for public money which they associated themselves with should be satisfactorily reported upon by their staff of industrial experts, and that their arrangements as to capital, management, and scientific assistance were approved. Such co-operation was one of the principal factors in the success of German industries. In the case of an enterprise abroad, financed by a German bank, it was stipulated in the agreement that all orders for materials should be placed with German firms—generally firms in which the bank had a financial holding.

The speaker then dealt, in turn, with such questions as the training and remuneration of research chemists and chemical engineers, and the standardisation of chemical plant. It was noteworthy, he said, that invariably the chemist held the right of final decision as to the arrangement and construction of chemical plant in the German works. The chemical engineer was responsible for the engineering work only; for example, the strength of materials used, the efficiency of power application, and so on. The erection of chemical plant, said Mr. Allan, was undoubtedly greatly facilitated by the standardisation of many parts, and it was to be hoped that with the increasing demand for such materials in this country, the knowledge and technique which provided the German chemical manufacturer with a wide range of excellent plant materials would be rapidly acquired here.

LABOUR AND WAGES.

On the question of hours of labour and rates of wages as affecting the German chemical industry—a subject of much interest to British manufacturers,—Mr. Allan emphasised the point that present conditions were in all probability transitory in character, and that it was impossible to forecast the future state of labour either in Germany or in other countries. Before the war long hours were general throughout Germany, and wages in the chemical industry were variable. As an example of the changes that the war had brought about, the experience of one of the largest works engaged in the manufacture of chemicals was cited. Before the war a working week of 66 hours was the rule, and the wages paid to general labour averaged 0.65 mark per hour, or a total of 43 marks per week. With the adoption of the eight-hour day, the same labour now cost 1.7 mark per hour, or 81.6 marks per week, an increase of 90 per cent. in wages and a reduction of 28 per cent. in the hours of working. Assuming that the output per workman had remained unchanged, the cost of labour, allowing for the reduction in working hours, had risen to 112 marks, or an increase of 160 per cent. compared with the pre-war wage.

Moreover, it was quite commonly asserted, said Mr. Allan, that the character of labour had considerably altered, both in discipline and in the quality of work done, the general assertion being that the possible output was now only 50 per cent. of what it was before the war. That statement probably included the reduction following upon the lessened number of hours worked, as well as that arising from lowered efficiency, as figures derived from certain branches of industry showed a minimum reduction in output of about 25 per cent. With fuller employment it might be assumed that present conditions would be modified, but one could not help feeling that the old conditions would not return.

WORKS EXTENSIONS.

Some notice should be taken of the present conditions of the German chemical factories and the changes which had been made in them during the period of the war. Those factories with facilities for manufacturing explosives or gas warfare materials had greatly extended their plant, full consideration having been given to the possibility of utilising the extensions for industrial purposes after the war. Generally, it was left to the factory control to provide for increased outputs by such means as they chose to adopt. Every facility was afforded by the German Government as regards materials, labour, and finance.

Apparently the system of financing the extensions to factories, said Mr. Allan, had been that of repaying from time to time the expenditure incurred. In a number of cases, however, in which large plants had been erected on behalf of the Government during the later period of the war, repayment had not taken place, and firms were the possessors of very expensive plant and buildings which in normal circumstances they would not have erected. It was feared that the abnormal cost incurred by these extensions would not be met by the new Government, and that the firms themselves would have to bear the greater part, if not the whole, of the expense. Those circumstances, it was pointed out, applied only to work carried out during a late period of the war. Many enlargements of plant had been effected on such terms that capital charges upon the peace output would not be excessive.

In general, the plant of the German dye-manufacturing concerns was in excellent condition, and in many cases the producing capacity had been considerably increased as a result of the war. If competition with German dyes and pharmaceutical products was difficult before the war, it would be no less so in the future, when efficient plants and large-scale production would be important factors in the cost of production.

SYNTHETIC NITRATES.

Turning to the developments that have taken place during the war in the fixation of nitrogen, Mr. Allan referred to the plants at Oppau and Merseburg for the direct synthesis of ammonia from atmospheric nitrogen and hydrogen, and to the Höchst and Leverkusen plants for the oxidation of ammonia to nitric acid. These plants were monuments to the skill of the chemists and engineers who had erected them. The Höchst plant housed 256 platinum catalyst vessels, with a total monthly capacity of 8,000 tons of 100 per cent. nitric acid. The plant was erected in six months at a cost of £2,000,000., and was put into operation in February of last year. A feature of this and many other plants for various purposes was that though the aggregate output was very great, the plant itself was made up of a number of units, each self-contained. Increased output was attained by the erection of a fresh series of units. The advantages of this system were numerous.

A very noticeable feature of the large German chemical works was that the manufacture of an article was not undertaken unless in some way it was connected with the essential part of the firm's business. As an example, the speaker cited the manufacture of superphosphate of lime at the Bayer Company's Leverkusen works for the purpose of utilising waste acid, the superphosphate plant having a capacity of 50,000 tons per annum.

Apart from the very large German chemical firms there were numerous smaller ones, many of which, particularly those manufacturing heavy chemicals, were as badly equipped as the most antiquated of our English factories. On the other hand, some of the smaller works were as efficiently controlled as the large ones. The products of most of these were usually of a specialised character. The small works were often useful to the large ones, as they manufactured necessary products, the consumption of which was too small to justify the large manufacturers taking up their production.

A vote of thanks to the author, moved by Mr. E. Ardern and seconded by Mr. F. H. Terleski, was carried with acclamation.

STUDY OF *N*-BUTYL SUBSTITUTION IN THE ARYLAMINES.*

By J. REILLY, D.Sc., AND W. J. HICKINBOTTOM.

THE *n*-butyl substituted arylamines have been investigated hitherto to a very limited extent, probably because *n*-butyl alcohol has been available only in small quantities. Now that it is possible to obtain this alcohol in large amounts, its utilisation, industrially, in the preparation of dyestuffs and other technical organic compounds, is a matter for consideration. It also has been observed that the *p*-nitroso derivatives of the higher alkylanilines have marked physiological properties.

The simplest *n*-butylarylamine is *n*-butylaniline, which has previously been obtained as a by-product only in

the condensation of *n*-butyraldehyde with aniline (Kahn, *Ber.*, 1885, 18, 3361). The preparation of *p*-nitrosodibutylaniline and *p*-phenylene di-butylamine was unsuccessfully attempted by Karrer (*Ber.*, 1915, 48, 1393). He claimed that the di-butyl and diamylanilines acted differently from the lower alkylanilines.

It is, therefore, of interest to carry out a more detailed examination of these *n*-butyl derivatives. When *n*-butyl chloride and aniline were heated under reflux a mixture of mono- and di-butyl anilines was obtained. From the mono-*n*-butylaniline the *p*-nitroso derivative was obtained, which yielded, on reduction, the corresponding phenylenediamine. *as*-Phenyl-*n*-butylhydrazine was also prepared, and from it diphenyl-di-*n*-butyltetrazone. The latter compound is characterised by a series of colour changes on standing in presence of aqueous alcohol. Di-*n*-butylaniline gave a liquid *p*-nitroso compound which yielded a number of addition compounds with metallic salts. Reduction of *p*-nitroso-di-*n*-butylaniline gave *p*-phenylene-di-*n*-butyldiamine, identical with the diamine obtained by reducing the azo compound formed by coupling diazotised sulphanilic acid with di-*n*-butylaniline in acetic-acid solution. This result is at variance with those of Karrer.

The *n*-butyl-*o*- and *p*-toluidines were prepared similarly to the *n*-butylanilines, but in this case it was observed that di-*n*-butyl-*o*-toluidine could not be obtained by the action of *n*-butyl chloride on mono-*n*-butyl-*o*-toluidine, while *p*-toluidine yielded both mono- and di-butyl substitution products. Mono-*n*-butyltoluidine on nitration in presence of an excess of concentrated sulphuric acid yielded 2-nitro-*n*-butyl-*p*-toluidine, which on further vigorous nitration gave 2:3:5-trinitro-*n*-butyl-*p*-tolynitramine. Nitration of *n*-butyl-*p*-toluidine yielded successively 3-nitro-*p*-toluidine, 3:5-dinitro-*n*-butyl-*p*-toluidine, and the nitroso and the nitramino derivatives of the above compound. With the latter two compounds, various experiments were carried out on the elimination of the nitroso and nitramino groups. It was shown that boiling alcohols and sunlight are able to remove these two groups.

A study was made of the formation of the *n*-butylarylamines by condensation of the alcohol with the amine in the presence of hydrochloric acid or a similar condensing agent. It was found that by carrying out the reaction at 200°, appreciable amounts of a primary amine were obtained, and its presence was ascertained to be due to the intramolecular change of the *n*-butylaniline. This compound has been proved to be 4-amino-*n*-butylbenzene. A study of the literature revealed the fact that it is probable that *iso*-butylaniline yields 4-amino-*tert*-butylbenzene on heating with hydrochloric acid in a sealed tube, so that there is a difference in the behaviour of the two butylanilines. *Sec*-butylaniline undergoes intramolecular rearrangement in a normal manner, yielding 4-amino-*sec*-butylbenzene.

In certain of the substances containing a *n*-butyl group attached to the aminic nitrogen, the colour of the compound differs from that of the corresponding methyl or ethyl derivative produced. Certain dyestuffs which have been prepared containing *n*-butyl groups also give different colours compared with the colour of the corresponding lower alkyl derivative. A detailed comparative study (absorption spectra, shade of dye on various materials, etc.) of dye-products of the *n*-butyl series would be of interest.

*Paper read before the Chemistry Section of the British Association at Bournemouth.

BRITISH OVERSEAS CHEMICAL TRADE IN 1918.

WE give below extracts from the annual statement, just issued, of the trade of the United Kingdom with foreign countries and British Possessions in 1918, compiled by the Customs and Excise Department. The figures relating to the chemical and allied trades will be found much more useful than those given in the monthly Board of Trade returns, owing to the detailed analysis of the countries of origin of imported, and the destinations of exported, chemical products. Each product is specified separately, together with the extent of the trade done with the more important countries, the corresponding figures for 1917 being in parentheses.

IMPORTS.

Acetate of Lime.—United States, — (8,606cwt.); other foreign countries, 560cwt. (3,932cwt.); Canada, 21,199cwt. (30,643cwt.); total, 21,759cwt. (43,181cwt.).

Acetic Acid.—Germany, 11cwt. (—); Netherlands, — (600cwt.); Switzerland, 573cwt. (1,676cwt.); United States, 11,357cwt. (101,979cwt.); Canada, 77,812cwt. (92cwt.); total, 89,753cwt. (104,347cwt.).

Acetone.—United States, 138,291cwt. (100,415cwt.); Canada, 35,691cwt. (25,029cwt.); total, 173,982cwt. (125,444cwt.).

Bleaching Powder.—Germany, 28cwt. (—); United States, — (3,247cwt.); total, 28cwt. (3,247cwt.).

Other Bleaching Materials.—Total from foreign countries, 40cwt. (—).

Boracite.—Foreign countries, 6,546cwt. (—).

Borate of Lime.—United States, 19,852cwt. (55,742cwt.); Peru, 8,780cwt. (11,300cwt.); Chili, 121,974cwt. (165,911cwt.); Argentine Republic, 11,918cwt. (—); total, 162,524cwt. (232,953cwt.).

Borax.—France, 2,757cwt. (16,526cwt.); United States, 13,728cwt. (20,963cwt.); total, 16,485cwt. (37,489cwt.).

Sulphur.—Italy, 1,202,910cwt. (342,979cwt.); United States, 251,455cwt. (242,560cwt.); other foreign countries, 28cwt. (2,296cwt.); total, 1,454,393cwt. (587,835cwt.).

Carbide of Calcium.—Sweden, — (24,123cwt.); Norway, 404,347cwt. (294,040cwt.); Canada, 112,915cwt. (58,245cwt.); total, 517,262cwt. (376,408cwt.).

Coal Products, not Dyes.—France, — (114cwt.); United States, 8,194cwt. (37,144cwt.); other foreign countries, — (110cwt.); British Possessions, 5,467cwt. (5,394cwt.); total, 13,661cwt. (42,762cwt.).

Cream of Tartar.—France, 20,320cwt. (21,848cwt.); Portugal, 2,239cwt. (1,499cwt.); Spain, 9,589cwt. (4,694cwt.); Italy, 7,045cwt. (10,014cwt.); United States, 451cwt. (285cwt.); other foreign countries, 57cwt. (48cwt.); total, 39,701cwt. (38,388cwt.).

Glycerine, Crude.—Netherlands, 9,920cwt. (—); France, 19,681cwt. (2,767cwt.); Spain, 7,297cwt. (586cwt.); United States, 23,994cwt. (1,762cwt.); Argentine Republic, 2,100cwt. (2,785cwt.); other foreign countries, 189cwt. (—); British Possessions, 309cwt. (—); total, 63,490cwt. (7,900cwt.).

Glycerine, Distilled.—Netherlands, 7,076cwt. (13,041cwt.); United States, 21,968cwt. (2,789cwt.); other foreign countries, 642cwt. (1cwt.); British Possessions, 99cwt. (—); total, 29,785cwt. (15,831cwt.).

Nitrate of Potash.—Foreign countries, — (910cwt.); British India, 383,689cwt. (396,508cwt.); total, 383,689cwt. (397,418cwt.).

Muriate of Ammonia.—Foreign countries, — (215cwt.).

Potash Compounds, Other Sorts.—Russia, £98,310. (£40,728.); Sweden, £350. (—); Germany, £1,463. (—); Netherlands, £2,770. (—); France, £52,118. (£31,553.); Japan, £84,967. (£66,335.); United States, £37,920. (£139,228.); other foreign countries, £23,418. (£26,177.); Anglo-Egyptian Soudan, £34,986. (—); British India, £104,732. (£6,416.); other British Possessions, £9,023. (£18,718.); total, £450,057. (£329,155.).

Soda Ash.—Total from foreign countries, — (2,580cwt.).

Soda, Caustic.—United States, 109cwt. (15,571cwt.); other foreign countries, 270cwt. (247cwt.); British Possessions, — (120cwt.); total, 379cwt. (15,938cwt.).

Soda, Crystals.—British Possessions, 220cwt. (—).

Soda Compounds, Other Sorts.—Sweden, 2,123cwt. valued at £10,351. (2cwt., £8.); Norway, 43,831cwt., £123,774. (55,551cwt., £107,231.); Germany, 255cwt., £135. (6cwt., £22.); Netherlands, 396cwt., £2,912. (1,023cwt., £5,610.); France, 11,320cwt., £53,356. (7,464cwt., £36,425.); United States, 33,393cwt., £213,895. (36,945cwt., £170,962.); other foreign countries, 927cwt., £4,091. (936cwt., £19,989.); British Possessions, 753cwt., £3,493. (2,126cwt., £6,664.); total, 92,998cwt., £412,007. (104,053cwt., £346,911.).

Sulphuric Acid.—United States, 1,886cwt. (4,807cwt.); other foreign countries, — (240cwt.); total, 1,886cwt. (5,047cwt.).

Tartaric Acid.—France, 1,632cwt. (1,377cwt.); Italy, 13,348cwt. (14,205cwt.); British Possessions, — (150cwt.); total, 14,980cwt. (15,732cwt.).

Chemicals, Unenumerated.—Russia, £10,000. (£1,075.); Sweden, £9,917. (£166,530.); Norway, £602,819. (£568,394.); Denmark, £69,173. (£46,412.); Germany, £1,349. (£1,363.); Netherlands, £92,625. (£95,014.); France, £170,636. (£130,038.); Switzerland, £40,523. (£61,373.); Portugal, £32,114. (£9,117.); Spain, £219,413. (£7,643.); Italy, £294,980. (£303,739.); China, £2,256. (£1,135.); Japan, £151,108. (£77,887.); United States, £864,837. (£794,274.); Chili, £15,268,702. (£6,365,716.); other foreign countries, £31,072. (£180.); Hong Kong, £17. (—); Australia, £38,415. (£29,619.); Canada, £114,311. (£109,795.); other British Possessions, £15,977. (£14,809.); total, £18,030,444. (£8,784,113.).

Chemical Manufactures, Total Value of.—From foreign countries, £23,483,006. (£12,870,854.); from British Possessions, £2,140,725. (£1,307,285.); total, £25,623,731. (£14,178,139.).

Bones for Manure.—Netherlands, — (371 tons); France, — (1,133 tons); Brazil, 5 tons (15 tons); Uruguay, — (4 tons); Argentine Republic, 2,564 tons (421 tons); other foreign countries, 40 tons (68 tons); Egypt, 2,345 tons (1,219 tons); British India, — (457 tons); other British Possessions, 190 tons (182 tons); total, 5,144 tons (3,870 tons).

Nitrate of Soda.—Chili, 300 tons (1,190 tons).

Phosphate of Lime and Rock Phosphate.—Netherlands, 666 tons (734 tons); Dutch West Indies, — (1,930 tons); Algeria, 32,871 tons (70,812 tons); Tunis, 413,633 tons (144,443 tons); United States, 13,361 tons (44,982 tons); other foreign countries, — (4,304 tons); Egypt, 400 tons (9,412 tons); other British Possessions, 3,941 tons (—); total, 464,872 tons (276,617 tons).

(To be continued.)

AUSTRALIAN METALS AND MINERALS.

PRIOR to the declaration of war by the United Kingdom, practically the whole of the base metal production in Australia had been sold to representatives of the German metal organisation. The outbreak of hostilities threw the industry into chaos, and steps were immediately taken to cancel existing agreements, and to establish the industry on a sound and permanent foundation, consistent with British interests.

The following legislative and administrative acts are cited by Mr. S. W. B. McGregor, H.M. Senior Trade Commissioner in Australia, in his report on the trade of Australia in 1918:

(1) Cancellation of all mineral and metal contracts with enemy companies and firms.

(2) Dissolution of the Lead Convention controlled by Germans, which determined the price to consumer and producer of all Australian lead.

(3) Dissolution of the Zinc Combine, a purely German combine which controlled the world's spelter market, determining price, output, and manipulating the market as it pleased in the interests of Germany.

(4) Elimination of the German interests in the copper industry in Australia.

(5) Elimination of all enemy agencies controlling tin, molybdenite, wolfram, and other metals.

The policy of the Government is to have all metallic ores, as far as possible, treated within the Commonwealth, so that the resultant metals can be marketed in a refined state.

Steps taken by the Commonwealth Government resulted in the formation and extension of the Broken Hill Associated Smelters' Proprietary, Limited, which has taken over the Broken Hill Proprietary Works at Port Pirie, South Australia. The new company is a co-operative institution for the smelting of silver-lead ores and concentrates and the refining of the silver-lead bullion. It has one of the largest silver-lead smelting works in the world, with a capacity for an output of 160,000 tons of pig lead and 5,000,000 to 6,000,000 ounces of silver per annum. The Sulphide Corporation, Limited, has improved and enlarged its lead-smelting works at Cockle Creek, near Newcastle, New South Wales. The refinery plant is now in operation, and the output of some 30,000 tons of lead per annum, with silver and gold, made available locally. The Fremantle Smelters, Fremantle, Western Australia, are owned by the Fremantle Trading Company, Limited. The plant, running at its full capacity, is capable of an annual output of 8,000 tons of pig lead or silver-lead bullion from usual grade lead concentrates. The company is at present smelting only the Northampton lead ores, which contain little or no silver, and the present output is at the rate of 5,000 tons pig lead per annum.

A new company, the Zinc Producers' Association Proprietary, Limited, has been formed to control and dispose of the output of zinc concentrates produced within the Commonwealth. All the principal zinc-producing companies are members, and the association is founded on a co-operative basis. The Commonwealth Government are represented on the board, thus safeguarding the interests of the general community. Under an agreement with the Zinc Producers' Association, the Imperial Government are to take 250,000 tons of zinc concentrates per annum for the period of the war and one year thereafter, and 300,000 tons per annum for the succeeding nine years. The Imperial Government also have an

option on the balance of production, subject to certain reservations. The output of zinc concentrates within the Commonwealth for the 12 months ended December 31, 1917, was 284,662 tons, and arrangements have been made whereby 40 per cent. of the normal output may be reserved for local treatment. The 1918 output was 345,017 tons.

A new company, the Copper Producers' Association Proprietary, Limited, has been formed on the same lines as the Zinc Producers' Association, to control and dispose of the output of copper produced within the Commonwealth. All the principal copper-producing companies are members of the Association. As in the case of the Zinc Producers' Association, the Commonwealth Government are represented on the Board of Directors. The Australian production of copper amounts to approximately 40,000 tons per annum. The whole of this copper is refined in Australia.

Encouragement is also given to the refining of tin ore and tin concentrates within the Commonwealth. The principal tin smelters are the Mount Bischoff Company, Tasmania, the Sydney Smelting Company (Pyrmont Works), New South Wales, and the Irvinebank Company, Queensland.

The Commonwealth Government entered into an agreement with the Imperial Government for the acquisition of all wolfram, molybdenite, etc., produced in Australia. Under this agreement practically the whole of these minerals produced in Australia have, during the war, been acquired for the Imperial Government, the prices fixed from January 1, 1918, being: Wolfram and scheelite, 65 per cent. WO_3 , 52s. 6d. per unit at producing centres; molybdenite, 85 per cent. MoS_2 , 100s. per unit at producing centres.

Another action of the Government towards the elimination of German influence was the creation of an Australian Metal Exchange, with offices at Melbourne and Sydney. No metals or minerals can be exported from Australia unless first registered with the Exchange by an active member, and, during the war, with the consent of the Minister of Trade and Customs. The members of the Exchange must be natural-born British subjects, and the Attorney-General has the right of veto with regard to membership during the war and 12 months after.

THE STUDY OF CATALYSIS.

MR. HUGH S. TAYLOR, in the course of an article in *Nature* (October 2), states that the modern curriculum of theoretical chemistry should concern itself largely with the scientific principles involved in catalytic reactions. An extended experience with catalysis, both pure and applied, has demonstrated that, from a complete realisation of the theoretical aspects of the problem, progress in the application follows the more rapidly and the more certainly. It is astonishing to note the facility with which new progress is attained by the employment of the scientific principles which have been acquired in a totally different application of catalysis to industrial progress. The records of certain of the Government Departments of investigative work, during the last few years, would be instructive in this regard. The need, therefore, is urgent for a well-trained force of young students, versed in the fundamentals of this modern branch of chemistry, and equipped to take their place in the further developments which lie so close at hand. There are manifold possibilities ahead—numerous processes and agencies catalytic awaiting the facile brain and hand of the investigator.

ITEMS OF INTEREST.

OBITUARY.—We regret to announce the death of Mr. W. G. Smith, who was associated with the firm of R. W. Greeff and Co., London, for the past thirty-five years. Mr. Smith had a very large circle of friends and was widely known throughout the chemical and colour trades. The funeral took place at West Norwood Crematorium on Thursday of last week.

ZINC AND ZINC DUST PRICES.—There is no change to report in the price of Australian high-grade zinc dust (88-92% metallic zinc), which remains at £68. to £70. per ton, c.i.f. United Kingdom. The price of Australian electrolytic zinc, containing 99.95% metallic zinc, is unchanged at £42. per ton, f.o.b. Australia, for direct shipment to New Zealand, India, South Africa, and the Far East.

CHEMICAL WORKS ANNIVERSARY.—October 4 was the anniversary of a chemical combine on Tyneside which has had far-reaching results. On October 4, 1794, John Losh, in partnership with the Earl of Dundonald as chemical manufacturers, took out a patent for the manufacture of sulphate of soda and caustic soda at the Bell Close Works, Scotswood-on-Tyne. Three years later the company was formed into the Walker Alkali Company, which became one of the most successful works in the country.

CHEMICAL ENGINEERING LECTURES AT MANCHESTER.—An important course of twenty lectures on various aspects of chemical engineering has been arranged by the Department of Applied Chemistry at the College of Technology, Manchester. The lectures will be given weekly, the first having been arranged for Tuesday next, October 14, at 4.30 p.m., when the lecturer will be Mr. E. L. Rhead, on "Inherent Faults in Metallic Materials Used in the Construction of Chemical Plant." The fee for the course is £2. 2s., and for single lectures 5s.

NEW ANALYTICAL METHOD.—In the novel method of chemical analysis developed in the research laboratory of the General Electric Company (U.S.A.), a beam of X-rays, passed through a filter to remove all except a single wave-length and through two slits to narrow it to about one twenty-fifth of an inch, traverses a small tube of the pulverised material under examination, and is received by a photographic film. The exposure may be from one to twenty hours. The developed film shows the over-exposed centre, with lines on each side caused by reflections from tiny crystals, and every line indicates a set of planes of some important atom. Interpretation of the line patterns of different crystalline structures has already identified some compounds and even component elements in some mixtures.

NEW PHOTOGRAPHIC DEVELOPING AGENT.—Mr. Herbert A. Lubs, of the colour laboratory of the United States Bureau of Chemistry, has investigated the preparation of *p*-aminocarvacrol and its use as a developing agent in photography. It is conveniently prepared from carvacrol by the production of nitroscarcavrol, and the reduction of this by ammonium sulphide. Five grammes of the pure derivative were obtained from 10 grammes of carvacrol. As a developer for prints *p*-aminocarvacrol was found to be as good as metol, *p*-aminophenol, or *p*-aminocresol, and the lasting quality of the mixed developer was superior to that of *p*-aminophenol, but not quite so good as that of the others. This work has been done particularly with the view of utilising the abundant source of carvacrol that may be prepared from cymene. Thymoquinol and *p*-aminothymol were also prepared, but they proved to be less satisfactory both with regard to yield and their behaviour as developing agents.

ANALYSIS OF FERROSILICON.—A complete analysis of ferrosilicon involves the determination of many elements in addition to iron and silicon—viz., carbon, manganese, phosphorus, sulphur, calcium, magnesium, barium, and aluminium, and direct determinations are difficult and laborious, some elements comprising silicon itself being sometimes estimated by the difference in method. In bringing the subject before the American Electrochemical Society, Mr. Earl M. Anger, of New York, insisted upon the necessity for very careful sampling of the ferrosilicon. In high-grade alloys the segregation of the silicon from the iron silicide is very pronounced, the silicon going to the top when the cast is cooling. For the determination of the silicon itself, Anger opens the alloy up with sodium carbonate; in alloys of more than 25 per cent. of silicon, this melt would attack the platinum crucible, and the carbonate is replaced by sodium peroxide, rather than by sodium hydroxide, in iron (not in nickel) crucibles. These recommendations were questioned by H. R. Power, of the Carborundum Company, who prefers nickel and the peroxide.

CERAMIC SOCIETY.—In view of the railway strike, the Emergency Committee of the Ceramic Society decided to postpone the autumn meeting of the Refractory Materials Section, which was to have been held at Stoke-on-Trent on Wednesday and Thursday of this week, until the end of April, 1920. This will cancel the spring meeting arranged to be held in London next year. The autumn meeting in 1920 will be held in the United States.

NEW SCOTTISH DYE-MAKING FACTORIES.—Progress is being made with the erection of the factories near Grangemouth for the Scottish Dyes, Ltd. The site covers 80 acres, and has sea, railway, and canal facilities. The directors of this company hope to secure a leading place in the production of dye-stuffs and chemicals, but special attention is to be devoted to the manufacture of fast dyes for textile manufacturers and dyers throughout the country. Scottish Dyes, Ltd., was initiated by Messrs. Morton, of Carlisle, the proprietors of "Sundour," which has had a rapid success, along with other dyes, since the war. For many years Messrs Morton had made a speciality of the manufacture of fast-dyed textile fabrics, importing the colouring materials from Germany, and have now an important dye-making department at Carlisle, under the name of the Solway Dyes Company. As soon as possible the extensive Grangemouth factories will be in full working order.

CHEMICAL WORKER'S TRAGIC DEATH.—Mr. Isaac Bradley, the Birmingham coroner, held an inquest on Friday of last week relative to the death of Leonard Baden Gittos (19), carbolic acid plant assistant, of Witton Road, Aston, following an accident at the works of Josiah Hardman, Ltd., chemical manufacturers, Aston Church Road. The youth, who was on night work, had to inspect certain taps in connection with the plant, which controlled the water supply, and also to examine a pipe passing over a scrubber. To do this he had to climb baulks of timber, loosely placed, with intervals between, forming steps. He carried a Davy lamp. At 10 p.m. on Wednesday it was found that he had fallen into a vat of boiling water. He was alone, and managed to crawl out by himself, his shouts afterwards attracting attention. At the hospital the young man said he slipped from the planks into the vat. The lamp was found in the vat next morning. Horace Clarke Boucher, works manager, stated in reply to Mr. Hepburn (H.M. Inspector of Factories) that it had not occurred to him that it was dangerous for a person to stand on planks to get to the vat. A fixed platform, railed round, would now be erected. Factory Act inspectors had said nothing about the absence of railings. Mr. Hepburn replied that it was not for firms to wait until a factory inspector said something ought to be done. Those who had control of works should see that Government regulations were carried out. A verdict of "accidental death" was returned. Mr. Baker expressed regret on behalf of the employers at the accident, and stated that he did not know whether hot water would be regarded as a dangerous mixture under the rules governing chemical works.

NATIONAL ASSOCIATION OF INDUSTRIAL CHEMISTS.—The Council of the London Section of the National Association of Industrial Chemists promoted a dinner and musical evening at the Ship Restaurant, Charing Cross, on September 27. In spite of the difficulties created by the railway strike, there was a fairly good attendance of members and friends, presided over by Mr. H. S. F. Rhodes, Chairman of the London Section Council. Mr. Rhodes emphasised the necessity of federation between the various organisations of scientists, and pointed out that the members of the council had always been strongly in favour of federating, having twelve months ago passed a resolution recommending federation of the N.A.I.C. with other associations which had similar aims and objects. Mr. F. N. Harrap, secretary of the section, gave a short resume of the history of the section, and pointed out the advisability of adopting a policy of decentralisation, by the institution of branches, similar to that already started in Dartford. Mr. Harrap explained that the question of registration as a trade union had been decided, and the association would probably be registered within a few days. With regard to the question of federation with other scientific bodies, the speaker pointed out that the Federation of Technical and Scientific Professional Associations had already been formed, with Mr. A. C. J. Charlier (President of the N.A.I.C.) as president. The Federation, consisting of professional associations operating as trade unions, would meet on October 18 to fix the rules and constitution. In conclusion, the secretary appealed to the members to maintain their interest in the association, and to realise that progress for the first two or three years, whilst the association was being organised, must necessarily be somewhat slow.

BEET SUGAR.

ACCORDING to the *Foreign Trade Record* of the National City Bank of New York, the United States will this year take second rank among the nations as a producer of beet sugar. While this new and greatly advanced rank is in part a result of the political rearrangement of the beet-sugar-producing areas of Europe, coupled with a marked falling-off in production of beet sugar in that continent, it at least is interesting, and, at the same time, illustrative of the growth of beet-sugar production in the United States. At the beginning of the war, the *Record* continues, the United States held only fifth rank among the beet-sugar-producing countries of the world, and, in fact, produced but about 8 per cent. of the beet sugar of the world. The marked falling-off in the European product, coupled with the slight increase in the production in the States, brought its share of the world's beet-sugar production to about 16 per cent. last year, with a prospect that the crop of the current year will be larger than that of last year, and form a slightly larger percentage of the world's total output. Latest estimates by sugar authorities indicate that the crop in the current year will be larger than that of last year, but may fall slightly below that of the high record of 1916.

While this new rank which the United States holds among the sugar producers of the world is due in part to increased production on the one hand and the decreased production in Europe, it is also due in part to the recent events which have established new political divisions within the beet-sugar areas of Europe. Prior to the war, Germany held first place as a beet-sugar producer, Austria-Hungary second, Russia third, France fourth, and the United States fifth. As a considerable part of the production of Austria-Hungary occurred in the section now designated as Czecho-Slovakia, and a considerable proportion of that of Russia occurred in the areas now known as Ukraine and Poland, the rank of European production by political divisions has been entirely disarranged, and it seems probable that no one of the European countries except Germany will this year produce as much beet sugar as does the United States. Latest estimates put the production of Germany at about 1,400,000 tons, while that of Czecho-Slovakia, Ukraine, and Poland will apparently fall materially below that of the United States, which for the current year will range between 700,000 and 800,000 tons.

Sugar-beets now produce only about 25 per cent. of the sugar of the world, as against 50 per cent. in 1911 and 65 per cent. in 1900 and 1897. Normally, beets supply about one-half of the sugar of the world, their large percentage in 1900 and the years immediately preceding being due to the very small production of cane sugar in Cuba during and immediately following her war with Spain. With the return to normal production of cane sugar in Cuba the share which beets were producing of the world's supply dropped from 65 per cent. to 50 per cent. in 1911 and 1913, 47 per cent. in 1914, 44 per cent. in 1915, 35 per cent. in 1916, 33 per cent. in 1917, 28 per cent. in 1918, and is estimated at about 25 per cent. in 1919, this change being due in part to the falling-off of beet-sugar production in Europe, and in part to the increased production of cane sugar produced in Cuba, Porto Rico, Hawaii, the Philippine Islands, and Java.

The world's production of sugar in the current crop year will probably be about 37,000,000,000lb., against

42,000,000,000lb. in 1914, and the share produced from beets about 25 per cent., as against 47 per cent. in 1914.

DYEWARE IMPORTS.

STRONG protest against restrictions on dye imports was made at a meeting of the Dewsbury (Yorks.) Chamber of Commerce. The President, Mr. Medley, observed that eleven months after the cessation of hostilities on the Continent the textile manufacturers in Yorkshire were still experiencing the very greatest difficulties owing to their inability to get dyewares, particularly bright colours which were fast to milling. They (the manufacturers) were running from pillar to post, and were then limited to the ridiculously small quantities that were to be obtained when the agents of the Swiss firms divided their supplies among the many manufacturers who were clamouring for colours. It was really absurd that a great industry like the woollen industry should be handicapped in that manner.

With the exception of sulphur black, synthetic indigo, chrome yellow and brown, such as could be obtained during the war, he was advised that the local manufacturers were still dependent upon Swiss firms for 75 per cent. of their total requirements. It was not a question of obtaining cheap dyewares so much as an adequate supply of the absolutely necessary colours. Many months ago a licensing committee was appointed by the Board of Trade, but there was no representative of the woollen trade on it. Up to now he had not heard of any licences being granted to import dyestuffs into this country; yet everybody understood that the committee had to control the arrangements for the supply of dyestuffs from Germany and Switzerland. Why, if these dyes had come from Germany, should the Yorkshire manufacturers of woollen goods not be placed on an equivalent level with the Americans?

The American Government, he added, had issued an order allowing the import from Germany of a six months' supply of dyewares. To a large extent the British woollen industry was being held up, though it was particularly essential to the heavy woollen trade that there should be an adequate supply of colours, bright in shade, fast to light, and capable of withstanding heavy milling. The anxiety of the woollen manufacturers was lest they should be compelled to fall below the pre-war standard of efficiency, or suffer in comparison with any foreign production. Whilst hoping that British producers of dyestuffs would be able to meet the needs of the trade with colours equal to foreign production, he was of opinion that something must be done in the meantime, and that quickly, to relieve the difficult situation.

The meeting finally resolved to bring the whole subject to the notice of the Board of Trade and the Associated Chambers of Commerce.

PREPARATION OF INDICAN FROM NATURAL INDIGO.—The Agricultural Research Institute of India publishes a new method for the preparation of indican. The indigo leaves are boiled twice with water, and the extract is then mixed with freshly slaked lime and filtered; the precipitate contains most of the gums and tannins. The filtrate is concentrated by evaporation, and then saturated with carbon dioxide gas in order to remove the lime. The liquid is filtered again, and concentrated to a syrup by evaporation. The extract is next mixed with acetone, the acetone extract separated and washed, and then the acetone is distilled off to a small volume. This is next mixed with ice, which causes crystals of indican hydrate to separate out. These may be further purified by recrystallisation from benzene.

LEGAL INTELLIGENCE.

Dealings in Chemicals.

At the London Bankruptcy Court on Tuesday before Mr. Registrar Meilor, the public examination was held of Albert Edward Smith, described as of 2, St. John's Terrace, Westbury Road, Forest Gate, and carrying on business at 18, Beer Lane, E.C.3. The statement of affairs filed by the debtor showed gross liabilities amounting to £3,528 18s. 6d., of which £1,528 18s. 6d. was due to unsecured creditors; assets nil. The receiving order was made against the debtor on March 6 last on the petition of a creditor, the act of bankruptcy being the failure of the debtor to comply with the requirements of a bankruptcy notice.

In reply to questions put by the Official Receiver, debtor stated that from 1907 until 1914 he was employed as clerk or book-keeper with different firms of chemical merchants in the city. From August, 1914, until April, 1916, he served in the Cyclists' Battalion of the Essex Regiment, and was then discharged from the Army. From April until August, 1916, he was employed as clerk by a chemical firm in the city. In August, 1916 while still in employment he carried on business from his mother's address as a chemical merchant, but subsequently he opened an office at 18, Beer Lane, E.C. He closed it however after a time because he found it was of no use to him, and since then has conducted his business from his mother's house at Forest Gate. He had paid all the liabilities incurred at Beer Lane. In the spring of 1916 he contracted to buy 310 tons of soda ash at £6. 10s. per ton from the Vulite Company. He had no capital at the time but he arranged to sell the goods at £13. 10s. per ton for export. Although he was employed as a clerk to a chemical firm, he managed to enter into this arrangement through meeting a traveller of the Vulite Company. Subsequently the Vulite Company refused to let him have the goods, because they could not let them go for export. They had purchased the goods from Messrs. Brunner Mond and Co., and the latter would not allow them to be sent abroad. If the Vulite Company had allowed the goods to have been sent abroad they would have been refused any further supplies. He brought an action against the Vulite Company for breach of contract with the result that he was awarded 3s. damages, and each side had to pay their own costs. He took the case to the Court of Appeal, when the judgment was confirmed. The costs of the Appeal amounted to about £170, which he paid out of his savings. The people to whom he had sold the goods agreed to accept half the damages he obtained, consequently they received nothing.

In October, 1917, he entered into a contract to sell 200 tons of caustic soda at £31. 10s. per ton. As soon as he obtained the order he entered into a contract to purchase the caustic soda at a price which showed him a substantial profit. He did not sell the caustic soda before he had actually obtained an option to purchase it. His profit on the transaction was about £4. per ton, to which had to be added the cost of the casks. He contracted to purchase the caustic soda from Messrs. Luke and Bailey, and he had arranged to sell same to the Northern Dyers and Chemical Company. He could not provide the money to pay for the caustic soda, and the Northern Dyers agreed to pay the money into his banking account subject to its being released when the goods were received. He could only obtain the caustic soda from Messrs. Luke and Bailey in small lots of two or three tons at a time, and as he could not touch the money paid into the bank by the Northern Dyers, he entered into an arrangement with the Immediate Transportation Company, under which they agreed to pay for the caustic soda as received. Afterwards the Northern Dyers refused to accept the goods on the ground that it was not up to sample. The stuff he tendered to them was exactly the same as the sample. The Northern Dyers Company brought an action against him for breach of contract and he put in a counterclaim for loss of profit. At that time the market price had gone down to about half, and debtor alleged that that was the real reason why the goods were rejected. He understood from his solicitors that he had obtained judgment against the Northern Dyers, but afterwards it transpired that the matter went to arbitration under which the Northern Dyers were awarded £897. damages. He subsequently cancelled the contract with Messrs. Luke and Bailey on the ground that they had sent the goods along in such small lots. The Immediate Transportation Company were creditors for £681. for money advanced. He did not know whether they still held the caustic soda.

Subsequently he contracted to sell a quantity of soda ash at £11. per ton. He purchased the goods at £10. 17s. 6d. per

ton, which left him a profit of 2s. 6d. per ton. He made a verbal contract with the vendors, but had no written contract, and eventually they declined to allow him to have the goods. He alleged it was because the price had in the meantime gone up to £12. per ton. An action was brought against him by Messrs. Grant, Hughes, and Co., to whom he had agreed to sell the soda ash, and they obtained judgment against him for £251.

His justification for entering into these contracts was that he thought he could carry them through. He was 26 years of age and the knowledge he had picked up whilst in the employment of different firms, justified him in dealing with these large amounts of chemicals. In February of this year he entered into contracts to buy a large amount of glue. He had no banking account at the time. He had borrowed money from his wife from time to time before he was married. In September last year he contracted to buy certain houses at Peckham for £1,900. He borrowed £2,000. from a Mr. Macdonald, in order to complete the purchase. He represented to Mr. Macdonald that the property was costing £3,000., and he told that gentleman he would give him a share of the profits he obtained from a transaction in soap. He had arranged to buy 100 tons of soft soap at £25. per ton and thought he could sell it at £35. per ton. He did manage to sell some at £35. per ton, but the remainder of the contract was cancelled.

The examination was eventually ordered to be closed.

Failure in the Chemical Trade.

At the Leeds Bankruptcy Court on Tuesday, before Mr. Gillespie (Registrar), the examination was resumed of Edwin Fredk. Heesch, lately residing at 158, Woodsley Road, formerly carrying on business at 212, Wellington Street, as a manufacturer's agent, now residing at 59, Clarendon Road, and carrying on business at Stansfield Mill Yard, 77 and 79, Kirkstall Road, as oxy-acetylene welder and chemical manufacturer, under the style of "The Gatap Company."

Debtor estimated his gross liabilities at £1,013. 19s. 6d., of which £924. 5s. 1d. is expected to rank for dividend, and the total available assets amount to £155. 15s. 7d., leaving a deficiency of £768. 9s. 6d. He ascribed his failure to "bad trade and losses in the chemical business owing to faulty manufacture." The debtor described himself as "a Dane by birth and German by conquest." He came to England in 1891, and in 1896 commenced business as a manufacturer's agent, dealing mainly with textile machinery made in Germany.

The examination was again adjourned for further accounts to be filed.

Brunner, Mond and German Patents.

On Tuesday an application was made to the Controller of Patents (Mr. H. Temple Franks) on behalf of Brunner, Mond, and Co., of Wilmington, Northwich, for a licence in respect of two German patents owned by the Badische Anilin und Soda Fabrik for the manufacture of ammonia.

It was stated, on behalf of the applicants, that the manufacture of ammonia was very necessary for explosives, and also in peace time for fertilisers, and that applicants were prepared to spend half a million on experimental plant for working these patents.

The Court intimated that the grant of these licences would be recommended.

GAZETTE NEWS.

LIMITED COMPANIES.—Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions, Orders, and Official and Other Notices.

Aramo Copper Mines, Ltd.—Meeting of creditors, 2, Metal Exchange Buildings, E.C., October 3.

Cogschultze Ammunition and Powder Company, Ltd.—Resolved July 30, confirmed August 15: That the company be wound up. F. J. Livesey, 42, Essex Street, Strand, W.C., chartered accountant, liquidator. Meeting of creditors at liquidator's, October 2.

Henrite Explosives, Ltd.—Resolved July 30, confirmed August 15: That the company be wound up. F. J. Livesey, 42, Essex Street, Strand, W.C., chartered accountant, liquidator. Meeting of creditors at liquidator's, October 2.

San Miguel Copper Mines, Ltd.—Resolved August 29, confirmed September 17: That the company be wound up. E. Johnston, 295-8, Salisbury House, E.C., liquidator. Claims to liquidator by November 8.

CORRESPONDENCE.

* * * We do not hold ourselves responsible for the opinions expressed by our correspondents.

Malachite Green Crystals.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir, The attention of this Association has been drawn to several instances on the Dyestuffs Licensing Sub-committee refusing to grant licences for the importation of malachite green crystals of American origin. The reason given for the refusal is that the committee "understand this product is now available from British sources of supply." It is, however, significant to note that the committee have ignored requests for information as to the names of British manufacturers who can, in fact, supply, and our correspondents have endeavoured, without success, to obtain supplies from such leading British firms as British Dyestuffs Corporation, Ltd., Clayton Aniline Company, Ltd., and L. B. Holliday and Co., Ltd.

I would therefore like to issue, through your columns, a public invitation to any British manufacturer who can supply to communicate with this Association, in order that I may put him in touch with our members who are wanting the goods. The lack of supplies means that expensive plant in this country has to stand idle. The dye in question is essential to the manufacture of finished silk goods, woollen goods, etc.; it is indispensable for "topping" and brightening cotton goods, and is of the first importance in the leather, jute, pigment, and other trades.

The Government have asked the country to increase its export trade, and, at the same time, we find one of their Departments not only hindering the manufacturer, but apparently wilfully and knowingly impeding the production of goods of a standard that will favourably compete in foreign trade.

This Association invites communication from firms who are suffering through the present unsatisfactory arrangements, and who object to disclosing the whole of their private business to an individual firm camouflaged under the official title of the "Central Importing Agency."

I would also add that the policy of this Association throughout is to foster British production. We would not for one moment urge that licences should be granted for the importation even of Allied dyestuffs where satisfactory British supplies are available at anything approaching a reasonable figure.—Yours, etc.,

THE BRITISH CHEMICAL TRADE ASSOCIATION.

O. F. C. BROMFIELD, Asst. Sec.

80, Fenchurch Street, London, E.C. 3,
October 6, 1919.

Chemists at Gretna Factory.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—If all that "Morrison" describes in his letter to your issue of September 20, of the wholly foolish and insane conduct of the Gretna "chemists" (the inverted commas are mine), be true, I am not surprised at the feeling of contempt, tempered somewhat by sorrow and pity, with which he was moved. He is generous to these unqualified "chemists" (again the inverted commas are mine) in crediting them with being skilled workers on an equality with the recognised and unequivocal trades of plumber and lead-burner; and chemists of recognised qualification will be gratified to read that "Morrison," having a very proper sense of discrimination, "knows and honours the value of the true chemist."

All this kind of thing, sir, only emphasises, if I may say so, the unfortunateness of the fact that as yet the term "chemist," except as applied to pharmacists, has not been restricted by statute to men and women of (1) good character, (2) sound general education, (3) proper systematic training in chemistry and collateral sciences in recognised institutions, (4) hallmark qualification; but is used by all and sundry who perform any routine operation connected with manufacture in a chemical works. Such men are artisans pure and simple, skilled to perform a limited number of practical operations. In short, are highly worthy trade workers like any other workers at a trade, and are not to be confused with the body of fundamentally and systematically trained qualified professional chemists.—Yours, etc.,

Dartford, October 6, 1919.

Laboratory Glassware.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—Kindly permit me a short space in your valuable journal concerning the chemical glassware used in laboratories. We find the glass well blown, but the annealing generally bad, whether bought from Scotch or English firms. Flasks are often found when required for use to have cracked whilst in the cupboard. These cracks are principally found around the necks where the rounding-off occurs, and a complete ring of glass drops off, showing that no annealing has been attempted. Manufacturers will do a good service to chemists if they would give annealing far more serious attention than is being given at present. I was using two Soxhlet extraction apparatus, and found each one had internal strains, resulting in cracks which completely spoiled my experiment and wasted a lot of precious time. Unless British manufacturers can produce a reliable annealed apparatus we shall be obliged to place our orders with foreign makers.—Yours, etc.,

P. G. ABRAHAM.

42, St. John's Road, Maindee, Newport, Mon.,
October 1, 1919.

The British Chemical Trade Association.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—We notice in your last issue a considerable amount of correspondence from the British Chemical Trade Association. It would be interesting to know who this Association represents, and how many of its members were recognised dealers in chemicals before the war.

The Board of Trade, apparently, are in doubt as to whether the Association is in any way qualified to represent the chemical trade in London.—Yours, etc.,

London, September 30, 1919.

OUR BOOK SHELF.

THE MANUFACTURE OF CHEMICALS BY ELECTROLYSIS. By A. J. Hale, B.Sc., F.I.C. London: Constable and Co., Ltd.; 6s. net.

Increasing interest in electrolytic processes warrants an extension of technical literature on the subject. The present volume is an important addition, covering as it does, although briefly, general principles and modern developments in diverse directions. To enumerate all its contents would take up more space than we can spare; very important features, however, are the sections dealing with per-salts, in which also are contained brief references to hydrogen peroxide from persulphuric acid, etc. Hydrosulphite of soda is another feature of wide interest. Other sections are the electrolytic reduction of organic compounds and the oxidation and substitution of organic compounds. References to English and foreign patents and to sources of literature are enumerated throughout. A really good book, which must stimulate study in new channels.

THE HYDROGENATION OF OILS. 2nd edition. By Carleton Ellis, S.B. London: Constable and Co., Ltd.; 36s. net.

A highly practical book, dealing with the operations involved in all variations of this important process. The author carefully discusses and illustrates every modification worthy of attention. As catalysts, both base and rare metals receive detailed treatment. Edible hydrogenated oils, uses of hydrogenated oils, the hydrogenation of petroleum, and hydrogen production—all form lengthy sections admirably treated. As from time to time we receive frequent inquiries for text-books on this subject, readers generally will do well to make a note of this highly useful volume.

CHEMICAL REAGENTS. By Dr. C. Krauch. (Second English edition revised and enlarged by H. B. Stocks, F.I.C., F.C.S.). London: Scott, Greenwood and Son, 17s. 6d. net.

The second English edition of this well-known work must continue its career of utility. Purity in reagents is the first law of the laboratory, and a book which deals, as this one does, with probable impurities, their detection, quantitative estimation of the reagent, uses and storage, and also descriptions of commercial varieties, etc., must cover much ground. That the present volume deals with these very important matters very ably and extensively is but a fair need of praise. All the new reagents such as dimethyl glyoxime, nitron, benzidine, etc., have been added, and are well treated.

FERTILISER NEWS.

(SPECIALLY CONTRIBUTED.)

Nitrate of Soda.—The position of the nitrate industry, after being so devoid of interest, has suddenly become full of incidents worth recording. As mentioned recently the Producers' Association in Chili after "fixing" the price of ordinary nitrate at 10s. 1d. per quintal f.o.b. and then threatening to reduce it to 8s., sold 500,000 tons at 9s. for delivery October to March. The sale of a further 250,000 tons on the same terms is now announced, and offers for a similar quantity being refused, the price has now been "fixed" at 9s. 4d. for October-November, and 9s. 6d. for December shipment. These large transactions *en bloc* are the more satisfactory in that before the war, when there was a "free market," sales were made piecemeal, the principle buyers being the large German firms, now for obvious reasons no longer taking the same important part in the trade; it would therefore, as we have already said, be interesting to know the names of the present gigantic purchasers. Curiously enough, considerable sales are reported at £22. per ton, c.i.f. Continental outports, that figure being well below the parity of nitrate bought at 9s. per quintal with freight at the rates recently quoted. Even more surprising is the announcement that the British Government have just sold at from £17. 10s. to £18. per ton the balance of their stock of nitrate in this country, costing many pounds more. We shall have occasion to revert to the matter, meantime trusting that our friends in the chemical trade have participated in the bargain. The Chilean companies standing aloof from the Association have now joined it, leaving the American and German *oficinas* outside it, and the only obstacles in the way of a gradual rehabilitation of the nitrate industry are the scarcity of tonnage and the prohibitive price of the fertiliser. Neither of these can be ignored. The September shipments from Chili were only about 44,000 tons. Details will appear next week.

Italian Fertiliser Notes.—Information from Italy shows that there is an active demand for superphosphates which is growing in volume, even in those districts where it was thought there would be a falling away owing to the agrarian troubles. It is observed also that the goods are being despatched with commendable regularity. As to basic slag it appears that there is not much that is new. Italy is waiting to know what the French Government are going to do with respect to the permission to export the merchandise in response to the advances made by the Italian Government. In any case, however, it is quite understood that the quantity of slag that will be available must be very limited. The position is very difficult in respect to sulphate of ammonia. The home production of course, is known to be exceedingly small and altogether unequal to the requirements of Italian agriculture; whilst, on the other hand, there appears to be no prospect of being able to import any from England; nor yet facilities for importing it from America. Such parcels of sulphate of ammonia as are available are quoted at 130-135 lire per quintal. The prospects of having potassic salts from Alsace are also very clouded. There has been great delay in deliveries, and orders in arrears will occupy the transport services over a considerable time.

Sulphate of Ammonia.—Deliveries of sulphate, as of all other fertilisers, have been directly and badly impeded, and trade is at a very low ebb. Prices are, of course, fixed until next year, and the export figure is given nominally as round about £25. A big bull point for this fertiliser is that farmers have become thoroughly convinced of the value of the material. Propaganda in the years preceding the war found fruition during the necessities of the war period, but even now propaganda is not being neglected and the farmer is all the time being advised by means of leaflets and "reason why" posters. He has no chance, therefore, of missing the sulphate of ammonia lesson. Impeded deliveries now would only mean very much bigger deliveries by and by, and the material seems likely to reach in the current year a level of popularity never before touched. Whilst high prices remain, of course, the biggest possible trade will not mature, and this can be said whilst at the same time the necessity of the high prices is realised. The American production is reported to be still growing, although here again strike troubles may have a temporary but important adverse effect.

Potash.—Labour and transport troubles apart, there would appear to be signs of a further improvement in the supply of potash manures, but these are still by no means bulking largely. The movement on the part of the American potash producers to secure some measure of protection for their

industry is being regarded with a good deal of suspicion by the farmers generally in the United States, especially as someone has been trying to stampede the farmers with the cry that their potash, if all home-produced, will cost them three times the price of imported German potash. In this country potash is required for many districts very obviously.

Slag and Superphosphate.—Taking conditions into account, the business in basic slag is fairly active. The increased make looks like again being checked, however, and this suggests higher prices. One thing that is certainly being driven home to the farmer again just now is the need for early ordering if he desires to get his material in hand while it can still be applied to the ground. The time to apply basic slag with the best effects is autumn or early winter, and farmers have always to remember that the higher the percentage of solubility, the greater will be the value of the efficacy of the manure. Superphosphates show little change, but demand over the recent period has exhibited signs of improving. Supplies, however, are not viewed with placidity; the raw material and the shipping position could do with a lot of improvement.

Other Fertilisers.—East Indian bonemeal is as highly priced as ever at about £15. for good class material, and inferior sorts ranging down to about £9. Dried blood, meat meals and tankages can be taken at about the figures given recently here. Fish guanos sell well according to analyses where offered, but there is no trading in Peruvian guano now being reported. The scheme whereby the Nitrogen Products and Carbide Company are going to amalgamate with the Alby United Carbide Factories was held up for a long time owing to the disinclination of the Norwegian Government to meet the companies in a friendly spirit. The scheme is now being proceeded with and meetings of the shareholders are due in the middle of this month. This should be the prelude to a period of effective manufacture and overseas business.

Barcelona Fertiliser Quotations.—The following prices are quoted for chemical fertilisers in Barcelona:—Nitrate of soda, 25 per cent. and 15-16 per cent. nitrogen, 72 pesetas; sulphate of ammonia, 20-21 per cent. nitrogen, 88 pesetas; sulphate of potash, 90-95, equal to 30/32, 118 pesetas; mineral superphosphate of lime, 13-15 per cent. soluble phosphoric acid, 20 pesetas; ditto, 16-18 per cent., 25 pesetas; bone superphosphate, 18-20 per cent. soluble phosphoric acid and 1-2 per cent. nitrogen, 34 pesetas. These quotations are subject to variation according as the parcels dealt in may be under or over a ton, all per unit of 100 kilogrammes.

Norwegian Agency for Alsace-Lorraine Potash.—According to a circular issued, the Norwegian Nitrate Company has acquired the general agency for the Alsace-Lorraine potash mines to cover all Scandinavia and Finland. The importance of this transaction is seen in that both Norway and Finland each consume about 200,000 tons of potash per annum, whilst Sweden and Denmark take 60,000 tons each.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

(SPECIALLY CONTRIBUTED.)

It will be next week before there is a complete resumption of operations in this district, but the collieries and by-product coke ovens are already working, and their output will be absorbed as soon as the furnaces on low phosphorus and ordinary brands of iron are in blast again between Workington and Carnforth. At mid-week there were only two furnaces in full draught, but it is believed that all twenty-four furnaces will be working to-day. The restarting of the rail mill at Workington next week assures the maintenance in blast of the furnaces on ordinary iron which consume all the coke made at the Cumberland by-product coke-ovens. It is too early yet of course to judge how business will develop in the hematite pig-iron trade, but there is just a possibility that if the country settles down to work and confidence is re-established the demand for iron may be greater than it was a fortnight ago, and in that case additional furnaces may be blown in. Certainly until that does take place the ovens must remain working at only two-thirds of their capacity.

BUSINESS NOTICE.—The business of Messrs. Donald Campbell and Co., oil, wax, tallow, etc., merchants, of 10, St. Mary Axe, E.C.3., has been converted into a limited company with a capital of £500,000 of which £450,000 has been issued and fully subscribed. The company takes over all contracts and all liabilities.

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

September 22nd to 27th (inclusive).

- Conducting a Liquid and a Gas Soluble in Said Liquid Through Closed Cycle of Thermal Operations. Beadle, C. H. 23,491.
 Production of Glycerine by Fermentation. Cocking, A. T.; and Lilly, C. H. 23,644.
 Alkali Chromates and Iodine. Datta, R. L. 23,375.
 Direct Oxidation of Ammonia. Duparc, L.; and Urfer, C. 23,505.
 Apparatus for Detecting and/or Controlling Mixture of Liquids and Solutions. Empson, A. W. 23,478.
 Method of Cooling or Allowing to Crystallise Fatty Emulsions. Erstev, K. 23,585.
 Recovery of Tin from Tin-pot Skimmings and Chloride of Zinc as By-product. Evans, A. J. and H. D. 23,318.
 Fertilisers. Fellowes, E. N.; and Hyatt, W. H. 23,730.
 Pectisation of Condensation Products of Phenols and Aldehydes. Jaloustre, L. A.; Kheifetz, Z.; and Warchavsky, M. 23,379 and 23,380.
 Treatment of Mineral Oils, etc. Knibbs, N. V. S. 23,515.
 Manufacture of Complex Silver Salts of α -amido Acids. Napp, H. R. (Hofmann-La Roche and Co.). 23,372.
 Colouring-matters. Pope, Sir W. J.; and Scottish Dyes, Ltd. 23,799.

September 29th to October 4th (inclusive).

- Treatment of Metal-bearing Ores, etc., and Recovery of Constituents Thereof. Ashcroft, E. A. 23,960.
 Granulating Cyanamide. Barbé, L. L. J. 24,039.
 Conversion of Fatty Acids or Oils or Fats Containing Free Fatty Acids into Glycerides. Bolton, E. R.; and Lush, E. J. 23,957.
 Zinc Chloride. Burgess Laboratories, C. F. 24,129.
 Oxygen Compounds of Sulphur. Clayton, T. A. 24,040.
 Rotating Colour Mixing or Blending Devices. Clifton, W. E.; and Ewart, J. S. 24,270.
 Pulverising or Atomising Liquids. Constantinesco, G. 23,880.
 Manufacture of Painting, Priming, etc., Compositions. Emulsion Aktieselskabet; and Schou, E. 23,964.
 Ore-concentrating Machine. Gasche, F. G. 24,166.
 Drums for Drying Materials. Gerlach, A. 24,228.
 Drying-apparatus. Higginbottom, E. 24,250.
 Raising Liquids. Higginson, J. 24,111.
 Drying-apparatus. Imray, O. (Secord, Peters, and Paterson). 24,048.
 Conversion of Wash from Distillery into Fertiliser. Kestner Evaporator and Engineering Co.; and Reavell, J. A. 24,176.
 Stabilising Nitro-cellulose. Laan, B. van der. 24,119.
 Disintegrating, Spraying, or Vaporising Liquids. Lang, A. A. D. 24,209.
 Ammonium-nitrate Explosives. Muller, E. 24,120.
 Enriching Poor Phosphates. Poupart, C. 24,187.
 Petroleum Jelly. Rütgerswerke Akt.-Ges. 24,047.
 Cellulose Acetate. Scott, J. L.; and Tulloch, T. G. 24,122.
 Solder for Aluminium and Its Alloys. Shortland, H. 24,163.
 Hydro-extractors. Singleton, W. C. 23,819.
 Phenolic Resins or Esters. Soc. Coralex. 23,958.
 Aliphatic Nitrates. Wilde, P. R. de. 23,881.
 Determining Composition of Gases. Williams, A. and L. D. 24,005.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 6d. in stamps to the Comptroller, Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane, W.C.

1917.

- Solutions of Cellulose or Material Containing Cellulose. Bloxam, A. G. (Zellstoffabrik-Waldhof). 14,806. 132,815

1918.

- Oxidising Ammonia to Form Oxides of Nitrogen and Nitric Acid. Jones, L. C.; and Parsons, C. L. 7,221. 132,551
 N-monoalkyl Derivatives of Certain Aromatic Compounds. Lapworth, A.; and Levinstein, Ltd. 9,710. 132,555
 Acetaldehyde. Matheson, H. W. 10,070. 132,557
 Acetic Acid. Matheson, H. W. 10,071. 132,558
 Recovering Mercury from Mercury Sludge. Matheson, H. W. 10,072. 132,559
 Oxidising Mercury. Matheson, H. W. 10,073. 132,560
 Alkali Percarbonates. Deutsche Gold-und Silber-Scheide-Anstalt vorm. Roessler. 10,282. 116,903
 Desulphurisation of Zinc Sulphide Ores. Rigg, G. 11,588. 119,223
 Burner for the Oxidation of Ammonia. Maxted, E. B.; and Smith, T. A. 13,037. 132,571
 Treating Peat for Obtaining Carbonaceous Material for Decolourising Purposes. Leadbeater, J. W. 13,111. 132,572
 Furnaces for Distillation of Coal, Shale, and Other Like Substances. Anderson, F. A.; Deacon, M.; and Brady, N. P. W. 13,221. 132,576
 Purification of Sewage and Other Liquids. Jones, W.; and Jones and Attwood. 13,379. 132,581
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COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

1917.

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- Separating a Salt from Its Solution by Evaporation. Piccard, P. 12,292. 132,771
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 Precipitate Rich in Albumen and Poor in Ash from the Raw Juices and Waste Liquors of Sugar Factories. Kowalski, M. von Wierusz. 22,774. 132,798
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ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

- Fuel Oils. F. Tinker, Erdington, Birmingham. British Patent, 130,699, of 1918.

A fuel oil containing both mineral oil and tar or tar oils containing pitch is obtained by adding to the tar, etc., before it is mixed with the mineral oil, a third ingredient or intermediate oil which is miscible with each of the other ingredients and which is intermediate of them in its chemical composition and surface tension. Usually, an intermediate oil is intermediate in specific gravity also, as it is found that the surface tension and specific gravity increase with the proportion of carbon, oxygen, nitrogen, and sulphur in the oil. In one method of making an intermediate oil, a mineral oil is oxygenated. For example, a shale oil of a specific gravity of 0.89-0.90 is heated to 300° C., and air is blown through it for three-four hours until the product is soluble in tar and has acquired the necessary surface tension. In a second method, asphaltic oils, such as Mexican oils, are stripped of the lighter and medium fractions, thus removing the oils having a high hydrogen-content. In a third method, oils such as Borneo oils having the requisite hydrogen-content are stripped until

the requisite surface tension is obtained. In a fourth method, naturally occurring intermed. oils are used. If the surface tension of these oils is slightly too low, as in the case of oils from Trinidad and Texas, or too high, as in the case of creosote, heavy asphaltic oils and asphalts, and oils from sulphurous shales, the surface tension is adjusted by blending. The tars, etc., employed include dehydrated tar alone or mixed with pitch, and creosote oil in which pitch has been dissolved. The tar, mineral oil, and intermediate oil are preferably used in equal proportions, and any solids are separated by heating to 85-90° C. and afterwards settling or filtering.

Ammonia. E. B. Maxted, Walsall, Staffs. British Patent, 130,023, of 1917.

Ammonia is produced by subjecting a gas mixture consisting of, or containing in substantial proportions, nitrogen and hydrogen, at an elevated pressure, to the action of an electric arc, preferably of high tension, the gas mixture produced being rapidly cooled, for instance, by direct or indirect contact with water or a cooler gas current. The temperature to which the gas is heated by contact with the arc is preferably 2,000° C. or higher, and a suitable pressure is from 50 to 100 atmospheres. In the apparatus described a nitrogen-hydrogen mixture, compressed by a compressor B and circulated by a pump D, is subjected in a reaction chamber A to the action of an arc formed between electrodes C¹, C²; the gas mixture produced passes

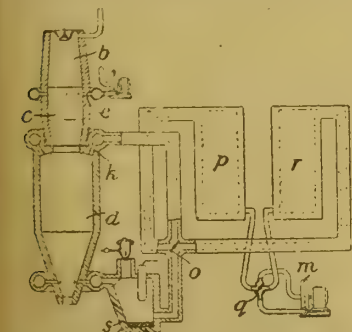
through a non-conducting water-cooled tube E and a cooling-coil F to a chamber G, in which the ammonia is eliminated by refrigeration or absorption, the unconverted gas being recirculated by the pump D. Fresh gas, to compensate for that transformed into ammonia, is passed into the apparatus through the compressor B. The cooling-coil F may be omitted, the gas mixture being led directly into water in the absorber.

Cellulose Acetate Solutions. Cellon, Ltd., Tyrer and Co., P. H. Chambers, and G. T. Feasey, London. British Patent, 130,402, of 1918.

Cyclohexanone, cyclopentanone, or other cycloketones or alkyl or aryl substitution derivatives are added in small proportions to cellulose acetate solutions for use as aeroplane dopes, etc. The proportion is less than the amount of cellulose acetate contained in the solution.

Extracting Metals. F. M. Wiberg, Bergsskolan, Falun, Sweden. British Patent, 130,334, of 1918.

In a cyclic process for the reduction of ores, etc., a part of the reducing gas is withdrawn for regeneration before it has traversed the entire column of ore and become spent,



and the remainder of the gas is burnt to preheat the ore. The gas is supplied to the reducing chamber 'd' from an electrically heated producer 's', and the greater part is withdrawn through opening 'k' and returned to the producer. If this gas is too hot to pass directly through the blower 'm' it is drawn through one of a pair of regenerators 'p', 'r' in which it is cooled, and forced through the other regenerator to be

heated again before entering the producer; valves 'o', 'q' enable the direction of flow to be reversed. The remainder of

the gas traverses the upper part 'c', 'b' of the ore column, air being used to heat the ore to consume any combustible constituent. Iron may be used as the heat-absorbing material in the regenerators.

Vulcanising Rubber. North British Rubber Company and B. D. Porritt, Fountainbridge, Edinburgh. British Patent, 129,798, of 1918.

The vulcanization of rubber by sulphur is accelerated by compounds resulting from the interaction of strong alkalis or strongly basic substances and monohydroxy derivatives of benzene or its analogues. Sodium phenate is one such compound in which the hydrogen of the hydroxyl group is replaced by the metal or equivalent radicle. In others, *m*- or *p*-cresol or β -naphthol may be the acidic group.

Sodium Permanganate. D. Tyrer, Stockton-on-Tees. British Patent, 130,844, of 1918.

Sodium permanganate is obtained from sodium manganate by first preparing barium manganate, then converting this into the permanganate, and finally decomposing the latter with a sodium salt. The conversion of the barium manganate into permanganate is effected by adding sulphuric acid very slowly, with or without the previous addition of a trace of barium permanganate. After treatment of the latter with a sodium salt, the product is evaporated until, on cooling, it solidifies to a crystalline mass of sodium permanganate.

Chemical Synthesis. L'Air Liquide Soc. Anon. pour l'Etude et l'Exploitation des Procédés G. Claude, Paris. British Patent, 130,068, of 1917.

Exothermic chemical syntheses, and particularly the synthesis of ammonia from its elements, are effected by the combined action on the constituents of the synthesis of a catalytic agent, a high temperature, and hyper-pressures, which are defined as pressures exceeding 500 atmospheres

and which may exceed 2,000 atmospheres. Under these conditions, when the reaction is once started, the heat of the reaction is more than sufficient to maintain the catalyst at a suitable temperature—for example, 500-700° C. The apparatus described comprises compressors C¹, C², which take in the mixed constituent gases, already compressed to 100-200 atmospheres, and deliver them under hyper-pressure to a catalysing apparatus K. The apparatus K consists of a long thick weldless tube T of steel or suitable metal screwed in a fluid-tight manner—for example, by embedding the joint in copper, on to a metal plug A, to which is also attached a thick tube G surrounded by a water-cooled jacket E. The tube T contains an inner open-ended thin-walled tube T¹, filled

with catalyst at the right-hand end. The external surface of the tube T may be kept at a suitable temperature by an oil bath, or by a boiler containing water under pressure, in which case steam under pressure is obtained as a by-product. The hyper-compressed gases entering the tube T through the plug B first traverse the space between the tubes T, T¹, being thereby heated, and then pass through the catalyst and along the tube T¹ to the condenser G, where the liquid product, for example ammonia, collects in the trap F and is withdrawn through a valve R. The uncombined gases may be passed through a second and third apparatus of successively decreasing size.

Strontium Peroxide. J. B. Pierce, West Virginia, U.S.A. British Patent, 130,840, of 1918.

Strontium peroxide is prepared by treating strontium oxide with oxygen under pressure, pressures of 1,500-1,800 lb. per sq. in. being mentioned. The reaction is facilitated by heat, 400-500° C. being suitable.

Metallic Chlorides. W. Heap, Heaton Chapel; and E. Newbery, Manchester University. British Patent, 130,626, of 1918.

Aluminium, magnesium, cerium, and rare-earth chlorides are obtained in anhydrous form by heating an oxide, hydrate, hydrated chloride, or weak acid salt, such as carbonate or oxalate, with phosgene gas or with a mixture of carbon monoxide and chlorine. When using a mixture of carbon monoxide and chlorine, a catalyst such as animal charcoal may be employed to convert part of the mixture into phosgene. According to the Provisional Specification, the invention is applicable to the production of calcium, iron, and other chlorides.

Fungicides. R. Mond, Sevenoaks, Kent; and C. Heberlein, London. British Patent, 130,709, of 1918.

Fungicides for horticultural and like purposes or for destroying fungi in water reservoirs consist of copper sulphate together with about 93 per cent. of the chemical equivalent quantity of an alkali carbonate or bicarbonate. It is stated that, owing to the formation of basic compounds, no free copper sulphate is left in solution, and that the maximum proportion of the colloidal compound produced is in the form of hydrosol. Preferred proportions are 4lb. copper sulphate crystals to 4.25lb. soda crystals. Solutions may be prepared for immediate use or the mixture may be put up in the dry form to be mixed with water for use. Dry mixtures of copper sulphate crystals with sodium bicarbonate alone or with a mixture of carbonate (crystals or anhydrous) and bicarbonate are stated not to interact on storing. Lime may be added to the mixtures as a substitute for part of the alkali carbonate or an inert substance may be added. A protective colloid, such as glue, may also be added. Mixtures containing various proportions of alkali carbonate greater than the chemical equivalent are also referred to.

Lubricants. H. M. Wells, St. Anne's-on-Sea; and J. E. Southcombe, Birkenhead. British Patent, 130,377, of 1918.

Lubricating oils are prepared by adding to a hydrocarbon lubricating oil a minute amount—e.g., 1-2 per cent.—of a substance other than soap which lowers the interfacial tension between oil and water. Where it is desired to prevent the product from forming an emulsion with water, acids of lower molecular weight, such as butyric or other volatile fatty acids, cinnamic acid, or water-soluble naphthenic acids, are added to the mineral lubricating oil. A product which is emulsifiable with water and suitable for marine-engine lubrication is obtained by the use of higher fatty acids such as those obtained from rape oil, wool grease, or whale oil. Oleine and other commercial fatty acids are preferably employed, the products so obtained being very similar to those obtained by compounding the corresponding animal and vegetable oils with mineral oils. The hydrocarbon oil may be derived from petroleum, coal, coal-tar, shale, colophony, etc.; petroleum jelly also is used.

Electrolytic Deposition of Metals. Q. Marino, Hendon, London. British Patent, 130,446, of 1918.

An electrolyte for plating consists of a solution of a phosphate or pyrophosphate of the metal in caustic alkali, to which has been added ammonium tartrate, salicylate, or citrate, or two or more of these salts. An alkali carbonate may replace part of the caustic alkali. Copper phosphate or pyrophosphate may be precipitated from a solution of the acetate, sulphate, or other salt, and washed in cold water before dissolving in alkali. The electrolyte may be heated, especially when plating hollow-ware. Copper anodes are readily dissolved. After thinly coating with this electrolyte, iron or steel may be more thickly plated in an ordinary electrolyte, such as copper sulphate solution. Alloys such as brass may be deposited.

Picric Acid. L. B. Holliday and A. Clayton, Deighton Chemical Works, Huddersfield. British Patent, 130,382, of 1918.

Picric acid is prepared by treating sulphonated phenol with a mixture of strong nitric acid and strong sulphuric acid; the mixed acid is added in two portions, the first (say, one-fourth of the whole) at or below 45° C., and after stirring for about an hour the remainder, heated to or above 70° C., is added, and the mixture heated to complete the reaction.

Organic Phosphorus Compounds. O. Imray, London. (A communication from the Society of Chemical Industry in Basle; Basle, Switzerland.) British Patent, 130,456, of 1918.

The pure sodium salt of the organic phosphorus reserve compound of green plants is prepared by dissolving the impure acid or salts thereof in dilute mineral acid, adding a solution of a ferric salt, treating the washed precipitate with excess of caustic soda solution, filtering, adding alcohol to the filtrate and crystallising, and finally recrystallising from water. The crystalline salt is formulated as $C_6H_5O_2P_6Na_{12} + 47 H_2O$ and the anhydrous salt as $C_6H_5O_2P_6Na_{12}$. Salts of calcium, barium, strontium, magnesium, copper, lead, manganese, iron, etc., may be obtained therefrom by double decomposition, and from these the free acid can be prepared; other salts are obtained by wholly or partially neutralising the free acid by inorganic or organic bases.

Organic Acid Anhydrides and Chlorides. A. Boake, Roberts and Co., Stratford, London; and T. H. Durrans, Oxford. British Patent, 130,399, of 1918.

Organic acid anhydrides or chlorides are prepared by the reaction of sulphur dioxide and chlorine upon anhydrous alkali or alkaline-earth salts of the acids in the presence of small quantities of the following bodies: esters of alcohols or phenols with organic or inorganic acids, ethers, aldehydes, acetals, phenols, or hydrocarbons; ethyl acetate, isoamyl formate, ethylphenyl acetate, methyl cinnamate, triphenyl phosphate, tricresyl phosphate, ethyl malonate, isobutyl chloride, benzyl benzoate, dibenzyl ether, eucalyptol, pinene, limonene, cinnamic aldehyde, anisic aldehyde, cresols, methylal, and isoamylacetal are specified as suitable. An example is given of the preparation of acetic anhydride; acetyl chloride, benzoyl chloride, butyric anhydride, and phenylacetic anhydride are also specified as products.

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Lithopone. P. Desachy, Paris. British Patent, 126,628, of 1917. Convention date, October 19, 1917.

A process for the manufacture of a pigment comprising the sulphate of a metal of the alkaline earths and zinc sulphide utilises the process described in Specification 126,625 of producing zinc sulphide alone by causing a hot solution of sodium sulphide to react on an insoluble zinc product such as the oxide, carbonate, sulphite, etc. In preparing a mixture of barium sulphate and zinc sulphide, for instance, a mixed precipitate of barium sulphate and hydrated oxide, carbonate, or sulphite of zinc is first produced by treating a zinc sulphate solution with barium hydroxide, carbonate, or sulphite. The oxide or insoluble salt of zinc in the mixed precipitate is then converted into zinc sulphide by adding a hot solution of sodium sulphide or barium sulphide. The resulting mixture of barium sulphate and zinc sulphide is finally filtered, washed, calcined in a closed vessel with a small quantity of sulphur, and allowed to cool, with the exclusion of air.

Artificial Resins. Resan Kunsthaz-Erzeugungsges., Vienna. British Patent, 130,608. Convention date, March 22, 1918.

Artificial resins and intermediate condensation products are obtained by electrolysis mixtures of phenol, cresol, xylenol, or their derivatives with aldehydes or substances producing them, such as sodium acetate or methyl alcohol. Phenol, formaldehyde, and acetic acid rapidly give a hard but easily removable resin at the anode. A diaphragm may be used, the mixture being placed in the anode compartment, while the cathode compartment contains an electrolyte; this may be a condensing agent, such as sodium chloride, which is carried by the current into the anode compartment. The progress of the reaction may be followed by means of electric measuring instruments, and may be arrested at any desired stage. It may be regulated by varying the concentration, current, temperature, or pressure, or by stirring or circulating the electrolyte.

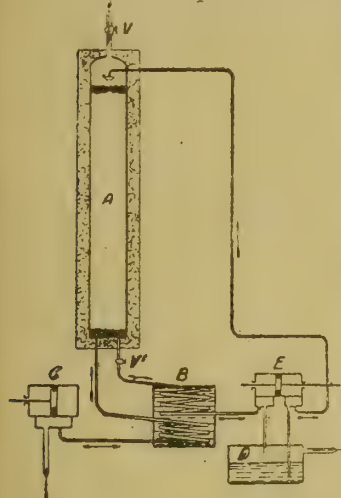
Nitrocellulose. J. Duclaux, Paris. British Patent, 130,619. Convention date, August 25, 1918.

Nitrocellulose is purified, and recovered from substances containing it, such as old or damaged powders, waste celluloid, etc., by forming a solution, for example, in acetone, methyl alcohol, alcohol-ether, methyl formate or acetate, or

ethyl formate, and either purifying the solution by dialysis or precipitating the nitrocellulose by addition of liquids which retain the impurities. The solution may be dialysed through membranes of viscose or of cellulose precipitated from cuprammoniacal solution, or of denitrated nitrocellulose, under a pressure equal to or greater than the osmotic pressure. The impurities pass through the membrane. In purifying by precipitation, the nitrocellulose may be precipitated by addition of water which may contain sulphuric acid or sodium carbonate, or by addition of organic liquids such as benzene, toluene, xylene, carbon tetrachloride, chloroform, or other chlorinated hydrocarbons. A quantity of benzene or other organic liquid insufficient to produce precipitation may be added to the nitrocellulose solution, which is then precipitated by addition of water. The precipitate may be washed and boiled with water, the vapours being condensed to recover the volatile solvents.

Hydrogen. L'Air Liquide Soc. Anon. pour l'Etude et l'Exploitation des Procédés G. Claude, Paris. British Patent, 130,358. Convention date, August 9, 1917.

Hydrogen is extracted from gas mixtures that contain it, for example, from water gas, coal gas, or coke-oven gas, by treating the gas mixture with ether at a pressure of 50 to 300 atmospheres, and at a temperature of -40 to -60° C., to dissolve out the other constituents. Other solvents, for example methyl acetate, which have the same power of dissolving carbon monoxide, the same rates of CO solubility, and the same temperature coefficient of this solubility ratio, may be employed. A suitable apparatus comprises a compressor C for the gas mixture, a refrigerating tank B, a thermally insulated absorption column A filled with balls or plates, a circulating pump E, and a tank D in which the solvent gives up its dissolved gases. The cooled and compressed gas, rising in the column A, meets the descending solvent, and practically pure hydrogen is liberated through the valve V. The saturated solvent escapes through the valve V² to the refrigerating tank B, and, before passing to the tank D, acts upon the piston E to assist in returning the unsaturated solvent, sucked up from the tank D, to the



top of the column A. To avoid loss of solvent, the dissolved gases may be liberated in two or more stages, first at a pressure greater than atmospheric, for example at 10 to 50 atmospheres, and finally at atmospheric or less than atmospheric pressure.

REPORTS OF COMPANIES.

American Smelting and Refining Company.

Earnings for 1918, after providing for fixed charges, were \$14,137,167., a decrease of \$10,898,770. on the previous year. Deducting the annual charge for depreciation of \$3,918,509., ore depletion \$1,521,121., appropriation for safety and welfare \$250,000., miscellaneous profit-and-loss charges \$740,038., there is left \$7,707,498. Preferred stock dividends amounted to \$4,247,773. For the first three quarters dividends were paid on the common stock at the rate of 6 per cent. per annum, and for the last quarter at the rate of 4 per cent. per annum, leaving at credit of profit-and-loss \$104,834.

DIVIDENDS.

ASBESTOS CORPORATION OF CANADA.—For the quarter ended September 30, a dividend of $1\frac{1}{4}\%$ on the common shares.

RIO TINTO COPPER COMPANY, LTD.—Interim dividend of 20s. per share on the ordinary (20 per cent.), against 30s. per share a year ago.

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 4, Queen Anne's Gate Buildings, London, S.W. 1, whence, unless otherwise stated, further information may be obtained:—

British India.

H.M. Trade Commissioner at Calcutta reports that a Calcutta merchant wishes to get into touch with United Kingdom manufacturers of soaps and chemicals. (Reference No. 733.)

Canada.

The following inquiries have been received at the Canadian Government Trade Commissioner's Office, Portland House, 73, Basinghall Street, London, E.C. :—

A Montreal company would like to get into touch with United Kingdom importers of natural oxides and ochres.

A Montreal firm of importers and exporters have for sale a large quantity of sulphur, sulphuric acid, zinc oxide, and soda ash.

Hong Kong.

A firm of general import and export merchants at Hong Kong wish to get into touch with United Kingdom manufacturers of the following products: Sulphate of ammonia for fertilising purposes, dyes, and drugs and industrial chemicals. (Reference No. 744.)

A Hong Kong firm wish to get into touch with British importers of South China produce, especially cassia oil, peanut oil, aniseed oil, camphor oil, tea oil and lard. (Reference No. 745.)

Austria.

A firm of agents in Trieste desire to obtain agencies for United Kingdom manufacturers and firms dealing in soap and candles and copper compounds, who would buy on their own account. (Reference No. 746.)

Belgium.

A business man at Fléron, near Liège, is desirous of securing an agency for United Kingdom firms exporting chemical fertilisers. (Reference No. 748.)

Czecho-Slovakia.

Two merchants of good standing wish to act as agents for United Kingdom firms dealing in material for tanning leather, such as valonia, quebracho extract, mimosa tannin, and myrabolans; and phosphates and other materials for manures. (Reference No. 755.)

Italy.

H.M. Consul at Leghorn reports that a firm of agents in Leghorn desire to purchase soap on their own account. (Reference No. 761.)

An agent in Milan desires to obtain agencies for United Kingdom manufacturers of chemicals for the whole of Italy. (Reference No. 721.)

The following inquiry has been received at the British Chamber of Commerce for Italy, via Silvio Pellico 12, Milan:—

An agent in Milan wishes to obtain agencies, on a commission basis, for United Kingdom manufacturers and exporters of oils and fats for commercial purposes. (Reference No. 185.)

France.

A firm of exports agents in Paris, with extensive organisations (London office), desire to obtain exclusive agencies for United Kingdom manufacturers of tanning products, chemicals, including boric, citric, carbonic, and sulphuric acids, permanganate of potash, sulphate of copper, for France, Belgium, and Roumania, where they have offices and representatives. (Reference No. 710.)

The Acting British Consul at Nantes reports that an agent in Nantes desires to obtain agencies for United Kingdom manufacturers of paints, varnishes, and linseed oil, for Nantes and the West of France. (Reference No. 715.)

Spain.

A firm in Malaga desires to be put in touch with United Kingdom houses dealing with chemical products, such as oxalic acid, tripoli, bismuth, lac, ammonia, etc. (Reference No. 728.)

"BURGUNDY MIXTURE."—The short account of the work of Messrs. Robert L. Mond and C. Heberlein, on the chemistry of "Burgundy Mixture," which appeared in our last issue, was abstracted from *Nature*. Owing to an unfortunate oversight, the name of our contemporary was omitted.

JAMAICA DYEWOOD FACTORY.—According to the *Times Trade Supplement*, the Yorkshire Dyeware and Chemical Company have nearly completed an extensive factory at the south-western end of Jamaica. The factory buildings are situated on a site of 27 acres, the buildings alone covering six acres. Extensive machinery is being installed, and it is hoped that the factory will be in operation by the end of the year. A plentiful supply of water has been provided by means of a canal three miles in length. Large stocks of logwood and roots are being collected at the factory. To facilitate the purchase and transport of dyewoods, the company owns its own schooners. The undertaking will provide steady employment for a large number of hands.

SUGAR SHORTAGE.—The British Sugar Beet Growers' Society, Ltd., 14, Victoria Street, Westminster, S.W. 1, state that in the coming factory season in Germany there will be about 50 fewer raw-sugar factories in operation than in 1913. The area under sugar beet is said to have declined by about 19.4 per cent., the weight and sugar content of the crops being also seriously below the average. In France the damage has been on a much larger scale. Before the war there were 250 factories turning out one million tons of sugar annually. Of this about three-quarters were consumed in France, the remaining quarter being exported. The invaders destroyed 150 factories, and to-day the production is less than 150,000 tons per annum. The world's supply has fallen greatly below the demand, and will apparently continue to fall. The society, therefore, point out that it is urgently necessary that England should produce, as well as consume, sugar, and no longer be, as she was before the war, wholly dependent upon imported supplies.

MARKET REPORTS.

TAR AND AMMONIA PRODUCTS.

WEDNESDAY.

Benzole: London, 90%, 2s. to 2s. 1d.; North, 1s. 10d. to 1s. 11d.; 50%, 1s. 10d. to 1s. 11d.; North, 1s. 9d. to 1s. 10d. naked. Carboic acid, crude, 60%, East and West Coast, nominally 1s. 7d. to 1s. 8d.; crystals, 39-40%, 9d. to 9½d., f.o.b. Crude tar, London, 45s. to 50s.; Midlands, 44s. to 46s.; North, 45s. per ton, ex works. Pitch, 77s. 6d. to 80s.; East Coast, 70s. to 75s., f.o.b.; West Coast, 62s. 6d. to 65s., f.a.s. Solvent naphtha, naked, London, 90-190%, 2s. 5d.; North, 2s. 3d. to 2s. 4d.; 90-160%, naked, London, 2s. 5d.; North, 2s. 2d. to 2s. 3d. Crude naphtha, naked, 30%, 9d.; North, 8d. to 8½d. Refined naphthalene, £16. to £18.; salts, £6. to £7. Toluol, naked, London, 2s. 6d.; North, 2s. 5d. Creosote, naked, London, 6½d.; North, 5½d. to 5¾d.; heavy oil, 6½d. Anthracene, 40-45%, 7d. per unit. Cresylic acid, 95%, 2s. 5d. to 2s. 6d.; 97-99%, 2s. 7d. to 2s. 8d., ex works, London, and f.o.b. other ports. Sulphate of ammonia: home trade, October £20. 10s., November £20. 15s., basis 24½%. Nitrate of soda, £22. to £22. 10s.

FERTILISER MATERIALS.

LIVERPOOL, THURSDAY.

Nitrate of soda is without alteration, the quotation on spot for 95-96% quality remaining at £20. per ton, net cash, f.o.r., Liverpool, prompt delivery. East Indian bone meal for shipment is without alteration, the quotation for October-December shipment being £17. 10s. per ton, net cash, ex ship, Liverpool, for 4½% ammonia and 52% phosphate quality. On spot, Liverpool, holders ask £16. per ton, net cash, ex store, for 4½% and 45% quality. Mineral Phosphates: No alteration is to be reported in this market, and values at present are only nominal. Dried blood continues scarce, the value being about 30s. per unit of ammonia per ton.

LONDON METAL MARKET.

THURSDAY.

Copper: Standard brands, £103. 15s. to £104. cash; £103. 5s. to £103. 10s. three months; electrolytic, £113. to £120. Tin: Standard, £281. to £281. 5s. cash; £281. 15s. to £282. three months; Straits, £281.; English, £280. Lead: Soft foreign, £26. 15s.; English, £27. 15s. Spelter, £41. 10s.; hard, £28. to £30. Antimony, English regulus, 90%, £45. Aluminium £150. Nickel £205. delivered, packages extra. Quicksilver £19. 10s. Bismuth 12s. 6d. Platinum 442s. per oz. Wolfram 32s. 6d. per unit.

MANCHESTER CHEMICAL MARKET.

THURSDAY.

There is a general feeling of relief at the settlement of the railway trouble, but deliveries of goods will be in arrears for some time owing to traffic congestion. Makers, on the whole, are well engaged with orders, and there is an active demand for all heavy chemicals. Home prices for caustic soda are unaltered on basis of £24. for 74%, but bleaching powder has been advanced to £17., packages extra. Bicarbonate of soda, 58% alkali, and soda crystals are higher at £8. 5s., £6. 10s., and £5. 10s. respectively, in bags. Saltcake has also been advanced to 70s. per ton, carriage paid. Chlorate of soda easy at 6d. per lb. Potash, 1s. per lb. Bichromates are unchanged at 1s. 6d. and 11d. for potash and soda respectively. Nitrite of soda scarce at £60. per ton. Sulphate of copper continues flat, and price only nominal at £40. per ton. Phosphate of soda steady at £26. Concentrated sodium sulphide, £24., and commercial hyposulphite,

£16. 10s., on rails. There is a little more arsenic offering, but price is firm at £60. per ton. Barium chloride easier at £23. per ton. Yellow prussiate of soda scarce and dearer at 10½d. per lb. Potash dull at 1s. 9d. per lb. Carbonate of potash 85% higher at £103. per ton. Lead salts are again quiet, but prices are maintained: English white acetate, at £83.; brown, £68.; nitrate, £56. per ton. Brown and grey acetate of lime unaltered at recent rates. Acetate of soda lower at £50. per ton. Prices for acetic acid are steady. Oxalic acid, foreign make, is now selling at 1s. 1d. per lb., and price has a lower tendency. Copperas is moving off fairly well at £4. 5s., delivered in owner's wagons.

LIVERPOOL CHEMICAL MARKET.

THURSDAY.

The announcement made on Monday morning of the settlement of the railway workers' strike changed the buying and selling conditions in the market for the better. Feelings of apprehension and uncertainty, which had induced restraint in the market, passed away and left a feeling of freedom under which buyers were more disposed to place orders for fresh supplies of chemicals, especially for deliveries at forward dates. More inquiries on export account have come to hand, so that a very fair degree of activity has prevailed in the market. Bleaching powder has been in somewhat freer request. Prices are £17. per ton, on rail or conveyance in buyers' packages, and £15. to £18. per ton, for export. Chloride of calcium continues quiet, and is £8. to £11. per ton, in casks, f.o.r. Caustic soda has been well inquired for, and is £24. per ton for 76%, £22. per ton for 70 to 72%, and £19. per ton for 60 to 62%. Nitrate of soda has been more in demand, and is £21. to £22. per ton. Saltcake has been quieter, and is £6. 10s. per ton, in casks, f.o.b. Soda crystals have sold freely, and are £5. 10s. per ton in 2cwt. bags, f.o.r. at works. Bicarbonate of soda has been in good request, and is £8. 5s. to £10. per ton, according to terms of delivery. Borax has been steadily called for, and is still in light supply. Ordinary is £45. per ton; and powdered, £46. per ton, in bags. Ammonia alkali has sold readily, and is £6. 10s. per ton f.o.r. at works. Hyposulphite has been in moderate demand, and is £16. per ton for ordinary, and £21. per ton for pea crystals, in 1cwt. kegs. Sulphite of sodium has had a limited sale, and is £10. per ton for ordinary, and £16. to £18. per ton for pea crystals, in 1cwt. kegs. Bichromate of soda has been rather more in request, and is 9d. per lb. Phosphate of soda has been in moderate demand, and is £25. per ton. Sulphide of sodium has been quiet, and is £20. per ton in casks, and £22. per ton in drums. Chlorate of potash has been but little called for, and is 1s. to 1s. 2d. per lb. Permanganate of potash has been rather more in request, and is 3s. 3d. per lb. Sulphate of potash has been quiet, and is £30. per ton. Carbonate of potash has again been in very fair inquiry, and in limited supply. It is £95. per ton for 80 to 85%. Caustic potash has been in fairly active demand, and is £120. per ton. Nitrate of potash has sold rather freely, and is £55. to £60. per ton for refined, and £40. per ton for ordinary. Canadian potashes have been very quiet. First quality Montreal, are £200. to £220. per ton, and second quality, £190. to £210. per ton. Bichromate of potash has been in quietly steady demand, and is 1s. 6d. to 1s. 7d. per lb. Yellow prussiate of potash has been more inquired for, and is 1s. 9d. to 1s. 10d. per lb. Sal ammoniac has sold more readily. Lump is £90. per ton; seconds, £80.

per ton; and ground, £5. per ton extra. Sulphate of ammonia has been in moderate request, and is £20. 10s. per ton for October; £20. 15s. for November, £21. for December, £21. 7s. 6d. for January, 1920, £21. 15s. for February, and £22. per ton for March to May, 1920. Carbonate of ammonia has been rather more in request, and is 6½d. per lb. Muriate has had a very limited sale, and is £50. to £55. per ton, according to quality. Magnesia has sold somewhat readily. Carbonate is £2. 5s. per cwt., and sulphate, £10. to £16. per ton, according to grade. Alum has been well inquired for, and the supply at hand has been small. Quotations are: £18. 10s. per ton for the home trade, and £18. 10s. to £19. 10s. for export. Aluminoferric has been in moderate inquiry, and is £8. 10s. to £12. per ton, according to quality. Sulphate of alumina has been rather more in request, and is £12. to £17. per ton according to grade. Sulphur has been in good request. English flowers are £32. per ton, and are still scarce. Roll is £28. per ton, and rock, £22. per ton, in bags, f.o.r. Sicilian grades are: flowers, £28. per ton; roll, £22. 10s. per ton, and rock, £17. 15s. per ton. Cream of tartar has had a moderate sale, and is £11. 15s. to £12. per cwt. Tartaric acid has been in quietly steady demand, and is 3s. 1d. to 3s. 2d. per lb. Boracic acid has been in very fair request, and is £72. per ton for crystals, and £74. per ton for powdered. Oxalic acid has sold a little more freely, and is 1s. 2d. to 1s. 3d. per lb. according to requirements for delivery. Citric acid has been in very fair demand, and is 4s. 4d. per lb. White acetate of lead has been very quiet, and is £85. per ton. Arsenic has been more in request. White powdered continues firm in price, and is £60. per ton. Sulphate of copper continues very quiet. Prices are £41. to £42. per ton for home trade uses, and £42. to £43. per ton for export.

TYNE CHEMICAL REPORT.

TUESDAY.

Business in chemicals has been considerably interfered with on account of the railway strike—not only for home consumption, but also for export. Steamers are being held up on account of coal restriction order. Trade is plentiful and now the strike is at an end, business is being quickly resumed.

Prices per ton net are nominally:—Bleaching powder, softs, £17.; caustic soda, 74/77% £23. 5s., do. 70% £22., do. 60% £20.; recovered sulphur, 2cwt. bags £23.; hyposulphite of soda 5/7cwt. casks £19., 1cwt. kegs £25.; sulphite of soda, 5/7cwt. casks £12., do. 1cwt. kegs, £20.; silicate of soda, 75° Tw. £9. 12s. 6d.; do. 100° Tw. £10., do. 140° Tw. £10. 10s.; soda crystals, 2cwt. bags, £5. 10s.; sulphate of soda (salt cake) in bulk £4.; pure white sulphate of alumina £19. 10s.; blanc fixe £22.; sulphide of sodium, crystals, £18., do. refined concentrated solid, 60/62%, £25.; hydrate of barium, crystals, £56.

COALS.—Market is very steady, but with the export restrictions still operative for France and neutrals, actual business is

difficult. Prospects for a firm market are well assured for some time ahead. Quotations:—Best Northumbrian steam 100s. per ton, seconds 95s. to 100s.; Northumbrian small coals 75s. to 80s., seconds 70s. to 75s.; best Durham gas coals 80s. to 85s., seconds 65s. to 75s.; Durham bunkers 70s. to 80s., seconds 60s. to 70s.; foundry coke 100s.; gas coke 95s. to 100s.

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Wednesday.

Considerable gratification was felt at the beginning of the week when it became known that the railway strike had terminated, and since then an effort has been made in the Glasgow and West of Scotland chemical trade—as in other industries—to get things on a normal footing again. Deliveries, however, are still uncertain owing to the transit problems, which are still in evidence, and the general market conditions are inclined to be quiet. There are some price variations occurring here and there, and the following list indicates the latest quotations: Arsenic, £62. per ton, net, Glasgow; bicarbonate of soda, £9. 15s. and £10. 10s. per ton for 6-8 casks and 1cwt. kegs, net, Liverpool; boracic acid crystals, English refined, £72. for 2cwt. bags, and borax crystals £39. for 2cwt. bags, carriage paid; caustic soda, white, 70-72%, £24. per ton, net, Glasgow; chlorate of potash, 1s 1d. per lb., net, Glasgow; chlorate of soda, 8d. per lb., net, Glasgow; citric acid, 4s. 4d. per lb., 5%, Glasgow; cream of tartar, 98%, £11. 10s. per cwt., net, Glasgow; paraffin wax U.K. deliveries 125°, 6½d. to 6½d.; 121-30°, 5½d. to 5½d.; 118-200°, 5d.; 110-120°, 4d. to 4½d.; and 98-102°, 4d. to 4½d.; salammuniac, £80. and £75. per ton, net, any port, for first and second lump respectively; salammuniac crystals, £85. per ton, net, Glasgow; saltpetre, £3. 4s. net, Glasgow; tartaric acid, 3s. 3d. per lb., 5% Glasgow.

As far as the different sea oils are concerned, business is also keeping to the quiet side, but during the week a number of fairly important deals are stated to have been carried through here and there. Among the whale oils the yellow variety is still unobtainable: while brown and black are keeping steady at their old quotations of 76s. and 74s. respectively. Pale, on the other hand, however, continues on a lowering tendency, and the latest price is 95s., as against 102s. about a month ago. Newfoundland cod is steadily maintained at 80s., and pale seal continues to change hands at 96s.; but Menhaden is easier in quotation at 83s., as against the previously quoted 86s.

Naturally, the Glasgow and West of Scotland coal trade was acutely effected by the railway strike, and at the moment of writing matters at the pithead are far from normal or easy. There is, however, a noticeable improvement in the general position, and the accumulation of output is gradually being lessened with more transport available.

IMPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

BRISTOL.Publication of Official Returns
Suspended.**GLASGOW.**Week ending October 4.
NIL.**GOOLE.**

Week ending October 4.

DEXTRINE—
Rotterdam, 71 bgs.**GRANGEMOUTH.**

Week ending October 4.

NIL.

GRIMSBY.

Week ending October 4.

DYESTUFFS (otherwise undescribed)
Dieppe, 10 brls.TAR—
Dieppe, 2 cks.**HULL.**

Week ending October 4.

AMMONIA—
Sydney, 34 cylds.BARYTES—
Antwerp, 100 bgs.CRYOLITE—
Esbjerg, 300 bgs.DEXTRINE—
Amsterdam, 10 brls.DYESTUFFS—
Myrabolans
Nontreal, 15,427 bgs.Sumac
Genoa, 500 bgs.FERRO SILICON—
Christiania, 125 cks.OXALIC ACID—
Rotterdam, 3 cks.PHOSPHATE—
Antwerp, 152 t.; Ghent, 200 t.POTASSIUM MURIATE—
Rotterdam, 4,142 cks.ROSIN—
Gothenburg, 6 brls.STEARINE—
Antwerp, 68 bgs.TALLOW—
Sydney, 237 pps., 265 cks.,
683 pks.TAR—
Gothenburg, 100 brls.TARTARIC ACID—
Genoa, 54 brls.ZINC OXIDE—
Antwerp, 40 brls.**LEITH.**

Week ending October 4.

PHOSPHATES—
Tunis, 1,000 t., £4,312.**LIVERPOOL.**

Week ending October 4.

ARSENIC—
Antwerp, 62 cks.BARIUM SULPHATE—
Barcelona, 180 brls., 660 sks.BARYTES—
New York, 87 brls.BEES WAX—
M'silles, 34 bgs.; Montreal, 40 cks.BORATE OF LIME—
Buenos Ayres, 1,793 bgs.;
Mejillones, 4,054 bgs.CREAM OF TARTAR—
Barcelona, 65 brls.; Bordeaux,
16 cks.DEXTRINE—
Tokio, 200 bgs.DYESTUFFS (otherwise undescribed)
New York, 41 brls.DYESTUFFS—
Aniline Dyes
New York, 12 pkgs.Bark Extract
Baltimore, 200 brls.; Phila-
delphia, 150 brls.Hematin Crystals
Philadelphia, 50 brls.Logwood Crystals
Baltimore, 10 brls.; New York,
36 brls.Logwood Extract
Baltimore, 50 brls.; Phila-
delphia, 200 bxs., 20 brls.Myrabolans
Bombay, 2,526 bgs.Quelbracho Extract
B. Ayres, 21,333 bgs., 2,870 brls.

DYESTUFFS—

Tanning Extract
Baltimore, 791 brls.; Norfolk,
50 brls.

FATTY ACIDS—

Philadelphia, 150 brls.

GLUE—

Bordeaux, 10 brls.; New York,
27 bxs.

GLUE (POWDER)—

Antwerp, 20 bgs.

LEAD CARBONATE—

Philadelphia, 15 cks.

MANGANESE ORE—

Bombay, 1,000 t.

NICKEL OXIDE—

Montreal, 222 brls.

OCIRE—

Bordeaux, 6 cks.

OIL STEARINE—

Buenos Ayres, 137 cks.

PARAFFIN SCALE—

New York, 1,527 brls.; Phila-
delphia, 375 brls.

PARAFFIN WAX—

New York, 1,130 brls., 509 bgs.

POTASSIUM MURIATE—

Rotterdam, 7,267 bgs.

POTASSIUM SULPHATE—

Rotterdam, 1,500 bgs.

ROSIN—

Bordeaux, 975 cks.; Galveston,
1,242 brls.; Nantes, 919 cks.;
New Orleans, 5,090 brls.;
Valencia, 40 brls.

SALTPETRE

Calcutta, 1,000 bgs.

SCALE WAX—

Philadelphia, 100 brls.

SOAP—

Marseilles, 451 cs.; New Orleans,
500 brls.; New York, 200 brls.;
Norfolk, 1,000 brls.

SODIUM BICHROMATE—

New York, 18 cks.

SODIUM FORMATE—

Bordeaux, 11 pkgs.

SODIUM NITRATE—

Tocopilla, 10,174 bgs.

SODIUM PHOSPHATE—

Antwerp, 67 cks.

STEARINE—

Antwerp, 67 bgs.

TALLOW—

Buenos Ayres, 616 cks.; Bor-
deaux, 241 cks.; Monte Video,
348 pps., 2,770 cks.; New York,
24 brls.; Victoria, 100 cks.

TANNERS OIL—

New York, 45 brls.

TANNING MATERIAL—

New York, 5 brls.

TARTAR—

Marseilles, 52 cks.

ULTRAMARINE—

Marseilles, 50 cs.

WAX—

Philadelphia, 274 brls.; Ran-
goon, 800 bgs.

WAX (REFINED)—

Baltimore, 224 bgs.

ZINC OXIDE—

New York, 101 brls.

LONDON.

Week ending October 4.

ACETIC ACID—

Holland, 92 pkgs.

AMMONIUM FLUORIDE—

U.S., £141.

ARSENIC—

Portugal, 30 t.

BARYTES—

Spain, 350 brls., 1,700 bgs.

BEEES WAX—

Belgium, 81 bgs.; Brit. India,
203 bdls.; Chili, 32 sks.; Cape,
83 pkgs.; Natal, 34 cs.; Pt. E.
Africa, 29 cs.

BERYLLIUM NITRATE—

France, £87.

BORIC ACID—

Italy, £7,320.

CALCIUM LACTATE—

Canada, £71.

CARBON (BLACK)—

U.S., 24 cs.

CARBON (DECOLOURISING)—

Holland, £2,000.

CHEMICALS (otherwise undescribed)

France, £364.

CHROME ORE—

Pt. E. Africa, 150 t.; Rhodesia,
500 t.

COAL PRODUCTS (otherwise undes.)

U.S.A., 4 t. 5 c.

DYESTUFFS—

Aniline Dye

Switzerland, 503 pkgs.

Annatto

U.S., 1 pkg.

Argols

France, 271 pkgs.; Portugal,
1,020 pkgs.; Spain, 241 pkgs.

Cochineal

Canary Islands, 6 pkgs.

Cutch

Brit. India, 546 pkgs.

Mimosa Extract

Brit. India, 1,110 bgs.

Myrabolans

Brit. India, 9,828 pkgs.

Tanners Bark

Cape, 22 t.; Natal, 876 t.

DYESTUFFS—

Tanning Extract

Italy, 57 t.

Turmeric

Brit. India, 140 pkgs.

FISH OIL—

Japan, 900 cs.; Natal, 204 drms.

Portugal, 40 brls.

GELATINE—

France, £2,925.

GLUE—

France, £4,916.

LACTIC ACID—

Canada, £47.

LITHOPONE—

Holland, 240 cks.; U.S.A.,
280 cks.

METHYL SULPHONAL—

Canada, £320.

MINERAL WAX—

Germany, 500 bgs.; Holland,
38 pkgs., 9 cs.

OCIRE—

Spain, 8 brls.

OXALIC ACID—

Holland, £1,120.; Norway, £109

PHENACETIN—

Switzerland, £1,440.

PARAFFIN SCALE—

U.S., 46 t.

PARAFFIN WAX—

U.S., 252 t.

PLUMBAGO—

Brit. India, 15 cks.

PYROGALLIC ACID—

Canada, £296.

ROSIN—

France, 1,473 cks.; U.S., 2,700

cs., 3,500 brls.

SULPHONAL—

Canada, £700.

SULPHUR—

Italy, 17 t.

SOAP—

Canada, £6,970.; U.S.A., £5,375

SODIUM PHOSPHATE—

Belgium, 20 t.

SODIUM PRUSSATE—

Holland, 9 t. 10 c.

SODIUM SALICYLATE—

France, £476.; Holland, 2 c.

STEARINE—

Argentine Republic, 127 cks.;
N.S.W., 51 cks.

TALLOW—

China, 370 pkgs.; N.S.W., 22

pkgs.; N.Z., 503 t. 12 c., 83 cks.,
171 pkgs.

TANNIC ACID—

Canada, £2,123.

TAR—

France, 4 cks.; U.S.A., 182 drms.

TARTARIC ACID—

Italy, 218 pkgs.

THIOCARBONILIDE—

U.S., £65.

TURPENTINE—

U.S., 500 brls.

UMBER—

Italy, 27 brls.

WHITE LEAD—

Belgium, 115 cks.; U.S., 1,120

cks.

WOOD OIL—

China, £5,000., 200 drms.; Hong

Kong, 1,000 cs.

ZINC OXIDE—

Holland, 225 cks.

MANCHESTER.

Week ending October 4.

DYESTUFFS—

Dyewood Extract

New York, 30 brls.

LITHOPONE—

Rotterdam, 200 cks.

MAGNESITE—

Madras, 3,285 bgs.

OXALIC ACID—

Rotterdam, 9 cks.

PARAFFIN WAX—

New York, 408 bgs.

PHOSPHATE OF LIME—

Boston, 95 brls.

ROSIN—

Galveston, 500 brls.

TARTAR EMETIC—

New York, 32 cs.

MIDDLESBROUGH.

Week ending October 4.

NIL.

NEWCASTLE-ON-TYNE

Week ending October 4.

NIL.

N. & S. SHIELDS.

Week ending October 4.

NIL.

STOCKTON-ON-TEES.

Week ending October 4.

NIL.

SWANSEA.

Week ending October 4.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

BRISTOL.

*Publication of Official Returns
Suspended.*

GLASGOW.

Week ending October 4.

AMMONIUM CARBONATE—

Cape Town, 5 c.

AMMONIUM SULPHATE—

Dunkirk, 5,799 bgs.

COAL PRODUCTS (otherwise undes.)

C. Town, £300.; Leghorn, 2,794 t.

PHOSPHORIC ACID—

Cape Town, £46.

SHEEP DIP—

Buenos Ayres, 227 t. 18 c.

GOOLE.

Week ending October 4.

NIL.

GRANGEMOUTH.

Week ending October 4.

PARAFFIN WAX—

Nantes, 13 t. 16 c.

GRIMSBY.

Week ending October 4.

NIL.

HULL.

Week ending October 4.

ACID—

Christiania, 10 crbys.

ALUM

Wasa, 4 brls.

AMMONIUM SULPHATE—

Antwerp, 8 cks.

BLEACHING POWDER—

Aarhus, 100 brls., 151 cks.;

Barcelona, 128 drms.; Rotter-
dam, 80 cks.

BORAX—

Antwerp, 40 bgs.

CHEMICALS (otherwise undescribed)

Amsterdam, 32 cks., 3 drms.;

Barcelona, 294 cs., 43 cks., 344

bgs.; Bilbao, 97 cks.; Chris-
tiania, 5,287 slabs, 20 cks., 90

drms., 2 cs., 30 kgs., 7 brls.;

Ghent, 26 cks.; Gothenburg,
23 cks.; Helsingfors, 450 cks.;

Malmö, 1 ck.; New York, 59

cks., 3 cs.; Rotterdam, 31 cks.,

6 drms., 14 brls.; Tammefors,
4 cks.; Wasa, 300 cks.

FERRO CHROME—

New York, 675 cs.

GLUE—

Amsterdam, 1 brl.; Gothenburg,
60 bgs.; Helsingfors, 20 bgs.

GLYCERINE—

Helsingfors, 20 cs.

MINERAL WHITE—

N. York, 200 bgs.; R'dam, 10 cks.

PITCH—

Gothenburg, 50 brls.

SALT—

Amsterdam, 80 cs.

LEITH.

Week ending October 4.

BORAX—

Amsterdam, 3 t., £120.; Rotterdam, 2 t. 10 c., £118.

POTASSIUM BICARBONATE—

Rotterdam, 1 t. 4 c., £196.

SODA ASH—

Amsterdam, 5 t., £35.

SODIUM BICARBONATE—

Rotterdam, 10 t., £165.

SODIUM BICARBONATE—

Rotterdam, 20 t. 6 c., £230.

LIVERPOOL

Week ending October 2.

ACETIC ACID—

Salonika, 2 t. 18 c., £353.; Zurich, 3 t. 13 c., £542.

ACETIC ANHYDRIDE—

Amsterdam, 1 t., £29.

ALUM—

Abo, 3 t. 18 c., £73.; Calcutta, 25 t. 2 c., £364.; Madras, 14 t. 6 c., £207.; Rangoon, 7 t. 14 c., £108.; Rouen, 31 t. 18 c., £555.; Secondee, 6 c., £42.

ALUMINA HYDRATE—

Barcelona, 1 t., £30.

ALUMINA SULPHATE—

Amsterdam, 10 t., £115.; Antwerp, 14 t., £230.; Manao, 2 c., £4.

ALUMINOFERRIC—

Braila, 10 t., £100.; Calcutta, 78 t. 19 c., £660.; Freemantle, 3 t. 3 c., £28.

AMMONIA—

Cape Town, 1 c., £2.; Funchal, 18 c., £37.; Koko, 1 c., £2.

AMMONIA ALUM—

Barcelona, 5 t., £88.; Nantes, 5 t. 1 c., £105.; Piraeus, 3 t. 16 c., £70.; Salonika, 1 t. 18 c., £34.

AMMONIUM CARBONATE—

Bilbao, 1 t., £65.; Bordeaux, 1 t. 6 c., £110.; Calcutta, 1 t., £65.; Canea, 1 t., £59.; Colon, 9 c., £55.; Las Palmas, 2 c., £7.; Piraeus, 4 t. 12 c., £305.; Parahyba, 5 c., £21.; Pernambuco, 3 t. 6 c., £283.; Trondhjem, 2 t., £62.

AMMONIUM MURIATE—

Antwerp, 9 t. 19 c., £600.; Barcelona, 1 t. 4 c., £75.; Bordeaux, 5 c., £14.; Constantinople, 4 t., £253.; Moji, 2 t., £108.; Naples, 19 c., £50.; Philadelphia, 15 t. 4 c., £531.; Piraeus, 4 t. 16 c., £284.; Perth, 10 c., £29.; Prevesa, 5 c., £16.; Salonika, 1 t. 19 c., £130.; Serbia, 2 t. £130.; Stamboul, 5 t., £317.

AMMONIUM PHOSPHATE—

Piraeus, 1 c., £6.

ANILINE OIL—

Halifax, N.S., 16 t. 6 c., £1,520.

ANILINE SALT—

Allegro, 5 c., £36.

ANTIMONY SALTS—

Barcelona, 8 c., £50.

ANTIMONY SULPHIDE—

Barcelona, 3 c., £42.; Lisbon, 1 t. 4 c., £67.

ARSENIC—

Karachi, 1 t., £50.; Malaga, 3 c., £7.; Oporto, 2 c., £7.; Rouen, 1 t., £90.

BARYTES—

Lisbon, 54 bgs., 5 t.

BLEACHING POWDER—

Alicante, 1 t. 19 c., £30.; Bombay, 15 t. 10 c., £250.; Calcutta, 5 t. 10 c., £80.; Karachi, 2 t., £36.; Lisbon, 25 t., £324.; Piraeus, 19 t. 5 c., £327.; Shanghai, 10 t., £76.

BORAX—

Abo, 1 t., £39.; Antwerp, 8 t. 10 c., £291.; Hong Kong, 1 t., £52.; Rouen, 12 t., £478.

BORIC ACID—

Abo, 2 c., £7.; Las Palmas, 4 c., £17.; Rouen, 1 t., £80.; Teneriffe, 2 c., £20.

CALCIUM CARBIDE—

Calabar, 3 t. 8 c., £101.

CALCIUM CARBONATE—

Pt. Harcourt, 2 c., £6.

CALCIUM CHLORIDE—

Barcelona, 3 t. 8 c., £24.; Pt. Sudan, 4 t. 14 c., £35.

CARBONATE OF LIME—

Lisbon, 5 t., £30.

CARBOSIL—

Pernambuco, 1 t., £10.

CARNAUBA WAX—

Copenhagen, 26 bgs.

CAUSTIC SODA—

Adelaide, 119 pkgs.; Barcelona, 20 drms.; Batoum, 120 drms.; Bilbao, 200 drms.; Calcutta, 11 drms.; Constantinople, 429 drms.; Coronel, 75 drms.; Copenhagen, 518 drms.; Karachi, 780 drms.; Las Palmas, 5 drms.; Kobe, 740 drms.; Manila, 100 drms.; Melbourne, 163 drms.; 250 cs.; Naples, 66 drms.; Osaka, 290 drms.; Pernambuco, 80 drms.; Piraeus, 800 drms.; South Georgia, 14 drms.; Smyrna, 773 drms.; Stockholm, 5 cks.; Volo, 135 drms.; Yokohama, 746 drms.

CHEMICALS (otherwise undescribed)

Antwerp, 1 t., £39.; Copenhagen, 20 t., £1,495.; Kampen, 2 t. 2 c., £153.

CHINA CLAY—

Bombay, 283 t.; Calcutta, 60 cks.

CITRIC ACID—

Rotterdam, 1 c., £25.

COAL PRODUCTS (otherwise undescribed)

Antwerp, 1 t. 5 c., £420.; Conakry, 500 gals., £33.; Halifax, N.S., 3 t., £1,256.; Shanghai, 7 t. 1 c., £3,362.

COAL PRODUCTS—

Benzole

Algiers, 11 t. 4 c., £250.

Carbolacene

Oporto, 2 t. 18 c., £75.

Carbolic Acid

Karachi, 2 c., £12.; Kobe, 28 t. 14 c., £1,700.; Lagos, 2 c., £3.; Rio de Janeiro, 2 t. 19 c., £112.

Creolina

P. Calabro, 1 t. 11 c., £116.

Creolite

Valencia, 3 t. 18 c., £248.

Creosote

Barcelona, 1 t. 1 c., £10.; Christiania, 14,400 gals., £612.

Naphthalene

Accra, 1 c., £5.; Aden, 21 t., £389.; Coomassie, 1 c., £5.; Guatemala, 2 c., £15.; Mombasa, 10 t. 3 c., £195.

Pitch

Axim, 18 c., £5.; Sierra Leone, 1 t. 2 c., £6.

Tar

Accra, 1 t. 4 c., £8.; Cape Coast, 1 t. 6 c., £13.; Grand Bassa, 1 t. 1 c., £9.; Monrovia, 1 t. 1 c., £9.; Sherbro, 2 t. 13 c., £89.

COPPER SULPHATE—

Barcelona, 5 t. 5 c., £200.; Calcutta, 2 t. 18 c., £118.; Karachi, 1 t. 10 c., £61.; Piraeus, 3 t., £118.; Salonika, 19 c., £40.; Volo, 10 t., £394.

COPPERAS—

Salonika, 45 pkgs.

CREAM OF TARTAR—

Tammerfors, 10 c., £120.; Talcahuano, 1 c., £51.; Valparaiso, 2 c., £103.

DISINFECTANTS (otherwise undescribed)

Calabar, 1 c., £3.; Calcutta, 4 t. 9 c., £196.; Coomassie, 9 c., £35.; Colombo, 1 t. 17 c., £52.; Dakar, 9 c., £23.; Ferrol, 2 qrs., £1.; Havana, 2 t. 16 c., £124.; Hong Kong, 16 c., £34.; Karachi, 2 t. 16 c., £74.; Lagos, 2 c., £6.;

DISINFECTANTS (otherwise undescribed)

Lisbon, 2 c., £12.; Pt. Said, 10 c., £30.; Pernambuco, 4 c., £57.; Rangoon, 3 c., £42.; Sierra Leone, 1 c., £9.; Sapele, 5 c., £10.; Secondee, 11 c., £51.; St. John's, 2 t. 8 c., £380.

DYESTUFFS—

Aniline Dye

Antwerp, 17 t. 7 c., £930.; Barcelona, 19 t. 15 c., £4,813.; Boston, 13 t. 14 c., £6,047.; Calcutta, 1 t. 9 c., £863.; Colombo, 2 c., £98.; Havre, 7 c., £90.; Lisbon, 1 t. 5 c., £229.; Madras, 5 t. 18 c., £1,627.; Mollendo, 1 c., £166.; Montreal, 1 t. 10 c., £320.; New York, 4 t.; 1 c., £1,763.; Piraeus, 10 c., £66.; Rouen, 12 c., £240.

FERRO TUNGSTEN—

Rio de Janeiro, 5 t.; Rotterdam, 5 t.

FORMALINE—

Belgrade, 3 c., £11.

GLUE—

Kobe, 20 bgs.

GLUE, SIZE, AND GELATINE—

Bombay, 3 pkgs.; Boston, 101 pkgs.; Rotterdam, 10 pkgs.; Sydney, 80 tins.

GLYCERINE (DISTILLED)—

Hong Kong, 100 cs.; Kobe, 32 drms.

IRON OXIDE—

La Guaira, 6 cks.

IRON SULPHATE—

Amsterdam, 3 t., £30.; Guatemala, 2 c., £12.

LEAD ACETATE—

Piraeus, 2 c., £9.

LEAD CARBONATE—

Guatemala, 1 c., £8.

LEAD NITRATE—

Antwerp, 6 c., £16.; Rouen, 19 c., £60.

MAGNESIUM CHLORIDE—

Bombay, 45 t. 1 c., £370.; Rangoon, 1 t., £18.

MAGNESIUM OXIDE—

Barcelona, 5 c., £10.

MAGNESIUM SULPHATE—

Colon, 7 c., £15.

MERCURY PERCHLORIDE—

Belgrade, 2 qrs., £20.

NICKEL AND AMMONIUM SULPHATE—

Buenos Ayres, 10 c., £30.

NICKEL SALTS—

Barcelona, 1 t. 10 c., £79.

NICKEL SULPHATE—

Barcelona, 17 c., £245.

OXALIC ACID—

Lisbon, 10 c., £56.

PARAFFIN WAX—

Fiume, 400 bgs.

PHOSPHORUS—

Shanghai, 100 cs.

PHOSPHORUS (AMORPHOUS)—

Cape Town, 13 c., £180.; Paranagua, 1 t. 12 c., £429.

PITCH—

Aviles, 275 t., £1,500.; Bilbao, 9 t. 5 c., £230.; Lagos, 3 t. 5 c., £18.; Lisbon, 3 c., £14.; Monrovia, 5 c., £4.

POTASSIUM BICARBONATE—

Antwerp, 18 c., £145.; Allegro, 5 c., £40.; Copenhagen, 5 t. 6 c., £342.; Lisbon, 15 c., £80.; Piraeus, 8 c., £62.

POTASSIUM CHLORATE—

Funchal, 1 c., £7.; Patras, 6 c., £39.

POTASSIUM IODIDE—

Calabar, 1 c., £142.

POTASSIUM NITRATE—

Malta, 6 c., £18.

POTASSIUM PRUSSATE—

Lisbon, 5 c., £45.

POTASSIUM SULPHATE—

Teneriffe, 1 t., £41.

RED LEAD—

Antwerp, 38 cks.

ROSIN—

Rio de Janeiro, 6 pkgs.

SALAMMONIAC—

Bombay, 7 t. 7 c., £493.; Durban, 2 c., £7.; Famagusta, 2 c., £7.; Galatz, 10 c., £36.; Karachi, 6 t., £434.; New York, 2 t., £160.; Palermo, 1 t., £72.; Piraeus, 1 t. 9 c., £102.; Philadelphia, 2 t., £148.; Rangoon, 1 t. 1 c., £73.; Salonika, 3 t. 2 c., £219.

SALT—

Bombay, 8 t.; Boston, 350 t.; Buenos Ayres, 127 t.; New York, 150 t.; Rangoon, 1,654 t.; Stavanger, 100 t.; Stockholm, 350 t.; Transvaal, 170 t.

SALTCAKE—

Sao Paulo, 11 t. 2 c., £50.

SALTPETRE—

Pernambuco, 5 t. 17 c., £359.

SHEEP DIP—

Panama, 4 c., £9.; Pt. Elizabeth, 17 t. 2 c., £664.

SOAP—

Aden, 50 cs.; Algiers, 1,440 bxs., 250 cs.; Amsterdam, 350 bxs.; Antofagasta, 100 cs.; Antwerp, 3,200 bxs., 1,210 cs.; Bangalore, 15 pkgs.; Bangkok, 245 pkgs.; Barcelona, 250 bxs.; Bengali, 107 pkgs.; Bluefields, 5 pkgs.; Bombay, 2,235 bxs.; Braila, 771 cs.; Calcutta, 21 bxs.; Calicut, 26 cs.; Callao, 350 cs.; Casablanca, 51 cs.; Cochich, 8 cs.; Constantinople, 16 kgs., 1,800 cs., 150 bxs.; Copenhagen, 5 cs., £268.; Dambi, 100 bxs.; Dongalla, 50 bxs.; Dunkirk, 50 kgs., 6,965 cs.; Durban, 250 cs.; Genoa, 500 cs., 200 bxs.; Gibraltar, 50 kgs., 610 cs., 515 bxs.; Gothenburg, 6 brls., 126 cs.; Havana, 25 cs.; Hong Kong, 1,000 bxs.; Iquitos, 760 bxs.; Kano, 1 cs.; Karachi, 198 cs.; Kingston, 1,063 cs.; Lagos, 2 bxs.; Larache, 100 bxs.; Las Palmas, 720 bxs.; Leghorn, 500 bxs.; Malta, 123 cs.; Manao, 150 bxs.; Melilla, 100 bxs.; Mombasa, 1,000 cs.; Piraeus, 10 bxs.; Port-au-Prince, 25 bxs.; Punta Arenas, 36 bxs.; Pt. Stanley, 30 bxs.; Pt. Sudan, 1,405 bxs.; Quebec, 20 bxs.; Rabat, 1,135 bxs.; Rotterdam, 1,620 bxs.; South Georgia, 20 pkgs.; Tampico, 2 pkgs.; Teneriffe, 709 bxs.; Trebizond, 6 cs.; Trinidad, 2,250 bxs.; Tripoli, 155 cs.; Truxillo, 50 bxs.; Valletta, 70 pkgs.; Tuticorin, 43 cs.; Varna, 10 cs.; Vera Cruz, 10 bxs.; Volo, 40 cs.

SODA ASH—

Calcutta, 939 pkgs.; Christiania, 100 bgs.; Copenhagen, 492 bgs.; Freemantle, 42 cks.; Hong Kong, 1,680 bgs.; Melbourne, 1,000 bgs.; Karachi, 1,100 bgs.; Mitylene, 100 bgs.; Montreal, 200 cks.; Oporto, 100 bgs.; Monte Video, 430 cks.; Piraeus, 280 brls.; Rotterdam, 100 brls.; Salonika, 300 brls.; Singapore, 63 brls.; Smyrna, 505 brls.; Sydney, 543 brls.; Syra, 160 brls.; Trondhjem, 250 bgs.; Venice, 200 bgs.; Yokohama, 930 brls.

SODA CRYSTALS—

Karachi, 50 bgs.; Pernambuco, 10 pkgs.; Piraeus, 100 pkgs.; Salonika, 34 pkgs.; South Georgia, 25 brls.; Trieste, 305 brls.; Tangiers, 15 brls.

SODIUM AND POTASSIUM TARTRATE—

Oporto, 2 c., £20.

SODIUM BICARBONATE—

Braila, 500 brls.; Callao, 27 cks.; Christiania, 100 bgs.; Genoa, 129 pkgs.; Karachi, 640 pkgs.; Las Palmas, 7 pkgs.; Leghorn, 450 pkgs.; Lisbon, 20 pkgs.; Montreal, 2,000 bgs.; Monte Video, 50 cks.; Oporto, 50 kgs.; Piraeus, 60 pkgs.; St. Vincent, 20 pkgs.; Pt. Sudan, 20 pkgs.; Valencia, 4 pkgs.

SODIUM BICARBONATE—

Valparaiso, 1,066 pkgs.
Yokohama, 300 pkgs.

SODIUM CYANIDE—

Cape Grace, 100 cs.; Corinto,
232 cs.; La Union, 50 cs.

SODIUM HYPOSULPHATE—

Stamboul, 4 pkgs.

SODIUM SILICATE—

Catania, 61 cks.; Monte Video,
160 brls.; Oporto, 39 brls.;
Pernambuco, 32 pkgs.; Vladivostock,
75 cks.

SODIUM SULPHIDE—

Algiers, 33 cks.

STEARINE—

Aarhus, 57 brls.

SULPHUR—

Barcelona, 1 t. 1 c., £69.;
Panama, 1 c., £8.

SULPHUR (FLOWERS)—

Benguella, 1 c., £2.; Nantes,
13 t., £315.

SULPHURIC ACID—

Mombasa, 4 c., £12.; Pt. Sudan,
3 c., £13.; Singapore, 3 qrs., £2.

TALLOW—

Marseilles, 139 brls.

TANNIC ACID—

Barcelona, 7 c., £160.

TAR (WOOD)—

Colombo, 1 t., £8.; Malacca,
3 t. 16 c., £25.

TARTARIC ACID—

Jesseltown, N.B., 1 c., £18.;
Madras, 2 t., £621.; New York,
5 t., £1,543.; Rotterdam, 22 lb.,
£8.

TURPENTINE—

Copenhagen, 51 brls.

WAX—

Bucharest, 10 bgs.

WOOD ACID—

Colombo, 19 c., £6.

WOOD PRESERVATIVE—

Bilbao, 3 t. 15 c., £85.; Funchal,
1 c., £5.

ZINC CHLORIDE—

Rangoon, 5 t. 4 c., £260.

ZINC OXIDE—

Barcelona, 7 c., £29.

LONDON.

Week ending October 1.

ACETIC ACID—

Genoa, 63 cks., £974.; Leghorn,
2 crbys., £13.; Melbourne, 2 cs.,
£26.; Rotterdam, 18 cks., £189.;
Salonika (F.), 30 crbys., £225.;
Valparaiso, 1 c., £13.; Well-
lington, 6 cs., £19.

ACETO SALICYLIC ACID—

Fremantle, 1 cs., £21.; Genoa,
2 cs., £17.; Melbourne, 6 pkgs.,
6 cs., £299.; Treport, 1 kg., £27.

ALUM—

Batavia, 10 cks., £65.; Brussels,
2 cs., £20.; Melbourne, 2 kgs.,
£12.; Paita, 19 c., £29.

AMMONIA—

Athens, 18 cs. (pt.), £13.; Bang-
kok, 2 cs., £7.; Beira, 8 cs., £15.;
Beyrout, 4 cs., £6.; Bombay,
5 cs., £14.; Cape Town, 10 cs.,
£20.; Delagoa Bay, 6 cs., £12.;
Durban, 23 cs., £45.; Hong
Kong, 4 cs., £9.; Jamaica, 3 cs.,
£6.; Karachi, 3 cs., £6.; Pt.
Elizbeth, 5 cs., £10.; Samarang,
1 cs. (pt.), £6.; Singapore, 2 cs.,
£7.; Suva, 4 cs., £8.; Italy,
via Treport, 16 cs., £32.

AMMONIUM BENZOATE—

Punta Arenas, 1 cs. (pt.), £7.

AMMONIUM BROMIDE—

Antwerp, 4 cs., £111.; Bombay,
3 cs. (pt.), £39.; Durban (F.),
1 cs., £16.

AMMONIUM CARBONATE—

Antwerp, 1 t., £40.; Auckland,
2 c., £9.; Bangkok, 9 c., £52.;
Buenos Ayres, 8 t. 9 c., £16.;
Callao, 10 c., £50.; Calcutta,
2 c., £8.

AMMONIUM CARBONATE—

Cape Town, 2 c., £8.; Rangoon,
2 t. 13 c., £215.; Talcahuano,
4 c., £15.

AMMONIUM CHLORIDE—

Pt. Said, 1 cs., £12.

AMMONIUM CITRATE—

Buenos Ayres, 4 cs. (pt.), £25.

AMMONIUM MURIATE—

Bombay, 5 t. 2 c., £369.; Con-
stantinople, 2 t., £157.; Mel-
bourne, 5 c., £19.; Tripoli, 5 c.,
£16.

AMMONIUM PERCHLORIDE—

Antwerp, 166 bxs., £215.

AMMONIUM PHOSPHATE—

Brussels, 1 kg., £14.

AMMONIUM SULPHATE—

Dunkirk, 150 t., £3,450.

AMMONIUM SULPHO CYANIDE—

Shanghai, 1 cs. (pt.), £5.

AMYL ACETATE—

Antwerp, 23 drms., £1,560.;
Rotterdam, 15 drms., £1,480.

AMYL NITRATE—

Buenos Ayres, 1 cs., £34.

ANTIMONY—

Rotterdam, 10 t.

ANTIMONY SULPHIDE—

Antwerp, 8 cks., £209.; Mon-
treuil, 16 cks., £549.; New York,
5 cks., £245.

ARSENIC—

Ghent, 36 drms., £27.

BARIUM HYDRATE—

Paris, 8 cks., £21.

BARIUM NITRATE—

Bombay, 15 kgs., 14 cks., £208.

BISMUTH CARBONATE—

Melbourne, 4 cs. (pt.), £177.

BISMUTH NITRATE—

Mauritius, 2 cs. (pt.), £14.

BISMUTH SUBNITRATE—

Copenhagen, 2 cs., £313.; Mel-
bourne, 4 cs. (pt.), £10.; Shan-
ghai, 1 cs., £11.

BISULPHITE—

Karachi, 5 t. 7 c., £128.

BITUMINOUS SOLUTION—

Hong Kong, 50 drms., £121.

BORAX—

Christchurch, 1 t., £40.; Colombo
5 c., £10.; Dunedin, 10 c., £20.;
Fremantle, 6 c., £12.; Rotter-
dam, 10 t., £390.; Wellington,
1 t., £40.

BORIC ACID—

Switzerland, via Antwerp, 9 t.
17 c. (F.), £709.; Beyrout, 5 c.,
£19.; Canton, 5 c., £20.; Dun-
edin, 10 c. (F.), £37.; Karachi,
2 c., £15.; Limon, 2 c. (F.), £8.;
Napier, 1 c., £7.; Singapore,
1 c., £6.; Sourabaya, 2 c., £10.;
Wellington, 3 c., £29.

CALCIUM PHOSPHORIC ACID—

Fremantle, 10 kgs., £40.

CALCIUM BROMIDE—

Sydney, 1 cs., £7.

CALCIUM GLYCEROPHOSPHATE

Melbourne, 4 cs. (pt.), £8.

CALCIUM LACTOPHOSPHATE—

Mauritius, 2 cs. (pt.), £14.

CARBONATE OF LIME—

Barcelona, 14 bgs., £18.

CARNAUBA WAX—

Rotterdam, 4 c.

CAUSTIC POTASH—

Madras, 1 cs. (pt.), £8.

CAUSTIC SODA—

Cologne, 16 t. 15 c., £285.;
Libau, 12 t. 1 c., £277.

CERESINE WAX—

Copenhagen, 1 t.; Naples, 2 t.
11 c.; Paris, 1 t.; Rotterdam,
8 t. 5 c.; Salaverry, 4 c.; Yoko-
hama, 1 t. 17 c.

CHEMICALS (otherwise undescribed)

Amoy, 3 cks., £50.; Switzerland,
via Antwerp, 3 cs., £222.; Bey-
rout, 1 cs. (pt.), £23.; Bombay,
1 cs., £15.; Brussels, 2 pkgs.,
£37.; Christchurch, 1 cs., £14.;

CHEMICALS (otherwise undescribed)

Durban, 1 cs., £6.; New York,
4 cs., £466.; Penang, 1 cs., £16.;
Rotterdam, 4 cs., £8.; Sydney,
10 pkgs., £152.

CHROME SULPHUR—

Amsterdam (F.), 1 t. 1 c., £65.

CITRIC ACID—

Amsterdam, 1 t. 5 c. (F.), £600.;
Hong Kong, 1 cs. (pt.), £8.;
Karachi, 1 c. (F.), £29.; Mauri-
tius, 1 c., £13.; New York, 3 t.,
£1,428.; New York, 3 t. 16 c.
(F.), £1,607.; Penang, 3 c., £72.;
Shanghai, 1 c., £28.

COAL PRODUCTS—**Aniline Dye**

Brussels, 11 kgs., £151.; Cal-
cutta, 17 cs., £493.; Colombo,
1 kg., £54.; Drammen, 1 kg.,
£23.; Melbourne, 20 cks., £595.;
New York, 7 cks., £101.; Paris,
99 pkgs., £4,430.

Aniline Oil

Rotterdam, 7 drms., £400.

Benzidine

Rouen, 2 cks., £178.

Bitumen

Calcutta, 44 cks., £270.

Carbolic Acid

Constantinople, 2 cks., £12.;
Kobe, 277 pkgs., £2,886.; Mel-
bourne, 3 cs., £13.

Cresote

Boston, 100 cks., £158.; Buenos
Ayres, 50 drms., £338.; Copen-
hagen, 30 cks., £105.; Hong
Kong, 2 brls., £12.

Naphtha

Cape Town, 10 drms., £11.

Naphthalene

Durban, 10 cs., £15.; Singapore,
2 cks., £12.

Pitch

Antwerp, 425 t., £1,381.

Tar

Cape Town, 50 cks., £133.;
Helsingfors, 270 cks., £365.;
Pt. Elizabeth, 200 cks., £340.

COBALT ACETATE—

Genoa, 1 ck., £33.

COBALT LINOLEATE—

Amsterdam, 1 ck., £48.

COPPER SUBOXIDE—

Copenhagen, 15 drms., £144.

COPPER SULPHATE—

Perim, 5 c., £12.; Trinidad,
3 c., £8.

COPPER SULPHOCYANIDE—

Copenhagen, 7 drms., £79.

COPPERAS—

East London, 20 cs., £5.; Sydney,
4 cks., £7.

CREAM OF TARTAR—

Aalborg, 1 t. 6 c. (F.), £420.;
Amsterdam, 5 c., £54.; Amster-
dam, 1 c. (F.), £12.; Bombay,
1 c. (F.), £25.; Brussels, 10 c.,
£105.; Cape Town, 1 t., £235.;
Delagoa Bay, 6 c., £92.; Mossel-
bay, 2 c. (F.), £33.; Omodoro-
hwadairu, 1 c. (F.), £10.; Pt.
Elizabeth, 1 cs. (pt.), (F.), £6.;
Rotterdam, 1 t., £225.; Sydney,
1 c., £11.; Rockhampton (transit),
2 t. (F.), £720.; St. John,
N.B. (transit), 2 t. (F.), £400.

DEXTRINE—

Aden, 10 c.

DISINFECTANTS—

Alexandria, 3 c., £15.; Athens,
2 c., £6.; Bangkok, 12 c., £30.;
Beira, 2 c., £16.; Bombay, 2 c.,
£8.; Bocasdel Toro, 6 c., £22.;
Buenos Ayres, 1 t. 4 c., £69.;
Calcutta, 1 t. 11 c., £81.; Cape
Town, 6 t. 18 c., £469.; Christ-
church, 2 c., £11.; Demerara,
7 c., £11.; Durban, 4 c., £17.;
Durban, 10 c. (F.), £62.; Fre-
mantle, 1 c., £7.; Gibraltar,
2 c., £14.; Hankow, 14 c., £33.;
Madras, 1 t. 7 c., £25.; Ottago,
6 c., £29.; Paris, 5 t. 10 c., £120.;
Penang, 1 t. 9 c., £80.; Pt.
Swettenham, 5 t., £243.; Punta
Arenas, 9 c., £20.; Singapore,
15 c., £31.; Trinidad, 3 t., £374.;
Valparaiso, 1 c., £5.; Wellington,
3 c., £20.

ETHER—

Samarang, 2 cs., £45.

ETHYL CHLORIDE—

Durban, 1 cs. (pt.), £11.

FATTY ACIDS—

Dunkirk, £1,440.

FULLER'S EARTH—

Genoa, 8 t.; Madras, 3 c.;
Melbourne, 1 t.; New York,
11 t.; Rotterdam, 50 t.;
Toronto, 30 t.

GELATINE—

Durban, 1 c.; Montreal, 18 c.

GLUE—

Aarhus, 2 t.
Christchurch, 3 t.
Mantyluoto, 2 t. 10 c.

GLUE, SIZE, AND GELATINE—

Amsterdam, 1 c.; Antwerp, 6 t.
2 c.; Bangkok, 1 c.; Bombay,
5 t. 18 c.; Calcutta, 1 c.; Christ-
church, 4 c.; Cape Town, 1 t.;
Copenhagen, 1 t.; Delagoa Bay,
1 c.; Durban, 1 c.; East Lon-
don, 4 t. 2 c.; Fremantle, 1 c.;
Hong Kong, 4 c.; Karachi, 4 c.;
Kobe, 5 t. 1 c.; Madras, 6 t.
7 c.; Montreal, 5 c.; Perth, 1 t.
Rockhampton, 2 c.; Rotterdam,
37 t. 16 c.; Shanghai, 3 c.

GLYCERINE—

Alexandria, 1 c., £7.; Bangkok,
3 c., £27.; Bombay, 12 c., £80.;
Calcutta, 5 c., £60.; Canton,
1 c., £15.; Hong Kong, 1 c.,
£7.; Karachi, 2 c., £14.;
Kilindini, 4 c., £18.; New York
(crude), 11 t. 12 c., £695.; Paris,
5 t. 8 c., £775.; Penang, 1 c.,
£9.; Piraeus, 2 c., £17.; Shan-
ghai, 2 c., £15.

GOLD CHLORIDE—

Mauritius, 2 cs. (pt.), £8.

HYDROCHLORIC ACID—

Trinidad, 2 c., £5.

HYDROGEN PEROXIDE—

Singapore, 4 cs., £21.

HYPOPHOSPHORIC ACID—

Adelaide, 1 cs., £9.; Melbourne,
2 cs., £32.

IODINE (RESUBLIMED)—

Genoa, 20 cs., £1,800.; Mauritius,
3 cs. (pt.), £45.

IRON AND AMMONIUM CITRATE

Launceston, 1 cs. (pt.), £5.;
Melbourne, 4 cs. (pt.), £7.

IRON AND AMMONIUM OXALATE

Ghent, 1 cs., £22.

IRON PERCHLORIDE—

Calcutta, 1 cs., £10.

IRON PYROPHOSPHATE—

Montreal, 1 cs., £13.

KEISELGHUR—

Jamaica, 11 c., £13.

LACTIC ACID—

Brussels, 6 cks., £58.; Rosario,
2 cks. (pt.), £18.

LEAD AND MANGANESE

RESINATE—
New York, 2 brls., £18.; Stock-
holm, 30 cks., £380.

LEAD LINOLEATE—

Amsterdam, 4 brls., £159.; New
York, 2 brls., £52.

LEAD RESINATE—

New York, 2 brls., £45.

MAGNESIA (CALCINED)—

Guayaquil, 2 cs., £20.; Paris,
3 cks., £16.; Rouen, 2 cks., £8.

MAGNESIUM CARBONATE—

Beyrout, 1 ck., £9.; New York,
1 cs. (pt.), £20.

MAGNESIUM SULPHATE—

Bombay, 5 c., £

MANGANESE LINOLEATE—
New York, 2 brls., £47.

MANGANESE RESINATE—
Amsterdam, 1 ck., £17.

MERCURY OXIDE—
Mauritius, 3 cs. (pt.), £6.

MERCURY OXYDATE—
Copenhagen, 1 cs., £85.

MERCURY PERCHLORIDE—
Calcutta, 1 cs., £7.

METHYL SALICYLATE—
Sydney (F.), 1 cs. (pt.), £8.

MINERAL WAX—
Copenhagen, 10 c.

MIRBANE OIL—
Barcelona, 1 dr., £60.; Mont-
real, 1 dr., £55.

**NICKEL AND AMMONIUM
SULPHATE**—
Soerabaya, 2 kgs., £24.

NICKEL SALTS—
Paris, 48 cks., £50.

OXALIC ACID—
Durban, 1 cs., £10.

PARAFFIN WAX—
Antwerp, 11 c.; Liman, 20 t. 10 c.

PHOSPHORIC ACID—
East London, 4 cs., £6.; Lisbon,
9 crbys., £73.; Treport, 10 crbys.,
£86.

POTASSIUM ACETATE—
Fremantle, 2 cs. (pt.), £5.

POTASSIUM BICHRIMATE—
Adelaide, 1 cs., £10.; Boulogne,
3 cks., £240.; Jamaica, 1 cs.,
£50.

POTASSIUM BIOXALATE—
Fremantle (F.), 1 kg., £10.

POTASSIUM BROMIDE—
Bombay, 4 cs. (pt.), £32.;
Launceston (F.), 1 cs., £8.;
Mauritius, 3 cs. (pt.), £10.

POTASSIUM CHLORIDE—
Brussels, 4 c., £30.; Cyprus,
1 c., £10.

POTASSIUM CITRATE—
Bombay, 2 cs., 1 cs. (pt.), £48.

POTASSIUM CYANIDE—
Bombay, 2 c., £53.

POTASSIUM HYDROXIDE—
Beyrout, 1 cs. (pt.), £5.

POTASSIUM HYPO—
Montreal, 1 cs., £35.

POTASSIUM IODIDE—
Alexandria, 1 cs. (pt.), £5.;
Amsterdam, 1 cs., £168.; Bang-
kok, 5 cs., £500.; Durban, 1 cs.,
£46.; Genoa, 1 cs. (pt.), £52.;
Melbourne, 2 cs., £80.

POTASSIUM SULPHATE—
Brussels, 2 cs., £14.

**POTASSIUM SULPHOGUAIA-
COLATE**—
Buenos Ayres (F.), 4 cs. (pt.),
£60.

PYROGALLIC ACID—
Bombay, 1 cs. (pt.), £7.; Hong
Kong, 1 cs. (pt.), £8.; Soerabaya,
2 cs. (pt.), £22.

QUININE—
Calcutta, 27,096 ozs.

ROCHELLE SALTS—
Montreal, 8 cks., £222.

SALICYLIC ACID—
Aalborg, 4 brls., £52.; Copen-
hagen (F.), 2 brls., £26.; Shan-
ghai, 1 brl., £13.

SALT—
Lisbon, 2 t.; Lyttleton, 170 t.;
Madras, 2 t. 10 c.; Rangoon,
11 c.; Santiago, 5 c.

SALTPETRE—
Amsterdam, 5 t., £267.; Dur-
ban, 10 c., £31.; East London,
17 c., £59.; Genoa, 5 t., £250.;
Lisbon, 2 t. 4 c., £115.; New
York, 50 t. (F.), £1,929.; Oporto,
18 c., £45.; Pt. Elizabeth, 1 c.,
£15.

SHEEP DIP—
Buenos Ayres, 66 t. 4 c., £2,808.;
Cape Town, 2 t. 7 c., £95.;
Punta Arenas, 8 t. 6 c., £547.

SILVER NITRATE—
Mauritius, 2 cs. (pt.), £12.

SOAP—
Adelaide, 1 c.; Alexandria, 1 t.
15 c.; Amsterdam, 1 t. 3 c.;
Antwerp, 253 t.; Auckland,
9 c.; Bangkok, 5 c.; Barbados,
2 c.; Beira, 1 t. 4 c.; Bombay,
2 t. 8 c.; Boulogne, 40 t. 11 c.;
Buenos Ayres, 7 c.; Calicut,
2 t. 10 c.; Calcutta, 11 c.;
Canary Islands, 4 c.; Cape Town,
2 t. 2 c.; Cologne, 40 t. 5 c.;
Colombo, 1 t. 10 c.; Christiania,
2 t.; Cologne, 10 t.; Dieppe,
1 t. 13 c.; Colombo, 1 t.; Copen-
hagen, 1 c.; Durban, 2 c.;
Dunedin, 1 c.; East London,
4 t. 2 c.; Galatz, 4 t. 2 c.; Genoa,
9 c.; Groningen, 12 c.; Ham-
burg, 6 t. 5 c.; Havre, 1 t. 15 c.;
Hobart, 1 c.; Italy, 2 t. 17 c.;
Kadachi, 18 c.; Leghorn, 3 c.;
Madras, 14 c.; Mauritius, 6 c.;
Montreal, 3 c.; Melbourne, 2 c.;
New York, 1 c.; Oporto, 4 c.;
Penang, 14 c.; Piraeus, 2 c.;
Pt. Elizabeth, 3 c.; Pt. Swetten-
ham, 7 c.; Punta Arenas, 10 c.;
Rio Gallegos, 7 c.; Rotterdam,
19 t. 5 c.; Samarang, 2 c.;
Shanghai, 4 c.; Smyrna, 4 c.;
Singapore, 1 c.; St. Helena,
5 c.; Sydney, 12 c.; Toronto,
2 t.; Trinidad, 2 c.; Wellington,
1 c.; Yokohama, 6 c.

SODA ASH—
Rotterdam, 10 t., £73.

SODA CRYSTALS—
Tripoli, 1 t., £5.

SODIUM ACETATE—
Brussels, 3 cks., £30.

SODIUM ARSENATE—
Penang, 1 kgs., £22.

SODIUM ARSENITE—
Durban, 2 t. 1 c., £110.

SODIUM BICARBONATE—
Calcutta, 2 c., £7.; Durban, 16 c.,
£30.; Libau, 1 t., £14.; Monty-
luoto, 2 t., £26.; Shanghai,
10 c., £15.; Tripoli, 10 c., £5.;
Wasa, 3 t., £39.; Wellington,
2 c., £5.

SODIUM BROMIDE—
Bombay, 1 cs. (pt.), £7.; Dur-
ban (F.), 1 cs., £15.

SODIUM HYDROXIDE—
Madras, 1 cs. (pt.), £7.

SODIUM HYPOSULPHITE—
Amoy, 1 t., £27.

SODIUM IODIDE—
Genoa, 1 cs. (pt.), £14.; Rio de
Janeiro, 1 cs. (pt.), £5.

SODIUM METABISULPHITE—
Paris, 4 t. 18 c., £128.; Toronto,
2 t. 19 c., £70.

SODIUM NITRATE—
Bombay, 18 kgs., 17 cks., £343.

SODIUM PRUSSATE—
Kobe, 3 t., £215.; Philadelphia,
16 c., £70.

SODIUM SILICATE—
Durban, 1 t. 1 c., £46.

SODIUM STANNATE—
Paris, 1 ck., £97.

SODIUM SULPHATE—
Fremantle, 1 t., £13.; Samarang,
1 kg., £6.

SODIUM SULPHIDE—
Singapore, 1 t., £24.

SODIUM SULPHITE—
Brussels, 2 pkgs., £9.

SULPHUR—
Antwerp, 5 t., £150.; Jamaica
(F.), 6 c., £8.

SULPHUR (ROLL)—
Karachi, 10 c., £12.; Trinidad,
6 t. 10 c., £276.

SUPERPHOSPHATES—
Colombo, 50 t., £600.; Durban,
20 t., £210.

TALLOW—
Genoa, 100 t.; Libau, 15 c.

TANNIC ACID—
Punta Arenas, 1 cs. (pt.), £14.

TAR (SWEDISH)—
Buenos Ayres, 1 t. 19 c.

TARTARIC ACID—
Amsterdam, 10 c., £155.; Bom-
bay, 1 c. (F.), £11.; Bombay,
12 c., £211.; Brussels, 1 c., £20.;
Busreh, 1 c., £17.; Fremantle,
2 c., £46.; Karachi, 7 c. (F.),
£126.; Melbourne, 3 t., £888.;
Montreal, 1 t., £330.; New York,
1 t., £365.; New York, 3 c. (F.),
£50.; Pt. Elizabeth, 1 c. (F.),
£10.; Singapore, 4 c., £80.

TURPENTINE—
Mauritius, 9 c.

WAX—
Amsterdam, 10 c.

WHITE LEAD—
Alexandria, £9.; Antwerp, £421.;
Bordeaux, £920.; Bombay, £568.;
Boulogne, £500.; Calcutta, £59.;
Cebu, £95.; Durban, £537.;
East London, £6.; Hong Kong,
£453.; Kingstown, £209.;
Napier, £61.; Oamaru, £60.;
Pt. Elizabeth, £10.; Pt. Sudan,
£61.; Paris, £485.; Pernambuco,
£20.; Shanghai, £135.; Singa-
pore, £360.; St. Lucia, £15.;
Wellington, £226.

WOOD PRESERVATIVE—
Pt. Elizabeth, £33.

ZINC OXIDE—
Des Moines, £230.

ZINC SULPHATE—
Beyrout, 2 cks., £7.

MANCHESTER.

Week ending October 1.

ALUM (LUMP)—
Montreal, 17 tes.

ALUMINA ACETATE—
Rotterdam, 1 brl.

ALUMINA SULPHATE—
Ghent, 62 cks.

ALUMINA SULPHOCYANIDE—
Rouen, 4 cks.

AMMONIUM CARBONATE—
Gothenburg, 115 pkgs.

AMMONIUM MURIATE—
Rouen, 22 drms.

ANTIMONY SALTS—
Rotterdam, 2 cks.

BARIAL SULPHOCYANIDE—
Boston, 4 cs.

BLEACHING POWDER—
Gothenburg, 409 cks.

BORAX—
Rotterdam, 20 bgs.

COAL PRODUCTS (otherwise undes.)
Alexandria, £1,055.; Antwerp,
£21,037.; Ghent, £247.; Genoa,
£18.; Gothenburg, £341.; Mel-
bourne, £547.; Philadelphia,
£678.; Rouen, £2,256.; Rotter-
dam, £395.; Sydney, £4,950.;
St. John, £11.

COAL PRODUCTS—
Nigrosine
Rotterdam, 1 kg.

DISINFECTANTS (otherwise undes.)
Rotterdam, 6 cks.

DYESTUFFS—
Logwood Extract
Rotterdam, 4 cks.

GLUE—
Boston, 1 cs.

LEAD NITRATE—
Antwerp, 8 cks.

MAGNESITE (CALCINED)—
Rouen, 100 bgs.

PITCH—
Antwerp, 187 t.

SALT—
Ghent, 4,000 bgs.; Gothenburg,
1,965 bgs.; Malmö, 3,947 pkgs.

SIZE—
Gothenburg, 4 cks.; Rouen, 1 ck.

SOAP—
Antwerp, 335 cs.; Montreal,
24 cks.

SODA ASH—
Montreal, 200 cks.

SODIUM BICARBONATE—
Gothenburg, 130 bgs.

SODIUM PRUSSATE—
Montreal, 5 cks.

SODIUM SULPHIDE—
Rouen, 121 pkgs.

SULPHUR—
Gothenburg, 22 bgs.

SULPHUR (BLACK)—
Rotterdam, 4 kgs.

TANNIC ACID—
Rotterdam, 4 cks.

MIDDLESBROUGH.

Week ending October 4.

AMMONIUM CARBONATE—
Antwerp, 3 t. 4 c., £205.

AMMONIUM SULPHATE—
Kobe, 548 t., £10,181.; Yoko-
hama, 50 t., £978.

BARIAL BINOXIDE—
Dieppe, 28 t., £3,238.; Yoko-
hama, 1 t., £138.

BARIAL CARBONATE—
Delagoa Bay, 1 t., £15.

BENZOLE—
Antwerp, 16,973 galls., £1,651.;
Dieppe, 25,755 galls., £2,575.

COAL PRODUCTS—
Disinfectants
Durban, 2,250 galls., £282.

Naphthalene
Dieppe, 30,459 galls., £3,186.

GLUE—
Antwerp, 10 t., £670.

MAGNESIUM CARBONATE—
Dieppe, 10 t., £391.; Rouen,
10 t., £391.

SALAMMONIAC—
Antwerp, 19 c., £72.

SALT—
Antwerp, 400 t., £1,330.; Sarps-
borg, 1,123 t., £2,809.

SODIUM SILICATE—
Cairo, 5 t. 3 c., £65.

TOLUOL—
Dieppe, 2,588 galls., £232.

NEWCASTLE-ON-TYNE.

Week ending October 4.

ANTIMONY—
Gothenburg, 2 t.; Montreal,
17 t.; Rotterdam, 69 t.

CAUSTIC SODA—
Gothenburg, 10 t.; Rotterdam,
90 t.

FERRO MANGANESE—
Gothenburg, 50 t.

GELATINE—
Bergen, 1 c.

RED LEAD—
Gothenburg, 10 t.; Montreal, 7 t.

SODIUM SILICATE—
Gothenburg, 18 t. 1 c.

SODIUM SULPHITE—
Gothenburg, 1 t.

SULPHUR—
Gothenburg, 62 t.

SULPHUR (ROCK)—
Rotterdam, 10 t.

WHITE LEAD—
Rotterdam, 2 t.

N. & S. SHIELDS.

Week ending October 4.

BITUMASTIC SOLUTION—
Malmö, 1 t. 1 c.

CAUSTIC SODA—
Malmö, 18 t. 12 c.; Norrköping,
5 t.; Stockholm, 26 t. 15 c.

STOCKTON-ON-TEES.

Week ending October 4.

NIL.

SWANSEA.

Week ending October 4.

NIL.

PRICES CURRENT.

THURSDAY, Oct. 9, 1919.

PREPARED BY MESSRS. HIGGINBOTTOM AND CO., 21, SPRING GARDENS, MANCHESTER.

The values stated are F.O.R. at makers' works, or at usual ports of shipment in U.K., unless otherwise specified
The prices in different localities may vary

Acids:—

		S.	d.
*Acetic 40% and 60%	per cwt.	30/-	& 45/-
" " Glacial	per ton	85	0 0
Arsenic, S.G. 2,000°	per ton	70	0 0
Boric Crystals	per lb.	72	0 0
*Fluoric	per lb.	0	0 7
*Muriatic (Tower Salts), 28° Tw. ...	per carboy	0	6 6
*Nitric, 80° Tw.	per ton	32	0 0
Oxalic	per lb.	0	1 1
Phosphoric, 1,750°	"	0	1 9
*Sulphuric (fuming, 70%)	per ton	—	—
" " (Pyrites, 163°)	"	7	18 9
" " (" 140°)	"	4	10 0
" " (free from arsenic, 144°) ...	"	5	7 4
Tannic (commercial)	per lb.	0	2 6
Tartaric (crystals)	"	0	3 2
*Acetone	per ton	81	0 0
*Alum, loose lump (delivered) ...	"	17	0 0
Alumina Sulphate (pure)	"	17	0 0
Aluminoferrie (in slabs)	"	8	10 0
Aluminium (Ingot Metal, 98/99%) ...	per ton	150	0 0
*Ammonia, Anhydrous	per lb.	0	1 10
" " 880	per ton	33	0 0
" " 920	"	20	0 0
" " Carbonate	per lb.	0	0 6½
" " Muriate (grey)	per ton	47	10 9
" " (salammuniac) 1st & 2nd, per cwt.	80/- & 75/-		
" " Nitrate	per ton	60	0 0
" " Phosphate	"	110	0 0
" " Sulphate (grey), London, not	"	—	—
" " " Hull	"	—	—
" " " Manchester	"	—	—
*Aniline Oil (pure)	per lb.	0	1 2
Aniline Salt	"	0	1 2
Antimony	per ton	45	0 0
" " (tartar emetic), 43/44% ...	per lb.	0	3 4
" " (golden sulphide)	"	0	1 3
Arsenic, white powdered	per ton	60	0 0
Barium Chloride (in casks)	"	23	0 0
" " Carbonate (native), 92/94% ...	"	11	10 0
" " Sulphate (native levigated) ...	"	£7 to £14	
Baryta Chlorate	per lb.	0	1 3
*Bisulphide of Carbon	per ton	55	0 0
Bleaching Powder, 35%	"	17	0 0
" " Liquor, 7%	"	6	0 0
Casein (commercial)	"	90	0 0
Chromium Acetate (crystals) ...	per lb.	0	1 0
Calcium Chloride	per ton	8	0 0
China Clay (at Runcorn), in bulk ...	"	70/- to 90/-	

Coal-tar Products and Dyes:—

Alizarine (artificial), 20%	per lb.	0	2 0
Magenta	"	18/- to 35/-	
Anthracene, 40/50% A, f.o.b., L'don, per unit,	"	0	0 7
Benzol, 90's (naked)	per gal	0	2 0½
" " 50/90's	"	0	1 10½
Carbolic Acid (crude, 60°)	"	0	1 7½
" " (crystallised, 40°)	per lb.	0	0 9½
" " Acid (pale liquid, 97/98%) ...	per gal.	0	2 9
*Creosote (ordinary), naked	"	0	0 6½
*Crude Naphtha, 30% at 120°C. ...	"	0	0 9
*Grease Oils, 18° Tw. (naked) ...	per ton	6	10 0
Pitch, f.o.b., Liverpool or Garston ...	"	3	2 9
*Solvent Naphtha, 90% at 160° ...	per gal.	0	2 5
Copper	per ton	104	0 0
" " Sulphate	"	40	0 0
Dross Salts	"	39	0 0
*Glycerine (crude), 80%	"	72	0 0
" " (industrial, S.G. 1,260) ...	"	110	0 0
*Iodine	per oz.	0	1 0
*Iron Nitrate, 80° Tw.	per ton	12	0 0
" " Sulphate (copperas), delivered ...	"	4	5 0
" " Sulphide	"	9	0 0
Lead (Foreign Pig)	"	26	15 0
" " Litharge Flake	"	15	0 0
" " Acetate (white)	"	83	0 0
" " (brown)	"	18	0 0

		£	s.	d.
Lead, Carbonate (White lead), pure	... per ton	50	0	0
" Nitrate	 "	56	0	0
Lime, Acetate (brown)	 "	11	0	0
" (grey), 80%	 "	17	0	0
Magnesium Chloride	 "	15	10	0
" Carbonate (light)	 per cwt.	2	5	0
" Calcined Magnesite	 per ton	21	10	0
" Sulphate (Epsom Salts) (coml.)	 "	11	0	0
" (druggists)	 "	16	0	0
Manganese, Sulphate	 "	75	0	0
" Borate	 "	95	0	0
*Methylated Spirit, 64° (industrial)	... per gal.	0	5	7
*Naphtha (Wood), Solvent	 "	0	10	0
" Miscible, 60° p.	 "	0	10	8

Oils:—

*Cottonseed	per ton	95	0 0
*Linseed	"	90	0 0
Stearine, 115-120° M.P.	"	105	0 0
Potassium, Bichromate	per lb.	0	1 6
" " Carbonate, 85%	per ton	103	0 0
" " Chlorate	per lb.	0	1 0
" " Hydrate (Caustic Potash) 90% ...	per ton	160	0 0
" " " 75/80%	"	140	0 0
" " Potash Hydrate Liquid, 50° B _e ...	"	95	0 0
" " Nitrate (refined)	"	55	0 0
" " Permanganate (commercial) ...	per lb.	0	3 3
" " Prussiate (yellow)	"	0	1 9
" " " (red)	"	0	5 6
" " Sulphate, 90% (ex ship)	per ton	30	0 0
" " Muriate, 80%	"	30	0 0
Silver (metal)	per oz.	0	5 3½
Sodium (metal)	per lb.	0	1 3
" " Acetate	per ton	50	0 0
" " Arseniate, 45%	"	60	0 0
" " Borate (Borax), Crystals	"	39	0 0
" " Bicarbonate (2 cwt. bags)	"	8	5 0
" " Bichromate	per lb.	0	11
" " Carb. (Caustic Soda-ash), 48% ...	per ton	12	10 0
" " " (Alkali), 58% (bags)	f.o.r. wks.	6	10 0
" " " (Soda Crystals), (bags) car. pd. ...	"	5	10 6
" " Chlorate	per lb.	0	0 5
" " Cyanide (100% basis) for export ...	"	0	0 10
" " Hydrate (76% C. Soda) (f.o.r.) ...	per ton	24	0 0
" " " (74% C. Soda)	"	23	5 0
" " " (70% C. Soda)	"	22	0 0
" " " (60% C. Soda)	"	21	0 0
" " " (pure liquid, 90° Tw.)	"	10	2 11
" " 77/78% Powdered (99%) Hydrate ...	"	24	10 0
" " Hypsulphite (commercial)	"	16	10 0
" " Manganate, 25%	"	65	0 0
" " Nitrate, 96%, refd., f.o.r., L'pool ...	"	21	0 0
" " Nitrite, 100%	"	60	0 0
" " Phosphate	"	26	0 0
" " Prussiate	per lb.	0	0 10½
" " Silicate (glass) Alkaline	per ton	12	5 0
" " " (liquid, 100° Tw.)	"	9	10 0
" " Sulphate (Salteake), delivered ...	"	3	10 0
" " (Glauber's Salt)	"	4	0 0
" " Sulphide (conc.), 60/65% casks ...	"	24	0 0
" " Sulphite	"	10	0 0
Sulphocyanide, Ammonium, 95%	per lb.	0	2 0
" " Barium, 95%	"	0	1 4
" " Potassium	"	0	2 4
" " Calcium, 70%	per lb.	0	1 4
Sulphur, (Flowers)	Sicilian per ton	21	0 0
" " (Roll Brimstone)	"	21	0 0
" " Brimstone (best thirds)	"	—	—
" " (ex ship)	"	14	10 0
Tallow	"	100	0 0
Tin Crystals	per lb.	0	1 10
" " English Ingots	per ton	283	0 0
Titanium, Potass. Oxalate	per lb.	0	1 6
Titanous Chloride	per cwt.	4	10 0
Zinc (Spelter)	per ton	42	0 0
" " Powder, 88/92%	"	70	0 0
" " Chloride (solution, 102° Tw.) ...	"	23	10 0
" " Sulphate, Crystal	"	22	0 0

* Packages extra or returnable; otherwise, prices usually include packages.

THE CHEMICAL TRADE JOURNAL AND CHEMICAL ENGINEER.

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LONDON, SATURDAY, OCTOBER 18, 1919.

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EDITORIAL NOTICES.

Readers are invited to forward items of intelligence, company reports and balance-sheets, or cuttings from local newspapers of interest to the trades concerned.

Articles, reports, and correspondence on all matters of interest to the chemical and allied industries, home and foreign, are solicited. Correspondents should condense their matter as much as possible, write on one side only of the paper, and in all cases give their names and addresses, not necessarily for publication. Sketches should be sent on separate sheets.

Communications for the Editor, if intended for insertion in the current week's issue, should reach the office not later than Wednesday morning.

CURRENT TOPICS.

INDUSTRIAL ALCOHOL.

THE impetus which the railway strike has given to mechanical road transport ought to compel our new Ministry of Ways and Communications to give serious attention to the question of industrial alcohol. The mechanical transport and chemical industries know well enough the mass of evidence which exists as to the practicability of using industrial alcohol. It was used in Germany long before the war for agricultural internal-combustion engines, and a valuable series of experiments was carried out in this country by Dr. W. R. Ormandy which demonstrated that the difficulties of application to all forms of mechanical transport could easily and quickly be overcome. The only real drawback is the reluctance of the authorities to exempt from Excise duty alcohol used for industrial purposes. That is the one barrier which has to be overcome; all that remains then would be to solve the few remaining technical difficulties attaching to the production of alcohol and its extensive use in internal-combustion engines. At the British Association meeting, at Bournemouth, this year, Dr. Thaysen made out a very good case for the production of alcohol from mangolds, and there are many other means in various parts of the Empire by which alcohol could be produced from local materials. In the early days of the controversy it was alleged that certain products in Africa, which grow in large quantities, could be used as the basis of alcohol manufacture for industrial purposes at a cost of 3d. per gallon, a figure of course, which would not apply to-day. Nevertheless, it is quite clear that industrial alcohol could be produced at a figure which would be bound to have an important influence upon the price of petrol and benzole. The need for taking this question up and keeping the claims of alcohol to the fore does not rest entirely

upon the increased field for mechanical road transport, which the ravages of the war have created and the railway strike has accentuated. There is the far greater danger that the authorities, and particularly the Excise authorities, will be lulled into a sense of false security by certain extravagant hopes which are being raised by the finds of natural oil, such as they are, in this country. It is suggested, in quarters which we cannot help feeling ought to have shown more caution, that the recently discovered Derbyshire supplies and the oil to be obtained from the Norfolk shale will meet the whole of the home demand for motor fuel in this country. There is an absolute lack of figures to prove this assertion, and as things are at present there is bound to be a reliance placed upon imported oil for many years to come, and that must necessarily remain at a relatively high price. The benzole producers are business people, and naturally are not out to cut prices against imported petrol, and with the limited output there is a ready market for it at a price not much below that of petrol. The writer in question even allowed himself the satisfaction of the speculation that Great Britain may even be an oil-exporting country before many years. With the rapidly expanding field for the use of oil, and the knowledge that the sources of foreign supplies of petroleum oils are not increasing, it will not do to overlook any possible source of home-made fuel, and in spite of the supplies of benzole and the possible supplies from low-temperature carbonisation, the advocates of the use of alcohol, who have already done so much work, should see to it that this fuel is not preemptorily set aside by a wave of misplaced enthusiasm over home supplies of other forms of fuel.

TRADE RETURNS.

THE incidence of the railway strike in the closing days of last month is certain to have had some effect on the trade returns for September, but the extent to which the volume of British foreign trade has been influenced during the period under review must not be exaggerated. When the October returns are issued it will be found that the trade during the current month will bear the major portion of the loss resulting from the stoppage of railway transport. Last month's figures are anything but inspiring. Imports, valued at £148,625,000., are, it is true, slightly less than in August, but compared with September, 1918, they represent an increase of over £50,000,000.; whilst the exports, valued at £66,500,000., are £26,000,000. more than in the corresponding period of last year, but £8,273,000 less than in August. In the case of imports, much larger arrivals of foodstuffs and raw materials are responsible for the greatly increased returns compared with a year ago, the imports of manufactured goods showing but a comparatively small increase. On the export side, improved shipments of manufactures were to a large extent responsible for the increase over the returns of September, 1918. The position of the overseas trade in chemicals and allied products is still a fluctuating one. Exports of chemicals, drugs, dyes, and

colours were valued at £2,075,842., against £1,758,687. in the corresponding month of last year, an increase of £317,000. Compared with August, however, last month's value represents a drop of nearly £400,000. The shipments of sulphate of copper were reduced from 1,539 tons in September, 1918, to 61 tons; crude glycerine, from 1,860cwt. to 310cwt.; soda ash, from 324,497cwt. to 196,082cwt.; sodium bicarbonate, from 42,563cwt. to 40,253cwt.; caustic soda, from 112,795cwt. to 106,633cwt.; sodium sulphate, from 80,666cwt. to 29,029cwt.; and chemicals, other sorts, a decline in value from £468,708. to £381,897. The principal increases on the export side were in the case of bleaching powder, from 6,173cwt. to 23,028cwt.; distilled glycerine, from 3,560cwt. to 5,590cwt.; sulphate of ammonia, from 493 tons to 11,609 tons (chiefly to France, the Dutch East Indies, and Japan); superphosphates, from 530 tons to 819 tons; basic slag, from 71 tons to 2,112 tons; chemical manures, unenumerated, from 2,874 tons to 3,533 tons; muriate of ammonia, from 2,805cwt. to 10,405cwt.; white lead, from 1,594cwt. to 13,090cwt.; zinc oxide, from 284cwt. to 1,273cwt.; painters' colours and materials, unenumerated, from 38,940cwt. to 90,158cwt.; saltpetre, from 2,224cwt. to 3,728cwt.; chromate and bichromate of potash, from 42cwt. to 1,752cwt.; potash compounds, other sorts, an increase in value from £1,938. to £7,172.; chromate and bichromate of soda, from 4,505cwt. to 6,973cwt.; soda crystals, from 459cwt. to 5,798cwt.; soda compounds, other sorts, from 60,163cwt. to 60,822cwt.; sulphuric acid, from 339cwt. to 1,363cwt.; and tartaric acid, from 84cwt. to 723cwt. The imports of chemicals, drugs, dyes, and colours during September were valued at £2,125,285., against £3,535,038. in the corresponding month of 1918, a decrease of £1,410,000. Last month's value is approximately £350,000. more than the August total of £1,773,000. The most notable decline was in the value of the imports of "chemicals, unenumerated" (including acetate of lime, acetone, muriate of ammonia, and sulphuric acid). Imports of acetic acid dropped from 7,592cwt. to 4,601cwt.; sulphur, from 102,040cwt. to 986cwt.; cream of tartar, from 2,085cwt. to 460cwt.; crude glycerine, from 1,656cwt. to "nil"; saltpetre, from 39,159cwt. to 2,000cwt.; soda compounds, from 11,765cwt. to 2,765cwt.; chemicals, unenumerated, from £2,209,317. to £135,638.; and zinc oxide, from 5,557cwt. to 4,902cwt. The increases were chiefly confined to boracite, borate of lime, etc., from 8,675cwt. to 34,576cwt.; carbide of calcium, from 16,161cwt. to 31,164cwt.; coal products, not dyes, from 428cwt. to 1,818cwt.; potash compounds, other sorts, from £68,382. to £140,663.; tartaric acid, from 1,560cwt. to 2,189cwt.; barytes, from "nil" to 33,426cwt.; nickel oxide, from "nil" to 2,000cwt.; white lead, from "nil" to 20,149cwt.; and painters' colours and pigments, unenumerated, from 6,075cwt. to 49,644cwt.

DERBYSHIRE OIL.—It is stated that the flow of oil at Hardstoft Well, Chesterfield, has increased to over 2,000gals. per twenty-four hours, and at times shows considerable energy. Pumping has not been resorted to.

INDUSTRIAL POISONING IN CHEMICAL MANUFACTURE.*

Review of War Years.

By T. M. LEGGE, C.B.E., M.D.†

(Concluded from page 388.)

TOXIC JAUNDICE.

IN November, 1915, toxic jaundice occurring in a factory or workshop, and due to tetrachlorethane or nitro- or amido-derivatives of benzene or other poisonous substance, was added to the list of diseases in section 73 of the Factory and Workshop Act, 1901, of which notification is obligatory on medical practitioners and occupiers. The effects of tetrachlorethane when used as a dope in the manufacture of aeroplanes, and the high standard of ventilation which it was felt necessary to maintain even after the elimination of tetrachlorethane from the dope, have been described in detail in previous reports. This high standard was necessary in consequence of the continued use of benzole and acetone substitutes. In one factory where, owing to pressure of work, certain women had to carry on doping of the ordinary kind in a room provided only with natural means for ventilation, in a short time medical aid had to be summoned in consequence of symptoms of intoxication in some of them.

In last year's annual report I summarised the salient points in connection with T.N.T. poisoning. This has been the only source of cases of toxic jaundice included in the returns since the use of T.C.E. in dope ceased. It should be remembered, however, that a distinctive symptom in poisoning by arseniuretted hydrogen is jaundice, but in order to avoid confusion with cases of toxic jaundice from T.N.T. they have been, as they well can be, included under arsenic poisoning. In view of the description given last year, I merely make comparison of the figures due to T.N.T. in the three years.

Year.	Quarterly Periods.				Total.
1916	6 ³	16 ⁵	73 ²¹	86 ²²	181 ⁵²
1917	83 ¹²	56 ²⁰	21 ⁸	29 ⁴	189 ⁴⁴
1918	13 ⁴	6 ²	5 ²	10 ²	34 ¹⁰

The principal numbers relate to cases, the small figures to deaths.

One case (fatal), and that dating back to 1918, as regards employment, has been reported in the first five months of this year.

DINITROPHENOL.

In the French shell-filling factories, T.N.T. was not used to the same extent that it was in this country, being replaced by a mixture of picric acid and dinitrophenol. Experience in France showed in the first two years of the war that D.N.P. was highly toxic in the absence of care and cleanliness. By August, 1916, 27 deaths had occurred in seven factories using it, of which 17 occurred in weighing out the compound and melting it, eight in the process of hydro-extracting, one in stoving, and one in conditioning. In addition, numerous slight cases were treated. The health conditions and chemical reactions of the compound in the body were carefully investigated, with the result that a urinary test—the so-called Derrien reaction—was discovered, which served

both qualitatively and quantitatively to determine the amount of the poison absorbed, and so to give clear indication, provided the urine of each man was examined every day, when suspension and transference to other work was necessary.

The preventive measures adopted in France included close medical supervision of the workers by a daily visit from a surgeon and examination of the urine of every worker by a pharmacist. Every worker in whom the Derrien reaction remained positive for several days and increased in intensity was examined each day and suspended as soon as slight symptoms of intolerance showed themselves—gastro-intestinal trouble, lassitude, sweating, and liver or renal symptoms. Naturally, cleanliness of the skin, protection against dust and fumes by locally applied exhaust ventilation, and alternation of employment, also played their part.

When it became necessary in this country in 1918 to use D.N.P. in two factories, the late Lt.-Col. O'Reilly, C.M.G., R.A.M.C. (to whose unremitting efforts in the prevention of T.N.T., tetryl, and other forms of industrial poisoning at Woolwich Arsenal I desire to bear testimony) visited the principal factories in France, and as a result of his advice, very complete safeguards were established. The men employed were provided with a complete set of underclothing and overalls, into which they changed from their working clothes in a separate cubicle provided for each man. Locally applied exhaust ventilation of very perfect design was applied in the melting of the compound to take away the fumes, and in the filling of the 12in. shells. Any dust that collected around the margin of the shell was removed by a vacuum cleaner. The washing and bath-room facilities were all that could be desired. As a result of these measures, combined with daily examination of the urine, no trouble of any kind was experienced in the use of D.N.P. One fatal case, with typical symptoms, occurred in this country in 1916 in a factory where it was made.

FUMES AND GASES.

Below is a statement of the number of cases in 1917 and 1918 reported as accidents due to escape of gas, and for comparison those in 1913 and 1914. As already stated, cases due to arseniuretted hydrogen gas have been included under arsenic poisoning.

	1913.	1914.	1917.	1918.
Carbon monoxide	59 ⁷	62 ⁹	99 ¹⁸	54 ¹³
(a) Blast furnace	20 ³	20 ⁶	22 ⁶	17 ³
(b) Power	21	21	32 ⁸	21 ³
(c) Coal	9 ⁴	7 ¹	20	10 ⁴
(d) Other	9	14 ²	25 ⁴	6 ³
Carbon dioxide	12 ¹	3 ¹	1	5 ⁵
Sulphuretted hydrogen	8 ¹	22 ³	11 ⁴	7 ¹
Sulphur dioxide	1	1	2	1
Chlorine	1	2	3	4
Nitrous fumes	—	9 ²	62 ⁵	27 ⁷
Ammonia	3	4 ¹	4 ¹	6 ¹
Benzole, naphtha, and petrol	6 ²	4 ²	4 ²	7 ⁴
Tetrachlorethane	—	25 ⁴	—	—
Ether, acetone	—	—	4	1

The conditions of gassing in ordinary factories differ from those of chemical warfare, in the fact that they are

* Abstracted from the Annual Report for 1918 of the Chief Inspector of Factories and Workshops.

† H.M. Medical Inspector of Factories.

occasional and that protective appliances are needed for a time estimated usually by minutes and not hours. The need on the part of the workers, therefore, to avail themselves of the apparatus provided, and the employer to maintain it in a state of constant efficiency, is not considered to be so urgent as in the latter, where life is always in jeopardy. With the formation of Safety Committees in factories, gassing accidents should receive more attention than they have in the past. Persons should be made responsible for maintenance of the rescue appliances in proper condition, and regular drill in the use of them practised by foremen and workers alike. The best type of apparatus has still to be found for accidental escape in the repair of plant in which irrespirable or poisonous gases are present, during inevitable and unforeseen exposure to poisonous fumes and gases for short periods in repairing or cleaning stills, retorts, tank waggons, fermenting tanks, and for rescue work. Too often workers are found using respirators against nitrous fumes which are of no value whatever. The use of simple means, such as a folded handkerchief, is to court disaster. The worker must be equipped with a special mask or air helmet supplying him with fresh outside air, or else a self-contained oxygen breathing apparatus, making him independent of his surroundings. Probably the box respirator used in chemical warfare will find a useful place in certain chemical works. In all forms of reviving oxygen apparatus rubber is used largely for the connections. This perishes in the presence of acid gases and from lack of use, so that careful supervision is necessary to maintain it in a state of constant efficiency.

Nitrous Fumes.—A large number of cases, which must, however, only represent a small proportion of the actual number that occurred, arose directly out of the war in the manufacture of nitric acid and the subsequent nitration processes in the manufacture of explosives. In 1918 the cases had fallen largely as compared with 1917, when no fewer than 22 arose in the nitric acid plant, and 25 with five deaths in the manufacture of picric acid, tetryl, or tri-nitro-toluene; 10 were due to nitrating gun-cotton; four with one death to the bursting of carboys containing nitric acid; and three with one death to amalgamating with mercury the lead interior of three new pre-wash tanks, the solution used being mercuric nitrate. In the last case verbal instructions had been given to dilute the nitric acid with four or five times its volume of water, the object being to add sufficient water so that fuming during the preliminary washing over of the tank with nitric acid would not take place. With a weak solution, however, more labour was entailed in cleaning the tank, and the stronger the mixture the more easily could the work be done. Two men worked alternately as there was not sufficient room inside the tank for the two to work together. In this case, a suction fume pipe which operated with a compressed air ejector was not being used, as it should have been, during the repair work.

Nitrous fumes enveloping a workman for a period of one or two minutes leads to intense constriction in the throat, violent respiratory efforts are made, and the man becomes more or less collapsed. Exposure for more than two minutes will cause asphyxiation and death. Exposed for from one half to nearly two minutes the men rapidly recover on returning to the open air and soon feel as if the danger had passed. These are the cases in which, some hours later, distress is felt and often terminate fatally with œdema of the lungs. Workers daily

experiencing small escapes of nitrous fumes frequently have coughs with relaxed throat, and chronic bronchitis.

Early in the war a memorandum and placard on the precautionary measures to guard against nitrous fumes in the acid plant and nitrating sheds, as to the use of air helmets, use of oxygen cylinder, artificial breathing, and treatment in cases of gassing by nitrous fumes was circulated to occupiers of existing plants, and those in course of erection for the manufacture of picric acid, T.N.T., tetryl, and the like.

Benzole.—Benzole poisoning occurs in acute and chronic form. The following are instances of acute poisoning:

A man was employed as a stillman and succumbed to inhalation of benzole vapour, which had escaped into the benzole house owing to an increase of pressure on the steam boilers causing a quicker distillation of the vapour than the condenser was capable of dealing with. Consequently the vapour passed through the top of the intermediate receiver into the room. The man was first overcome on the evening of March 18. Artificial respiration had to be resorted to and oxygen administered. He revived, but became unconscious shortly afterwards. After repetition of the treatment for about two hours he again revived. Notwithstanding this, he returned to work on the evening of the 19th, and apart from a slight headache stated that he felt quite well, and worked throughout the shift. He returned again on the evening of the 20th, but died during the night; there was no direct evidence of any further gassing.

In another instance a man entered a benzole tank waggon through a manhole 16 inches in diameter to remove sediment. The tank had been filled with water, and steamed out for over 20 hours. The water was then run off, the tank refilled with cold water and boiled from 7 to 7 o'clock next day. Finally, after emptying, the tank was filled with cold water to cool it. The cold water was run off, and the tank stood about 10 days with the manhole open. A lad who was deputed to watch outside saw the deceased collapse. He got into the tank but found he could not assist him to get out, and summoned help. A man without hesitation went into the tank and fastened a rope round deceased. A rope had been provided, but deceased had not put it round him. The rescuer then collapsed. A third man at once went into the tank and managed to get them both out before he felt serious ill effect. In consequence of this fatality Mr. Jackson (North-Western Division) recommended: (1) Thorough boiling out with water, the mud being raked over at the same time; (2) filling and emptying with water immediately before entry; (3) provision of a respirator giving an air supply from outside the tank while anyone is inside it.

A somewhat similar accident, though not fatal, occurred in the cleaning out of a deposit of naphthalene at the bottom of a tank waggon used for bringing creosote oil (for use as fuel) from tar distilleries to a waggon works. In this case very similar instructions were given by Mr. Younger (Halifax).

Ether Intoxication.—Several cases of ether intoxication occurred in the manufacture of cordite with a mixture of ether and alcohol, which was used as a solvent instead of acetone. In nearly all the cases the effects were transitory. In the early stages of the manufacture, before the recovery plant in the stoves was perfected and women entered the stoves full of ethereal vapour, the attacks were sufficiently alarming. So much so was this

the case that their place had to be taken by men, who did not suffer to the same extent.

PITCH ULCERATION.

By an arrangement with the occupiers of the principal factories in South Wales for the manufacture of briquettes, reports have been obtained of cases of pitch ulceration, in several epitheliomatous in nature, which came to their knowledge. These cases were usefully followed up by inquiry by the certifying surgeon, so that for the years 1914-1918 particulars have been received of 64 men who have been affected, some of them more than once in the time stated. This is a very disappointing result, following on the inquiry which was made by Mr. A. H. Lush in 1911, and again in 1913, into the need for regulations requiring washing and bath accommodation, overall suits, prevention of dust, and protection against injury to the eyes.

The two factories in which by far the most satisfactory arrangements for washing accommodation and supervision of the workers have been made account for 44 of the 64 cases reported. These works employ the largest number of workers, and the high proportion in them is due to the closer supervision exercised by the management, resulting in the reference for treatment of all cases of warts found. For this reason also the cases reported from them are of slighter severity than from the others.

The nature of the work is to grind material first to powder before compressing the pitch and fine coal dust into blocks. Improvements made to reduce the excessive dust have not been very successful. Great difficulty is experienced in maintaining the conveyor casings dust-proof, and in addition it has to be borne in mind that the mixture of pitch and coal is of an explosive nature. The percentage of men using the baths is very small and is mostly confined to the younger men, who are not necessarily those most exposed to the dust. The percentage of men who change their clothing before going home is also very small. No really satisfactory preparation has yet been found for allaying the irritation of the dust on the skin. Dusting with starch powder or fuller's earth is used by some to relieve the burning and irritation on exposure to wind and sun, which is noticeable particularly after washing. In addition to the pitch warts, particulars were received of four cases of ulceration of the cornea due to pitch dust, involving in one case complete loss of sight. Crêpe or goggles are worn by some men, but not universally.

In addition to the epitheliomatous condition in pitch works information was received of eight cases contracted either in tar works or by workers coming in contact with tar between 1914 and 1918. Four were reported as severe, suffering from epithelioma of the scrotum, two of which proved fatal, and one from epithelioma of the forearm, requiring amputation, in a man aged 60 engaged in net-making and so handling tar. An exactly analogous malady arises in the refining of paraffin as carried on in the five shale-oil works in Scotland.

INDUSTRIAL DERMATITIS.

Dr. Bridge investigated the condition known as oil dermatitis which proved very troublesome in a large number of engineering works during the war, arising from the cutting oils, cutting compounds, and soluble oils used on automatic lathes and similar machines, and composed chiefly of mineral oil derived from the residue of petroleum left after distilling other oils which boil below 300° C. The malady has been known for a long

time, having been described, with typical illustrations, in a paper by Dr. H. S. Purdon, in 1902, on "Acneiform Eruptions in Flax Doffers in Belfast." The condition, Dr. Bridge says, closely resembles that seen in the green or paraffin sheds of the shale-oil refineries, but is milder in form. He describes the affections of the skin due to oil in engineering shops as, first, inflammation of the hair follicles (folliculitis or peri-folliculitis); secondly, septic infection; and, thirdly, eczema.

Injury to the skin is the primary factor in the production of septic infection, and as lubricating fluids contain fine, sharp particles in suspension, mere movement of the fingers or leaning the arms on the work may produce sufficient injury to the skin as to cause the primary lesion, through which the germ enters. For prevention, cleanliness of the workers' hands and arms, and the removal of the oil and dirt, unavoidably present, is essential. Dr. Bridge describes as having proved satisfactory not only in prevention, but also in curing the condition, washing with ether soap and powdering the arms before and after work with equal parts of zinc oxide and starch.

Numerous inquiries into outbreaks of eczema arising out of conditions due to the war were made. It is remarkable how many of them were due to derivatives of coal tar, petroleum, and shale oil, used as explosives or dyes (tetryl, picric acid, T.N.T., nitrosophenol), and, therefore, probably due to the same essential cause as pitch and petroleum acne. Generally, the substances setting up industrial eczema are, first, chemical irritants and caustic agents like bichromate of potash and arsenious acid and certain finished dyes; secondly, those which dissolve and remove the natural grease from the skin, such as turpentine, petroleum benzine, benzene, and its homologues, and the intermediate bodies their nitro- and amido-derivatives; thirdly, processes which soften and macerate the skin, such as alkalis; and, fourthly, processes which mechanically injure the continuity of the skin, such as brushing, scratching, and rubbing. With the oily and greasy material removed, the dry skin cracks, and the most important thing in prevention is to try to restore, as far as possible, the natural lubricant to the skin.

If irritating powders are handled—and this has been especially brought out in connection with the use of tetryl, in the handling of which hardly any workers escaped an initial incapacitating attack of dermatitis,—much the best preventive during work was found to be dusting the skin with a dry powder, such as talc and starch, rather than the use of an ointment, which tended to collect and retain the noxious powder. The spread of eczema from the hands to other parts of the body indicates that the pathogenic germs on the skin have set up a septic infection.

Dr. Bridge and Mr. Verney (North London) investigated an outbreak of eczema in which 40 to 50 cases had occurred within 15 months of the starting of the manufacture of phenacetin in what Mr. Verney described as "an old and unsuitable building, too small for the plant, and ventilated only through the door and by openings in the roof and near the eaves." Seeing the conditions of manufacture, Dr. Bridge found it difficult to arrive at the exact cause, but believed that the intermediate products and acids used led to a drying of the hands with subsequent cracking and the formation of vesicles; while the phenol vapour accounted for an acute erythema and swelling of the face occurring so rapidly as within an hour completely to occlude sight.

ACID RESISTING IRON

MR. E. L. RHEAD, in the course of a lecture on Tuesday on "Inherent Faults in Metallic Materials used in the Construction of Chemical Plant"—the first of a series of twenty lectures on chemical engineering subjects arranged by the Department of Applied Chemistry of the College of Technology, Manchester,—referred at some length to the characteristics of cast-iron.

In the case of cast-iron vessels used in chemical manufacture very serious results were frequently produced. Flakes of graphite formed channels by means of which the corroding liquid or gas penetrated the metal and brought about somewhat rapid corrosion. To illustrate this point the lecturer referred to some nitration pans which had been in use for some considerable time before being employed for nitration purposes. A good deal of corrosion had already taken place, but directly they were put on the more strenuous work of nitration the pans failed. An examination showed that the interior of the metal pans had been penetrated by the corroding liquid along the faces of the flakes of graphite, and had produced corrosion on both sides of those flakes. For acid-resisting cast-irons of the ordinary type it became necessary, in order to secure the best results, to keep to as close a grained iron as possible. The graphite also should be as small in quantity, and in as small flakes as it was possible to obtain. The larger the graphite flakes the greater the degree of attack that was likely to occur. Many of the heavy types of chemical vessels were being made with cast-iron containing a low percentage of silicon, the reason being to reduce the size of the graphite flakes and to avoid laying the metal open to attack. That referred to ordinary cast-irons.

Dealing with acid-resisting irons with a high silicon content, these were known under various names, and contained from 9 to 18 per cent. of silicon, the proportion varying with the make, and to some extent, said the lecturer, with the purpose for which the particular plant was to be employed. Those materials had been very largely used in the concentration of sulphuric and nitric acids during the period of the war, and they had given satisfactory results in the majority of cases. The life of the materials, however, varied very considerably. It had fallen to his lot to investigate the causes of the differences in the behaviour of the irons. In one particular case the material had been made into very large and expensive plant, and was found to be unsatisfactory, and to be giving out very quickly. The surface of the metal was very deeply pitted, and the cause of the corrosion was located as being due to the presence in the material of a considerable proportion of phosphorus in the form of phosphide. The phosphide in this material segregated with greater ease than it did in the case of ordinary iron. The fact that the phosphide component of the iron was responsible for the corrosion was made out as the result of a very careful investigation. All high-silicon irons that are used for the protection of acid-resisting materials should be free from phosphides, and also free from sulphur. Sulphur behaved in an unsatisfactory manner, and where it was concentrated the corroding influences were very strongly marked. The physical condition of acid-resisting materials had a great deal to do with the resistance that they offered. The right kind was the one that showed a fine grain and no sign of chilling.

At the opening meeting of the Manchester Metallurgical Society, on Tuesday evening, Mr. Rhead read a paper entitled "Notes on the Resistance of Iron and Iron Alloys to Chemical Action," which, in substance, was similar to the lecture reported above.

Mr. S. McCraith, who opened the discussion, said it was usually considered that a small percentage of copper in steel had a marked effect in preventing corrosive influences.

Mr. S. Evans stated that in his opinion corrosion was not a simple chemical action. There were probably two or three types of corrosion, and whether the chemical one was the most important and the most common was not definitely settled. With water cooling, corrosion in nitrate pots was cut down. Porcelain, he said, was a good deal more satisfactory for nitration than cast-iron. Regarding the effect of vibration on wrought iron as affecting its corrodibility, there was no doubt, he said, that it had a bad effect. The effect was to make the iron crystallise, and the growth of those crystals could be very plainly seen. The resulting channels then formed the lines of least resistance for the corrosion to take place.

Mr. W. Wilson said he was much interested in the remarks concerning phosphide segregation. There was no doubt that chemical segregation and the acceleration of corrosion went hand in hand. Referring to Mr. McCraith's remarks, the speaker said that a small percentage of copper undoubtedly had an inhibitive effect upon corrosion. Up to 0.3 per cent. in ordinary mild steel had a good effect in preventing corrosion from acids.

AMERICAN IMPORT DUTIES ON ZINC AND ZINC COMPOUNDS.

A BILL (H.R.6238) which has passed the United States House of Representatives, and is now before the Senate, proposes to amend as follows the Customs import duties on zinc ores and manufactures thereof, with a view to establishing and maintaining their production in the United States:—

Classification.	Rates of Duty.	
	Present.	Proposed.
Zinc-bearing ore of all kinds, including calamine:—		
Containing less than 10 per cent. of zinc	10 % ad val. on zinc content	Free
Containing 10 per cent. or more and less than 20 per cent. of zinc		½ cent per pound on zinc content.
Containing 20 per cent. or more and less than 25 per cent. of zinc		1 cent per pound on zinc content.
Containing 25 per cent. or more of zinc		1½ cts. per pound.
Zinc in blocks or pigs, and zinc dust	15 % ad val.	1½ cts. per pound.
Zinc in sheets	15 % ad val.	1½ cts. per pound.
Zinc in sheets, coated or plated with nickel or other metal, or solutions of zinc, old and worn-out, fit only to be re-manufactured		1 cent per pound.
Zinc, oxide of, and white pigment containing zinc, but not containing lead:—		
Dry	10 % ad val.	1 cent per pound.
Ground in oil	15 % ad val.	1½ cts. per pound.
Sulphide of zinc, white, or white sulphide of zinc	15 % ad val.	1½ cts. per pound.
Chloride of zinc and sulphate of zinc	½ cent per pound	1 cent per pound.

PERMEABILITY OF PAINTS AND VARNISHES.

THE first meeting of the session of the Oil and Colour Chemists' Association was held in London on October 9, Mr. H. H. Morgan presiding. A paper was read by Mr. A. de Waele entitled "Notes on the Permeability of Paints and Varnishes."

A year or two ago the author carried out a series of experiments to determine the relative porosity of various paints in respect both to their media and to their pigment-to-medium proportion, with the result that for any given pigment the proportion of spirit-free medium to 100 parts of pigment was found to be inversely proportional to the porosity. When comparing different pigments it was also found that intrinsic impermeability for a given proportion of pigment to medium was also influenced inversely as the specific oil absorption of the pigment. Oil absorption is referred to as that minimum proportion of oil necessary to convert the dry pigment into an unmistakable paste. A little consideration would show, said the author, that on physical grounds only such behaviour was to be expected, thus ruling out the possibility of any chemical influence. Films of paint were obtained by coating tinned iron, allowing several days for thorough drying, and then amalgamating with mercury and dilute sulphuric acid one edge of the sheet. In the course of a few hours amalgamation had proceeded sufficiently to peel off the sheet. It was necessary to examine microscopically the film worked on, and also to carry out determination in triplicate, but contrary to expectations, very rarely did accidental pinholes occur. Varnish films were similarly obtained. Determinations of permeability were obtained by introducing into a flat-lipped CO_2 flask a little strong H_2SO_4 , coating round the lip with a molten mixture of shellac and resin, applying the film, trimming off, and weighing when cold. The flask was then kept in an incubator in a saturated atmosphere, and weighings were made every three hours. Experiments were also made to determine the actual nature of the "pores" in varnish films, and it was obvious that they were not microscopic. The author's experience having shown that while a varnish film was free from obvious imperfections, such as cracks due to age, absolute adequate protection against rust was afforded no matter how porous the film might appear on the permeability determinations; it rather suggested that the degree of permeability was in the nature of the film being a semi-permeable membrane. Experiments in this direction gave results which conflicted with generally accepted laws.

Reference was also made to the behaviour of varnishes made on a tung-oil basis, having regard to the extraordinary absence of "bloom", or "chalking" on immersion of such a film in water. No differences were apparent, however, in the osmosis experiments between copal varnishes, both hard-drying and elastic types, and varnishes made with china-wood oil quite free from tendency to bloom. The author was in charge of the A.I.D. paint and varnish laboratory, and owing to disparity in results occasionally arising as to the degree of opalescence of oil-varnish films when immersed in distilled water, experiments were made which resulted in a piece of sheet tin coated with a flat-drying or semi-gloss black stoving enamel being used as a substratum in preference to glass or wood. The author was not prepared to offer any explanation as to the non-chalking of certain films of china-wood oil varnish on immersion,

but uttered a warning that although blooming may be condemnatory in an oil-varnish film, non-blooming must certainly not be taken as a criterion of its ability to withstand water. Finally, contrary to the experience of many, the author has found little difference between immersion in salt or distilled water.

Mr. A. Selby Wood, who opened the discussion, said that practical experience in the past had indicated that tung-oil varnish was more suitable for conditions where there was moisture or water, such as boat varnish, but if he understood the lecturer's experiment aright there did not seem to be much difference between the permeability of a china-wood oil and a tung oil film.

Mr. A. Molteni asked as to how the author judged rusting. Very often, although a metal appeared to be non-rusting with the film on it, when the film was removed there were signs of corrosion, although perhaps it could not be called rusting. He could not offer an explanation of this. (The author said he could not either.) Mr. Molteni also referred to an experiment on a very thin wood-oil film which appeared to be very resistant to moisture. He exposed it for about three months in a moist atmosphere, but there appeared to be no signs of rusting. It was then placed in the laboratory, and after two months the whole thing corroded very badly.

Mr. W. J. Palmer called attention to the fact that the pigment entered into this question of permeability as much as the medium, and American-published results took this into consideration more than seemed to be the case in this country. He believed the effect was a joint action of the pigment and medium, at any rate, so far as paints were concerned. The theoretical considerations were obscure, but there must be a theoretical basis.

Mr. J. B. Dampney asked for data concerning the relative resistivity of tung-oil varnish and ordinary varnish.

Mr. Tyson said he had found that polymerised linseed oil, burnt umber, and carbon black made an admirable protective coating for corrugated iron. Some iron painted with this material had been in use at his firm's works for nine years satisfactorily, notwithstanding the proximity of a chemical factory, a soap works, and a match factory.

Mr. J. G. Wilkinson said he had been trying permeability experiments on a small scale, and asked for more information as to their manipulation, particularly with regard to the preparation of the films. So far he had been using filter paper, coated with gelatine, and soaking in water, which was fairly satisfactory. Another question was as to the effect of the thickness of the films.

The Chairman said that he himself started some experiments of the nature referred to in the paper about 12 or 18 months ago, but they were not yet completed. When the results were obtained he would publish them if they seemed of any value. Many attempts had been made to determine the permeability of varnishes on wooden blocks. That method was often adopted in this country and in America, the wooden blocks being varnished, weighed, and then immersed in water or subjected to a moist temperature, and the increase in weight noted. For practical purposes, when varnishes were used on wood that was as good a method as any, because it reproduced, as near as possible, practical results. A large number of experiments of this nature were carried out by the British Engineering Standards Committee when drawing up the specification for the Air Board in connection with propeller varnishes. Such

experiments, however, had to be carried out very carefully, but very often they were not. He agreed that the pigment played a very vital part in protective paints, and he was pleased to hear that there was little difference shown in the author's experiments between tung-oil varnish and linseed-oil varnish. It would have been useful if that fact could have been established some years ago.

Mr. de Waele, replying to the discussion, said that he had found tinned steel was best in enabling a judgment to be arrived at as to rusting, the tin accelerating the rusting. In answer to Mr. Wilkinson, he said he did not measure the thickness of the film, but attempted to get the same thickness by working on varnishes of approximately equal gravity and equal viscosities as far as possible, *i.e.*, containing the same amount of volatile solvent.

Mr. de Waele then read a short paper entitled "A Suggested Method for Calculating the Cost of Ready-Mixed Paints," but time prevented him going into it in great detail. He pointed out that cases often arise in practice when it is necessary to make calculations as to the cost of a paint of a given tint, but actual preparation of samples is difficult owing to lack of time, etc. Often, also, in the attempted cheapening of certain paints by substitution of inert filler for white lead or other pigment base, some revision of formula is necessary in consideration of higher or lower oil absorption due to the substitution. The paper was an attempt to work out a method which would permit of such calculations without the necessity of recourse to the roller mill or the laboratory cone mill, both of which often afford inaccurate or insufficient information. The principal stumbling-block in the calculation of paint formulae is the amount of medium to be used to obtain a given fluidity or ease of working, and a number of examples were worked out. On employing the formulae for various pigments and mixtures of pigments it has been found that paints of equal fluidity are obtained by adding an equal volume of thinner to the volume of the paste.

BRUNNER-MOND'S SOAP INTERESTS.

LEVER BROS.' PURCHASE.

THE directors of Messrs. Brunner, Mond and Co., Ltd., issue the following statement to their shareholders under date of October 8:—

"In view of the many and inaccurate reports recently circulated in financial circles, the directors of Brunner, Mond and Co., Ltd., desire it to be known that they have to-day concluded an agreement to sell to Lever Brothers, Ltd., the ordinary shares in Joseph Crosfield and Sons, Ltd., soapmakers, Warrington, and William Gossage and Sons, Ltd., soapmakers, of Widnes, which were acquired by Brunner, Mond and Co., Ltd., in the year 1911. The sale was made at a price which the directors consider is a fair one, and is payable in cash.

"In conveying this information to their shareholders, the directors desire to say that although this rearrangement of investments will obviate the necessity for any issue of capital for some considerable time, yet they see no reason to anticipate that the rearrangement will cause any increase in the amount of profits previously earned by the company, or the amount available for distribution."

It is reported from Liverpool that the price paid by Lever Brothers to Brunner, Mond and Co. for the

acquisition of the ordinary shares in the two companies is four millions.

PHOSPHATIC FERTILISERS.

AT a meeting of the Institution of Mining and Metallurgy at Burlington House, London, on Thursday, Mr. F. D. Powers read a paper on "Coral Island Phosphates in the Making." In the course of his remarks the author stated that the oxides of iron and alumina are objectionable in the manufacture of super-phosphates, as they not only consume sulphuric acid, but if the mixed oxides exceed 4 to 4½ per cent. they are liable to form an objectionable gelatinous precipitate, which by coating some of the phosphate particles prevents the acids from reaching them. Yet these phosphates of iron and alumina are not necessarily useless when applied to certain soils in the raw state, for, in addition to the carbon dioxide transpired from the rootlets of plants, there is also the process of fermentation of the organic matter present to assist in its decomposition, while the rôle played by the various kinds of bacteria is known to be an extremely important one. McGeorge, in the *Hawaii Agricultural Experimental Station Bulletin* 41, shows that, in sand cultures with millet, ferric and alumina phosphates produced more vigorous plants than acid phosphate, sodium phosphate, phosphate rock, or Thomas slag. In the *Rhode Island College Experimental Station Bulletins* 114 and 118 it is stated that phosphates of iron and alumina when dehydrated by roasting gave better results than ground Florida phosphate, and the effect was increased by the addition of slaked lime. Carlton C. James (*Jour. Ind. and Eng. Chem.*, Jan., 1918), referring to the views held by some that reverted phosphate is of less value than acid phosphate, states, "Considering the results obtained here by an acid phosphate which has been reverted, we are inclined to believe that under certain conditions prevailing in Hawaii, reverted phosphates give the better results." Again, "We have found in numerous cases that the reverted phosphate is just as valuable or even more valuable than the water-soluble when applied to cases upon upland soils. These soils are, as a rule, highly ferruginous clays. On soils which have not been cropped for several years, the reverted phosphate gives excellent results."

Tri-calcium phosphate when applied raw must be finely ground. It is insoluble in water, but as it slowly comes in contact with the roots of plants, it is converted into mono-calcium phosphate, $\text{CaH}_4(\text{PO}_4)_2$, which is soluble in water. In contact with the lime of the soil, it is transferred into di-calcium phosphate, but by that time it is so uniformly divided that the organic acids generated by plants render the compound suitable for their assimilation. In this way the beneficial effects of the phosphate would not be apparent until at least after the end of the first year.

Finely ground raw calcium phosphate cannot be applied to all types of soil with equal success. The most suitable is that of an acid nature, or those which are rich in humus, or are wet and peaty. It may be of very little use in light soils. It will thus be seen that whether phosphates reach the soil naturally, or are applied artificially, the nature of the soil over which they travel will have a large influence in deciding as to whether they are taken up by plant life on land or are carried out to sea. Earthy calcium phosphates, such as fine guano, are more suitable for direct application to soils than crystalline forms.

BRITISH OVERSEAS CHEMICAL TRADE IN 1918.

(Continued from page 391.)

WE give below extracts from the annual statement, just issued, of the trade of the United Kingdom with foreign countries and British Possessions in 1918, compiled by the Customs and Excise Department. The figures relating to the chemical and allied trades will be found much more useful than those given in the monthly Board of Trade returns, owing to the detailed analysis of the countries of origin of imported, and the destinations of exported, chemical products. Each product is specified separately, together with the extent of the trade done with the more important countries, the corresponding figures for 1917 being in parentheses.

IMPORTS.

Guano.—Uruguay, — (1,034 tons); other foreign countries, — (268 tons); Falkland Islands, — (1,299 tons); total, — (2,601 tons).

Manures, Unenumerated.—Norway, 839 tons, valued at £2,774. (1,300 tons, £15,600.); Argentine Republic, 86 tons, £1,384. (582 tons, £6,220.); other foreign countries, — (767 tons, £11,298.); British Possessions, 22 tons, £741. (60 tons, £1,280.); total, 947 tons, £4,899. (2,709 tons, £34,407.).

Cochineal.—Canary Islands, 373cwt. (289cwt.); other foreign countries, 249cwt. (168cwt.); British Possessions, — (59cwt.); total, 622cwt. (516cwt.).

Cutch.—Foreign countries, 25cwt. (115cwt.); British India, 31,444cwt. (27,640cwt.); Straits Settlements, 14,469cwt. (1,676cwt.); British Borneo, 13,029cwt. (18,082cwt.); other British Possessions, 400cwt. (—); total, 59,367cwt. (47,513cwt.).

Alizarine and Anthracene Dyestuffs.—Foreign countries, 1,995cwt. (41cwt.).

Aniline and Naphthalene Dyestuffs.—Germany, — (1cwt.); France, 29cwt. (43cwt.); Switzerland, 39,397cwt. (45,848cwt.); United States, 5,233cwt. (7,089cwt.); other foreign countries, 4cwt. (1cwt.); total, 44,668cwt. (53,052cwt.).

Synthetic Indigo.—Switzerland, 2,084cwt. (9,894cwt.); China, — (44cwt.); other foreign countries, — (2,028cwt.); total, 2,084cwt. (11,966cwt.).

Other Coal-tar Dyestuffs.—Foreign countries, 219cwt. (397cwt.).

Extract for Dyeing.—France, £18,235. (£147,152.); Italy, £250. (—); United States, £157,916. (£388,541.); other foreign countries, £12,338. (£64,514.); British West Indies, £594,524. (£496,872.); other British Possessions, — (£5,704.); total, £783,263. (£1,102,783.).

Indigo.—Java, 187cwt. (804cwt.); San Salvador, 123cwt. (320cwt.); other foreign countries, 31cwt. (82cwt.); British India, 4,946cwt. (12,254cwt.); other British Possessions, — (41cwt.); total, 5,287cwt. (13,501cwt.).

Dyestuffs, Unenumerated.—France, 21,589cwt., valued at £77,367. (31,980cwt., £112,037.); Algeria, 423cwt., £2,260. (1,538cwt., £5,951.); Switzerland, — (103cwt., £853.); Portugal, 21,664cwt., £73,805. (24,445cwt., £81,908.); Spain, 39,013cwt., £199,420. (73,305cwt., £258,978.); Italy, 64,900cwt., £296,156. (43,439cwt., £184,805.); United States, 681cwt., £5,589. (501cwt., £3,489.); Argentine Republic, 701cwt., £3,635. (289cwt., £1,443.); other foreign countries, 12,964cwt., £58,692. (1,047cwt., £3,479.); Cape of Good

Hope, 4,980cwt., £13,323. (6,106cwt., £14,400.); British India, 2,127cwt., £11,123. (7,605cwt., £15,255.); other British Possessions, 7,549cwt., £36,203. (243cwt., £690.); total, 176,591cwt., £777,573. (190,601cwt., £683,288.).

Soap Stock.—United States, — (224cwt.); other foreign countries, 560cwt. (—); British Possessions, 325cwt. (670cwt.); total, 885cwt. (894cwt.).

Soft Soap.—Foreign countries, 43cwt. (—).

Household and Laundry Soap.—France, 440cwt. (1,728cwt.); Italy, — (2,249cwt.); United States, — (19cwt.); other foreign countries, 16cwt. (—); British Possessions, 120cwt. (116cwt.); total, 576cwt. (4,112cwt.).

Soap Powder.—Foreign countries, — (30cwt.); British Possessions, 16cwt. (—); total, 16cwt. (30cwt.).

Toilet Soap.—Germany, — (4cwt.); France, 1,653cwt. (820cwt.); United States, 13cwt. (321cwt.); other foreign countries, 116cwt. (56cwt.); British Possessions, 2cwt. (7cwt.); total, 1,784cwt. (1,208cwt.).

Soap, Unenumerated, including Cottonseed Oil Soap.—Foreign countries, — (8cwt.).

Antimony Ore.—China, 50 tons (—); Chili, 1,213 tons (5,890 tons); Bolivia, 5,971 tons (8,608 tons); Argentine Republic, 1,064 tons (1,003 tons); other foreign countries, 488 tons (959 tons); British East Indies, 2 tons (128 tons); Australia, 5 tons (1,612 tons); Canada, 24 tons (273 tons); other British Possessions, 100 tons (853 tons); total, 8,917 tons (19,326 tons.).

Antimony, Crude and Regulus.—France, 224 tons (61 tons); China, 846 tons (2,498 tons); Japan, 1,197 tons (2,425 tons); other foreign countries, 2 tons (67 tons); British Possessions, 335 tons (407 tons); total, 2,604 tons (5,458 tons).

Copper Ore.—Norway, — (72 tons); France, 90 tons (158 tons); Portugal, 1,240 tons (1,523 tons); Portuguese East Africa, 215 tons (370 tons); Spain, 43 tons (—); Peru, 102 tons (117 tons); Chili, 491 tons (2,292 tons); Bolivia, 10,866 tons (2,049 tons); other foreign countries, 251 tons (976 tons); Cape of Good Hope, 234 tons (779 tons); Transvaal, 1,487 tons (7,202 tons); Rhodesia, 300 tons (1,009 tons); Australia, — (7 tons); total, 15,319 tons (16,554 tons).

Copper, Regulus and Precipitate.—Portugal, 2,095 tons (924 tons); Portuguese East Africa, — (434 tons); Spain, 8,419 tons (10,239 tons); United States, 1,470 tons (2,606 tons); Mexico, — (3,559 tons); Peru, 65 tons (152 tons); Chili, 239 tons (411 tons); Bolivia, 66 tons (207 tons); other foreign countries, — (100 tons); Cape of Good Hope, 315 tons (5,173 tons); Transvaal, 118 tons (199 tons); Canada, 8,226 tons (4,227 tons); other British Possessions, — (7 tons); total, 21,013 tons (28,238 tons).

Lead Ore.—France, — (107 tons); Spain, — (138 tons); Peru, 108 tons (2,180 tons); Chili, 727 tons (580 tons); Argentine Republic, — (1,688 tons); other foreign countries, 227 tons (661 tons); British India, 14 tons (2,050 tons); Australia, 421 tons (—); other British Possessions, 5 tons (1,253 tons); total, 1,502 tons (8,657 tons).

Lead, Pig, and Sheet.—Spain, 49,977 tons (36,268 tons); Italy, — (3,506 tons); Greece, 1,253 tons (—); United States, 61,576 tons (10,084 tons); other foreign countries, 2,323 tons (1,424 tons); British India, 2,338 tons (1,720 tons); Australia, 85,280 tons (93,654 tons); other British Possessions, 5,185 tons (468 tons); total, 207,932 tons (147,124 tons).

Manganese Ore.—Russia, 2,231 tons (2,137 tons); Portuguese India, 2,541 tons (3,128 tons); Spain, 816 tons (1,710 tons); Japan, 1,449 tons (1,937 tons); other foreign countries, 460 tons (4 tons); Gold Coast, 29,510 tons (21,720 tons); British India, 324,338 tons (300,500 tons); other British Possessions, 4,261 tons (128 tons); total, 365,606 tons (331,264 tons).

Platinum, Wrought or Unwrought.—France, 596 troy oz. (632oz.); United States, — (2,716oz.); other foreign countries, 362oz. (—); British Possessions, 265oz. (458oz.); total, 1,223oz. (3,806oz.).

Pyrites of Iron and Copper.—Norway, 112,889 tons (49,960 tons); Portugal, 28,003 tons (31,096 tons); Spain, 695,811 tons (772,585 tons); Italy, — (600 tons); total, 836,703 tons (854,241 tons).

Quicksilver.—France, — (770,760lb.); Spain, 772,805lb. (399,350lb.); Italy, 304,275lb. (880,945lb.); other foreign countries, 380lb. (122,379lb.); total, 1,077,460lb. (2,173,434lb.).

Tin Ore.—Netherlands, — (9 tons); France, 29 tons (78 tons); Portugal, 132 tons (554 tons); Spain, 3 tons (49 tons); United States, — (2 tons); Peru, 28 tons (311 tons); Chili, 7,528 tons (16,944 tons); Bolivia, 15,992 tons (14,048 tons); Argentine Republic, — (16 tons); other foreign countries, 307 tons (307 tons); Nigeria, 8,123 tons (8,756 tons); British South Africa, 5 tons (54 tons); Straits Settlements, 33 tons (25 tons); Australia, — (34 tons); other British Possessions, 150 tons (21 tons); total, 32,330 tons (41,208 tons).

Zinc Ore.—Netherlands, — (25 tons); France, 413 tons (813 tons); Algeria, 24,066 tons (27,411 tons); Spain, 39,596 tons (15,705 tons); Italy, 13,661 tons (21,916 tons); Tunis, 6,673 tons (4,232 tons); Japan, 10 tons (441 tons); United States, — (73 tons); other foreign countries, 4,979 tons (510 tons); Australia, 3,359 tons (16,054 tons); Canada, 30 tons (—); other British Possessions, — (188 tons); total, 92,787 tons (87,368 tons).

Zinc, Crude, in Cakes.—Norway, 5,591 tons (3,246 tons); Netherlands, 15 tons (2,693 tons); Belgium, 4 tons (—); France, 9 tons (83 tons); Japan, 7,051 tons (17,905 tons); United States, 50,495 tons (51,091 tons); other foreign countries, 79 tons (368 tons); Australia, — (439 tons); New Zealand, — (17 tons); Canada, 815 tons (194 tons); other British Possessions, 79 tons (69 tons); total, 64,138 tons (76,105 tons).

Methylic Alcohol.—United States, 66,939 gallons (190,736 gallons); Canada, 249,952 gallons (149,021 gallons); total, 316,891 gallons (339,757 gallons).

Barytes.—Spain, 21,700cwt. (20,615cwt.); United States, 7,904cwt. (1,945cwt.); other foreign countries, — (5,419cwt.); total, 29,604cwt. (27,979cwt.).

Nickel Oxide.—United States, 4,231cwt. (7cwt.); Canada, 15,342cwt. (23,601cwt.); total, 19,573cwt. (23,608cwt.).

Red Lead.—Netherlands, — (60cwt.); United States, — (2,255cwt.); total, — (2,315cwt.).

White Lead.—United States, 4,568cwt. (51,718cwt.); other foreign countries, 2cwt. (—); Canada, 40cwt. (—); total, 4,610cwt. (51,718cwt.).

Zinc Oxide.—Netherlands, 1,494cwt. (58,103cwt.); Belgium, — (1,871cwt.); France, 402cwt. (5,231cwt.); United States, 76,090cwt. (133,871cwt.); other foreign countries, 1,800cwt. (2,549cwt.); total, 79,786cwt. (201,625cwt.).

Painters' Colours and Pigments, Unenumerated.—Germany, 34cwt. (487cwt.); Netherlands, 26,081cwt. (128,541cwt.); France, 34,042cwt. (39,458cwt.); Spain,

38,462cwt. (34,786cwt.); Italy, 7,401cwt. (8,014cwt.); United States, 75,105cwt. (98,474cwt.); other foreign countries, 1,123cwt. (2,068cwt.); Cyprus, 630cwt. (1,534cwt.); British East Indies, 41cwt. (89cwt.); Canada, 3,520cwt. (5,784cwt.); other British Possessions, 29cwt. (418cwt.); total, 186,468cwt. (319,653cwt.).

Paraffin Wax.—Netherlands, — (21,220cwt.); Dutch Indian Possessions, 6,000cwt. (4,208cwt.); United States, 1,035,291cwt. (1,335,745cwt.); other foreign countries, 5,500cwt. (6,650cwt.); British India, 116,911cwt. (85,013cwt.); other British Possessions, 958cwt. (—); total, 1,164,660cwt. (1,452,836cwt.).

Pitch, other than Coal Pitch.—Russia, 19,151cwt. (27,248cwt.); United States, 2,545cwt. (10,907cwt.); other foreign countries, 1,701cwt. (3,768cwt.); total, 23,397cwt. (41,923cwt.).

Rosin.—France, 316,124cwt. (297,284cwt.); Portugal, 49,985cwt. (58,865cwt.); Spain, 17,574cwt. (68,129cwt.); United States, 365,496cwt. (1,302,276cwt.); other foreign countries, 1,958cwt. (—); British Possessions, 1,286cwt. (4cwt.); total, 752,423cwt. (1,726,558cwt.).

Salt, Rock and White, except Table Salt.—Portugal, 204 tons (732 tons); Spain, 500 tons (158 tons); total, 704 tons (890 tons).

Talc, French Chalk, Steatite, Mineral White, Silica, and Soapstone.—France, 268,773cwt. (185,289cwt.); Italy, 28,433cwt. (40,605cwt.); United States, 3,386cwt. (24,832cwt.); other foreign countries, 3,060cwt. (4,748cwt.); British Possessions, — (224cwt.); total, 303,652cwt. (255,698cwt.).

Tallow, including Vegetable Tallow, Unrefined.—France, 18,359cwt. (11,270cwt.); China, 2,559cwt. (26,683cwt.); United States, 124cwt. (2,132cwt.); Uruguay, 44,124cwt. (13,949cwt.); Argentine Republic, 177,356cwt. (27,411cwt.); other foreign countries, 1,200cwt. (6,277cwt.); Australia, 113,668cwt. (328,508cwt.); New Zealand, 42,168cwt. (190,025cwt.); other British Possessions, 3,256cwt. (4,044cwt.); total, 402,814cwt. (610,299cwt.).

Tar, other than Coal Tar.—Russia, 52,593cwt. (85,001cwt.); Sweden, 450cwt. (1,241cwt.); United States, 8,929cwt. (60,467cwt.); other foreign countries, 3,000cwt. (—); total, 64,972cwt. (146,709cwt.).

Varnish, not containing Spirit.—Germany, — (89 gallons); France, 185 gallons (3,264 gallons); United States, 1,068 gallons (79,634 gallons); other foreign countries, — (2,213 gallons); total, 1,253 gallons (85,200 gallons).

Vinegar and Acetic Acid (for table use).—Netherlands, — (229 gallons); France, 19,331 gallons (38,825 gallons); United States, 5,410 gallons (14,861 gallons); other foreign countries, 300 gallons (—); British Possessions, 9,398 gallons (698 gallons); total, 34,439 gallons (54,613 gallons).

(To be continued.)

POSSIBLE STATE MONOPOLY FOR GERMAN MATCH INDUSTRY.—The question of the establishment of a State monopoly for the German match industry was recently discussed at Weimar. The sum of 120,000,000 marks has been mentioned as being necessary for indemnifying the factory owners; this figure, however, merely represents a provisional estimate. While the Government apparently agree that the transformation of the match industry into a State monopoly would be comparatively simple and would not involve any appreciable industrial disturbance, they apparently feel that the matter is not urgent. It is suggested that the law which might eventually be passed as a result of the present discussions should only go into effect on March 31, 1921. In the meantime there would be ample opportunity to take any preparatory steps which might be necessary.—U.S. Com. Rep.

CHEMICAL TRADE OF SOUTH AFRICA.

ACCORDING to the annual report of Mr. J. L. Wilson-Goode (H.M. Trade Commissioner at Cape Town) on the trade of South Africa in 1918, paints and varnishes to the value of £24,634. were produced locally in the year 1915-16, and to the value of £46,421. during 1916-17. It is estimated that the South African market for paints and distempers approximates in point of value to £250,000. a year. The production of chemicals increased in value from £119,000. in the year 1911, to £171,040. in 1915-16, and to £234,494 in 1916-17. The chief chemicals produced in the Union are: Acids (sulphuric, nitric, hydrochloric, carbonic), alcohol, ammonia, argol, arsenic, bisulphate of soda, bleaching powder, disinfectants, epsom and glauber salts, glycerine, saccharine, sodas, starch and starch flour, and nitrate of lead.

A guncotton explosive, manufactured in Natal, which is known as "Sengite," is a production to which considerable attention has been devoted. It is possible that this article will become a permanent explosive, but the permanency or otherwise depends on future relative prices of glycerine and cotton. At any rate, during the period of the war, it can claim to have lessened the demand for glycerine and to have provided against the possibilities of a serious shortage of that article.

The present demand for cement in the Union is in excess of the local supply, but the ability to produce greater quantities is receiving considerable attention.

The demand for fertilisers is becoming increasingly felt in South Africa, but although considerable deposits of phosphatic rock exist at Saldanha Bay, the progress in this direction has not been very rapid owing to the difficulty of converting the insoluble iron and alumina phosphate into a form available for fertilising purposes. No doubt fertilisers will be manufactured to a much larger extent in the near future, but the importation of a considerable quantity of ingredients will be necessary for some time to come.

There are eight principal industries in the Union whose annual production in 1915-16, in each case, exceeds one million pounds sterling, and in some cases runs into several millions. Following these, in order, are: Soap, £382,000.; candles, £626,000.; tanning, £475,000.; distilleries, £382,000.; oil and grease, £272,000.; cement, £270,000.; fertilisers, £170,000. Among the new industries which have been initiated are those which concern the production of the following articles: Calcium carbide, chloride of lime, alcohol motor fuel, wattle bark extract, starch, glue and size, tinning of iron plates, disinfectants and dips, shoe and floor polishes, sulphate of ammonia, paints and distempers from local materials, raw wax from by-products of sugar cane, lead shot and pellets, antimony smelting, arsenic, and asbestos.

IMPORTS.

The imports of drugs and chemicals from the United Kingdom are far in excess of those obtained from any other country, and are approximately four-fifths of the total imports into South Africa. Before the war the importations from Germany were on a very large scale, being approximately three-fifths of the quantity imported from the United Kingdom. The United States had a small share of the trade, which she maintained during the period of hostilities, but, having regard to the advance of prices, it is probable that the importation from the United States has not increased to any

appreciable extent. Canada, Japan, and Australia have entered the market, and in some lines their position will probably be retained.

The value of the imports of perfumery in 1913 was £65,836., of which the United Kingdom contributed £32,408., America £20,944., and France £8,402. In 1918 the imports were valued at £162,466., of which the United Kingdom contributed £68,014., and America £68,542. The imports from France were valued at £23,100. Values have been considerably increased, and it is therefore not unlikely that the quantity imported shows a reduction as compared with pre-war importations.

Practically all the supplies of castor oil are drawn from India and the United Kingdom, although Portuguese East Africa sent supplies to this market during the year 1916. The trade in cocoanut oil is divided between India, Mauritius, and Zanzibar, the supplies from other countries, with the exception of Ceylon and Portuguese East Africa, being on a very small scale. With regard to linseed oil the total imports in 1913 were 421,246 gallons, of which the United Kingdom supplied 418,179 gallons. In 1918 the total quantity imported was 413,426 gallons, of which the United Kingdom only supplied 7,379 gallons. On the other hand, India, who entered the trade in 1916, supplied no less than 179,469 gallons, and the Argentine Republic supplied 175,297 gallons, although they did not hitherto send supplies to this market. The imports from the United States were 37,488 gallons, and from Canada 11,452 gallons. It is desirable, however, from the point of view of comparison, to quote the 1917 figures, which are entirely different. The total importations that year were 218,134 gallons, of which the United Kingdom supplied 184,058 gallons, India, 26,462 gallons, and the United States 7,608 gallons. In the year 1915 and 1916 practically the whole of the supplies was drawn from the United Kingdom. Perhaps there is no trade in which such remarkable changes have taken place as in the supply of linseed oil.

During the last two years supplies of paints, colours, and varnishes from the United Kingdom, which were on a large scale before the war, and reached a record figure in 1916, have been reduced, and America and Canada have taken the opportunity of supplying paints, varnishes, and leads, but, with the exception of American paints and leads, this competition is only regarded as temporary, the quality of the importation from these countries being inferior to the British articles and the packages of awkward dimensions. It is believed, therefore, that this trade will revert to the United Kingdom.

The restrictions placed upon the manufacture and export of certain articles, hitherto supplied by the United Kingdom, and the resultant diminution of British trade with South Africa, are mainly responsible for the increase in the trade of the United States and Japan during the war. Japanese imports into South Africa received a large measure of support as a consequence of the inclusion of the Cape ports in the itinerary of the ports of call for Japanese steamers. So far as America and Canada are concerned, neither of these countries has received encouragement from special banking, steamship, or distributing facilities. As a matter of fact, freights from the United Kingdom have been cheaper than from either of the countries named. In the case of America, the demand for cash for goods on delivery at the wharf, without guarantee of freight, compelled importers of American goods to lay out capital without any guarantee

of receiving the goods, and this arrangement constituted a restraint to American trade.

EXPORTS.

The quantity of wattle bark exported in 1913 was 145,717,738lb., valued at £309,329. In 1917 the quantity exported was reduced to 93,526,862lb., valued at £225,710, but in 1918 it increased to 107,904,898lb., valued at £287,220. There were no exports of wattle bark extract in 1913, but in 1917 the exports amounted to 2,784,188lb., valued at £49,520., and in 1918 to 8,339,459lb., valued at £124,887. Shortage of freight space has been mainly responsible for the reduction in the quantity of wattle bark exported during the war, but the local consumption has been on a larger scale as a consequence of the increased activities of the South African tanneries.

In 1913 the quantity of whale oil exported was 2,177,537 gallons, valued at £122,692., but in 1917 the exports were reduced to 212,659 gallons, valued at £16,410. In 1918 the quantity exported was 561,577 gallons, valued at £62,316. The large decrease in the exports during the war has been brought about by a combination of circumstances. In the first place, there has been a reduction in the number of firms operating; secondly, the consumption of whale oil by local soap works has largely increased; thirdly, the Government requirements of glycerine for use in the South African explosive factories have been considerable; and, lastly, there are large stocks of whale oil in the country for which permission to export to countries other than the United Kingdom was withheld during the war.

DUTCH CHEMICAL INDUSTRIES.

THE situation of the chemical industries of the Netherlands during the first half of 1919 must be considered unfavourable; in most establishments production has fallen considerably below the output for 1918; some of the largest works have closed down or are only partly in operation. The manufacturers of fertilisers suffer from the competition of imported Chili saltpetre, the stocks of which in the country are in excess of the needs of agriculture. General complaints are heard concerning difficulties of a financial character caused by the interference of the Netherlands Overseas Trust and the Netherlands Export Co., and delays in issuing export licenses. Although various raw materials have been ordered abroad, and there are no official objections to the importation, the manufacturers are still waiting in vain for shipments. The interests of these industries suffer also from the heavy fluctuations of prices which make the customers hesitate in placing orders unless an early delivery is assured. The trade pursues a policy of watchful waiting. Some dealers are still holding large stocks and trying to make sales abroad. The wide differences in the prices at which goods are offered add to the reluctance of the traders to buy.

The low exchange of the mark is of considerable importance at this time. Products of German origin are offered at prices which are noticeably lower than the prices of the raw materials, imported likewise from Germany, which are employed in the manufacture of those same products. Some chemical works have to face additional difficulties, as they are unable to export their products, while the raw materials and intermediate products can be imported from the territories of the Central Empires. For the chemical industries in general the outlook is dark. It is feared that the market may be glutted

with low-priced foreign goods, while the difficulties of exportation make impossible the sale of surplus products abroad, which is a vital question for the establishments concerned.—*U.S. Com. Rep.*

SCIENCE AND INDUSTRY.

METALLURGISTS AND A CHEMICAL BIAS.

THE subject of science and industry was discussed in his presidential address by Mr. F. C. A. H. Lantsberry, M.Sc., F.I.C. (Chief Chemist, Birmingham Small Arms Company, Ltd.), at the opening meeting of the Birmingham Metallurgical Society.

Engineers, industrial chemists, and metallurgists, said Mr. Lantsberry, might follow the noble example of Watt and determine what could be done for the immediate and future benefit of industries, rather than spend the time in preening themselves on the part played by their particular science in the winning of the war. In the past grave charges had been made as to the lack of business capacity on the part of the scientific man. He had upheld the reputed lack of commercial ability on the grounds that the man who possessed the true scientific spirit and business acumen was a *rara avis*, and generally speaking, the man who attempted to be both scientific and commercial became really efficient in neither. The present was an age of specialisation, for not only had a man to choose some particular branch of industry, but he had also to specialise in some section of that industry. The solution of the problem lay in sympathetic co-operation, and sympathetic co-operation was impossible between two experts who were each mutually ignorant of the other's subject. The time had arrived when more attention should, by all parties, be given to the acquisition of such scientific knowledge as might be obtained through the medium of technical societies.

Scientific knowledge would have to be more widespread before industry could take full advantage of the benefits to be derived from the application of scientific methods. The bulk of our large manufacturers had appreciated the value of scientific assistance to the extent of providing their works with well-equipped laboratories, but the efforts of those laboratories were hampered, and, in some cases, seriously hindered, by lack of appreciation of science on the part of the men with whom they had to deal. For the same reason other manufacturers who were in dire need of the assistance of a well-equipped laboratory hesitated to call in the assistance of investigators trained to work along proper lines.

When industrial conditions became normal, industry would have sore need of men with adequate scientific training. He was aware that at the present time men with high scientific credentials experienced difficulties in finding employment in their proper sphere, but he was convinced that this was a direct outcome of the unsettled condition of the country, which was not rapidly becoming "normalised."

The first essential in the training of a technical investigator was, Mr. Lantsberry insisted, that he should have a thorough groundwork in the fundamental principles of his own particular and allied sciences. He had known industrial chemists and engineers to make good metallurgists; but at the same time he was convinced that the best metallurgists had a strong chemical bias in their initial training, for chemistry was the subject *par excellence* for developing attention to detailed observation of phenomena.

LOW-TEMPERATURE CARBONISATION.

AT a meeting of the Scottish Junior Gas Association (Eastern Section) at Edinburgh, on Saturday last, a paper on "Low-Temperature Carbonisation" (an account of which appears in the current issue of the *Gas Journal*), was contributed by Mr. R. M'Laurin, the author dealing particularly with the low-temperature carbonisation process which bears his name. This process, he said, so far as he was aware, was the only true low-temperature process.

Dealing with the yields of gas in the various carbonisation processes, the author said that on a calorific basis one might be fairly safe in allowing for 6,000,000 B.Th.U. from high-temperature carbonisation, 4,500,000 B.Th.U. from semi-low-temperature carbonisation, and 2,500,000 B.Th.U. from low-temperature carbonisation. That is only when taking account of the gas evolved from coal on carbonisation. The total volume of unsaturated hydrocarbons escaping in the gas in high and semi-low-temperature processes per ton of coal is about the same; but in a true low-temperature distillation, they are only about one-sixth of the volume. The methane from high-temperature carbonisation is slightly greater in volume per ton of coal than for semi-low-temperature processes described. The high claims of the semi-low-temperature processes rest on the quality of the coke which can undoubtedly be produced. The weakness lies in the difficulty of making it continuously of uniform quality capable of standing transit. The smokeless fuel produced in the M'Laurin low-temperature process cannot correctly be termed a low-temperature product, nor even a semi-low-temperature product. It can only be correctly described as a semi-high-temperature product; for it has passed down through the producer zone, possibly reaching a temperature little short of that existing in a steamed vertical. The M'Laurin process, with its high-temperature coke, is more likely to prove a rival to the coke-oven than to the vertical retort. In many ways it resembles an elongated bee-hive oven with a by-product recovery plant installed. With the plant installed at Port Dundas, with its water-seal below, we obtained a smokeless fuel which occasionally sparked very badly when placed on a fire; and this difficulty could not be overcome without tearing down the whole of the plant. This, during the war, was out of the question. A smaller unit has been erected at Stirling, to obviate the necessity of wetting the hot fuel; and this has proved effective. The fuel produced in this is now thoroughly satisfactory in every way. In this plant we can at will produce smokeless fuel and metallurgical coke.

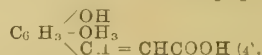
The sulphate of ammonia is the next most valuable constituent. The high-temperature liquors, besides their ammonia, contain cyanides, ferrocyanides, sulphocyanides, etc., and some phenolic bodies, for the most part unexamined, and which colour the spent liquors usually a reddish brown. A very fair average yield per ton of coal is 26lb. of sulphate of ammonia. For semi-low-temperature processes the yield is only about half the above—viz., 12 to 13lb. The M'Laurin process, so far as ammonia is concerned, is not a true indicator for the yields of low-temperature carbonisation, as the fuel is afterwards subjected to high-temperature and steam in the generator zone of the producer, and the ammonia given off on carbonisation. The yields, therefore, vary according to the time of steaming. Results, however, indicate that we get the ammonia given off on low-temperature carbonisation first, then the ammonia given

off on raising to a higher temperature, and finally a small proportion due to steaming. This proportion rises as the steaming is prolonged. Roughly, you may assume the sulphate of ammonia as running between 26 and 36lb. If the coal is burned to ash, however, it naturally rises even up to 60 or 70lb. per ton of coal; and if we were dealing with coals rich in nitrogen, possibly considerably higher. But this is not the result of low-temperature carbonisation.

The quantity of tar from high-temperature carbonisation varied from 6 to 12 gallons. From similar coals on semi-low-temperature carbonisation they would obtain 14 to 23 gallons, and low-temperature carbonisation would give about the same amount. The quality of the tars was, however, widely different. The high-temperature carbonisation contained the three primary cyclic compounds—benzene, naphthalene, and anthracene. A light naphtha gave benzene, toluene, and xylene. The anthracene oil contained anthracene and phenanthrene, etc. Among the phenolic bodies it contained carbolic, cresylic, xylenols, etc., very little, if any, naphthols, and some pyrocresols. They also contained a relatively small percentage of paraffins, olefines, and terpenes. The pitch contained bitumene and free carbons. The semi-low-temperature tars were reputed to contain paraffin wax, also paraffin olefins, and naphthalenes; and this kind were termed paraffinoids. The compounds were benzene, naphthalene, anthracene, bitumene, and free carbons, and the smallest percentage of carbolic. The true low-temperature oils differed in containing very complex phenols which dried readily on wood, so far as he could gather, differing from any known phenols. Distillation gave a whole series from 190° to 360° C., and the residue was still phenolic. Distillation destroyed the drying properties of these phenols. It had been impossible so far to work out a constitutional formula for any of them, owing to the difficulty of getting pure bodies. The paraffinoid portion contained paraffin waxes with a melting point about 48° C. The mass of the oil, however, was not really paraffinoid or olefines. Such oils would require to have carbon to hydrogen as 10 to 20 and 22, whereas the hydrogen present to 10 of carbon was about 16; and deducting for the paraffin present, it came down to 14. This brought it near to the turpentine or to cymenes. The boiling point of these paraffin oils ran about 360° C.; and it was difficult to find any hydrocarbons on boiling at this temperature. Paraffin was quite evident in the distillation, giving rise to the term paraffinoid. Little residue was left at the finish of the distillation, and what there was, was of a greasy nature. The distillation differed considerably from the original oil, indicating that they had been decomposing in the process. It was evident from this that these oils could not have passed through the regions of high temperature.

In the M'Laurin process the phenolic portion of the oil distilled-out or was washed-down; but on a semi-low-temperature vertical or Del-Monte type of plant, or in a high-temperature vertical or horizontal retort, the outside layer of coal was at 700° or 800° C. before the phenols were being distilled-out. Consequently they had to run the gauntlet of highly-heated carbon layers; and if they escaped destruction here, they had the heated walls of the retort to face before getting into the comparative safety of the draw-off pipe. Assuming that the complex phenolic bodies obtainable from low-temperature carbonisation were given off within the heart of such a piece of coal when it was reaching a temperature round about

360° C., the outer layer of red-hot carbon would not let these pass out with any oxygen attached, if it could help it. Therefore they should expect to find, as the external temperatures maintained increase, a gradual reduction in the complexity of the phenolic bodies and a steady increase in the proportion of hydrocarbons—possibly corresponding to the phenolic bodies deprived of their oxygen. This, he believed, correctly recorded what did happen. True low-temperature tars contained none of the simple aromatic compounds—such as benzene, toluene, naphthalene, anthracene; semi-low-temperature carbonisation contained some traces; but as the polyhydric phenols and complicated drying phenols disappeared, benzene, toluene, naphthalene, anthracene, phenanthrene, etc., appeared in the tar products. It was his opinion, therefore, that the coal itself contained the nuclei from which the cyclic compounds of the high temperature tars were largely made up, and only a small proportion (if any) was due to the condensation of acetylene or other similar unsaturated hydrocarbons. Resins were composed of phenolic compounds combined with complex alcohols or resino tannols. The phenols known were simpler than those they would have to assume as existing in coal; but this was not an unlikely supposition when they considered that some of the resins had sixty carbon atoms in their molecule. The phenolic bodies contained in resins were carboxy phenols such as



umbellic acid. Now when such acids were heated, they readily parted with CO_2 ; and the first gas given off on the low-temperature carbonisation of coal was CO_2 . Further justification for this assumption lay in the fact that some of the phenols extracted from his low-temperature ammonia liquors gave off CO_2 on heating to somewhere about 150° C. It was well known that pyrocatechol and chloroglucic acid were obtainable from the distillation of certain resins. Recent resins gave turpentine on heating a body containing 10 carbon atoms and 16 hydrogen atoms in the molecule. Turpentines readily polymerised; and it did not seem a great stretch of fancy to suggest that terpenic oil obtained by low-temperature distillation was the product of distillation of highly polymerised terpenes in the coal.

In the M'Laurin process, the heating of the coal was so slow and so uniform that the bulk of the lighter oils and gas were away before the softening of the resin began; and this again was so slow that it practically softened and hardened again *in situ* as it were. It was in this way that he accounted for the greater hardness of the high-temperature coke produced in his process. If the temperature was finally raised until the amorphous carbon was altered, then a very hard coke was obtained.

LEGAL INTELLIGENCE.

Chemical Import Restrictions: Application in Test Case.

In the Chancery Division on Tuesday, Mr. R. A. Wright, K.C., on behalf of Messrs. Brown and Forth, chemical manufacturers, London and Manchester, applied to Mr. Justice Younger to fix an early date for the trial without pleadings of their test action against Mr. Buckley, the Manchester Collector of Customs, which raises an important question as to the legality of a Royal Proclamation prohibiting the import of chemicals.

Counsel declared that the case was of the utmost importance not only to the plaintiffs, whose goods had been seized and detained, but also to traders generally. It raised the question whether it was possible to practice Tariff Reform by

Executive Act without express Parliamentary sanction. The plaintiffs had imported a quantity of pyrogallic acid, which was an ordinary commercial article used in photography. It was seized by the Collector of Customs at Manchester under the colour of a proclamation prohibiting the import of chemicals, and that proclamation purported to be issued under Section 43 of the Customs Consolidation Act, 1876. The case for the plaintiffs was that there was no power under the Act to issue such a proclamation or to prohibit the importation of ordinary articles of commerce, and they brought their action for a declaration that the seizure was entirely unauthorised and wrongful. When the matter came before the Vacation Court, Mr. Justice Greer showed considerable sympathy with the plaintiffs, and said he was inclined to think that their construction of the proclamation was right, but he was unable to finally decide so grave a question on an interlocutory application.

The Attorney-General (Sir Gordon Hewart, K.C., M.P.) opposed the application on the ground that every point raised by the plaintiffs could be taken by them on the proceedings already instituted by the Crown for the condemnation of the goods, which was the procedure prescribed by the Statute. If he assented to the application, he would be encouraging the setting-up of an entirely new system of trying revenue cases. The action was also misconceived because it was brought against a subordinate official who could not return the goods if ordered to do so. Under these circumstances he could not assist in expediting the trial of the action.

Mr. Wright urged that there should be a prompt trial. The seizure was made in August.

His Lordship said that in face of the opposition of the Crown he could not insist upon the action being set down for trial without pleadings. The plaintiffs must proceed in the ordinary way with pleadings.

Application to Wind Up Picric-acid Company.

Mr. Justice Astbury, in the Companies Winding-up Court of the Chancery Division, on Tuesday, heard a petition for a compulsory order to wind up Grays Chemical Works, Ltd.

Mr. Lavington, for the petitioner, Mr. G. T. Morgan, said he was a judgment creditor for £109., of which £50. was still owing. He was also a creditor for £75. arrears of salary.

For the company, it was stated by counsel that the whole of the assets were covered by securities held by the bank, and the evidence showed that there was nothing for unsecured creditors unless arrangements were carried through for raising new capital. The company was formed to manufacture picric acid for the Government, and that had now ceased. It was proposed to start another manufacture, for which new plant was needed.

His Lordship adjourned the petition, saying that in the face of the evidence he would not make an order. He wished to see what came of the negotiations that were going on.

OUR BOOK SHELF.

STEREO CHEMISTRY. By Alfred W. Stewart, D.Sc. Second edition. London: Longmans, Green and Co., 12s. 6d. net.

This book (one of the series of text-books of physical chemistry edited by the late Sir William Ramsay, K.C.B., F.R.S.) has achieved a second edition. Amongst the improvements, it will be found that the amount of space previously devoted to steric hindrance has been curtailed and utilised in other directions. A short chapter devoted to the Walden Inversion has been included. Section I., under the general heading, "Stereoisomerism in Carbon Compounds," covers ten chapters; Part II., "Stereoisomerism in Carbon Compounds Without Optical Activity," six chapters; Section II., "Stereochemical Problems Into Which Isomerism Does Not Enter," six chapters. Half this second edition consists of new or rewritten matter.

ELECTRIC SPARK IGNITION. By I. D. Morgan, A.M.I.C.E., A.M.I.E.E. London: Crosby, Lockwood and Son, 8s. 6d. net.

An account of the scientific basis of the subject of electric spark ignition in internal combustion engines, the ground covered being: Gas characteristics, spark characteristics, interaction of spark and gas, spark generator and characteristics. The book represents very useful work, and will be well received.

ITEMS OF INTEREST.

TINPLATE MANUFACTURE IN JAPAN.—It is reported, according to the *Japan Chronicle*, that the Yawata State Steel Works, in Kyushu, have for some time past been carrying on experimental work in the manufacture of tinplate, and the results are so promising that commercial manufacture is soon to be started and the product put on the market.

COLOUR WORKERS' WAGES.—An award has been issued of an arbitration into a claim for an advance of 10s. a week for men and 5s. a week for women engaged in the paint, colour, and varnish manufacturing industry of Great Britain. The court has awarded an advance of 4s. a week to men aged 18 and over, to apply to time workers and piece workers.

ZINC AND ZINC DUST PRICES.—Australian high-grade zinc dust (88-92% metallic zinc) continues very firm at £70. per ton c.i.f. U.K., inquiries being persistent for prompt supplies. The price of Australian electrolytic zinc, containing 99.95% metallic zinc, is unchanged at £42. per ton f.o.b. Australia for direct shipment to New Zealand, India, South Africa and the Far East.

BRUNNER-MOND'S NEW SECRETARY.—Messrs. Brunner, Mond and Co. announce that Captain Duncan Marsh has been appointed by the board of directors as the company's secretary, in succession to Mr. J. H. Gold, who was recently made a director. Before joining the Army Captain Marsh was a solicitor, and during the past few months has filled the position of acting-secretary to the company.

MALAY TIN EXPORTS.—It is reported by official cablegram from Kuala Lumpur that the export of tin from the Federated Malay States in September amounted to 3,161 tons, compared with 2,955 tons in August and 3,166 tons in the corresponding month last year. The total for nine months amounted to 28,261 tons, as against 28,336 tons in the corresponding period last year and 29,572 tons in 1917.

NON-FERROUS MINING.—The Committee appointed by the Board of Trade to consider and report upon non-ferrous mining in the United Kingdom held its first meeting after the recess on Monday, under the chairmanship of Mr. H. B. Betterton, M.P. It has decided to deal in the first instance with tin mining, and will proceed forthwith to take evidence. Subsequently the Committee will take up the question of zinc and lead mining.

CORROSION OF STEEL.—Steel is given resistance to rusting to an important degree by copper in amounts usually reported as only traces. In an investigation reported by D. M. Buck to the American Society for Testing Materials, increasing the proportion of copper from 0.01 to 0.03 per cent. decreased the corrosion by 30 to 40 per cent.; and with 0.15 per cent. of copper protection was given even to steel having a considerable excess of sulphur.

CHEMICAL WORKERS' WAGES.—An arbitration took place at Old Palace Yard, Westminster, on Monday afternoon on a claim by the Amalgamated Society of Pharmacists, Drug and Chemical Workers, for a general increase of wages based on various rates according to grade, skill and ability for men and women employed in the drug and fine chemical manufacturing trades. An application was also made for a reduction of working hours. The Court reserved its award.

CONTROL OF WORLD'S SUPPLY OF VANADIUM.—H.M. Acting Commercial Secretary at Washington says that according to a report published by the Standard Statistics Company, Messrs. J. Leonard Replogle (former Director of Steel Supplies) and Charles M. Schwab have bought the mines in Peru and the mills in Pittsburgh of the American Vanadium Company. This deal involves the control of about 98 per cent. of the vanadium supply of the world. The company, it is stated, will probably be known as the Vanadium Company of America.

INDUSTRIAL LEAGUE.—The annual dinner of the Industrial League will take place at the Connaught Rooms at 7 p.m. on October 22. The Rt. Hon. G. H. Roberts, M.P., President of the Industrial League will preside, and Lt.-Colonel John Ward, C.B., C.M.G., will be the principle guest. Since the last annual meeting the Industrial League has made considerable headway and recently amalgamated with the Industrial Reconstruction Council of which the Rt. Hon. J. H. Whitley, P.C., M.P., is President. A large number of employers from all parts of the kingdom are bringing workmen, shop stewards, foremen and managers to the dinner, and a record gathering is anticipated. The Secretary's address is, 66, Victoria Street, S.W.1.

PERSONAL.—Dr. M. O. Forster, F.R.S., has accepted office as Prime Warden of the City Guild of Dyers.

CUMBERLAND NITROGEN WORKS HELD UP.—At a meeting of the Derwent (Cumberland) Fishery Board on Monday, it was stated that the Nitrogen Products Company, who proposed to establish extensive works at Workington, and take water from the river Derwent, were not proceeding with the works owing to being unable to get a guaranteed coal supply. Mr. F. Hall (Mayor of Workington) read a letter, which stated that the company were not prepared to commit themselves to any expenditure till a thousand tons of coal per shift were guaranteed.

SCOTTISH OILWORKS RESTARTING.—Everything points to several of the Scottish oilworks being restarted at a much earlier date than had been expected. When the retorts at the various works were allowed to cool down it was feared that it might be well into November before work could be resumed. Last week the work of heating the retorts was started at Deans, and it is expected a start with similar operations will take place this week at Seafield. At Addiewell oilworks the candle factory has restarted, and a considerable number of the oil-workers have got employment effecting repairs at the various centres.

SPANISH PRICE OF QUICKSILVER FIXED.—The *Revista de Comercio y Hacienda*, in the issue of August 16 last, publishes a statement that the administration council of the Almaden mines at its session on August 12, taking into account the quotations of quicksilver in the London markets during the month of July and the average rate of exchange of the pound sterling, decided that the price for national industries of a flask of quicksilver of 34.507 kilos. (76lb.), effective on that date, shall be 451 pesetas (£17.) if delivery be taken at the mine, or 453 pesetas if placed aboard railway-car at the station of Almadenejas.

SALT, BROMINE, AND CALCIUM CHLORIDE IN THE UNITED STATES.—The quantity of salt produced and sold in the United States in 1918 was 7,238,744 short tons, valued at £5,400,000., an increase of 3.7 per cent. in quantity and 35.1 per cent. in value over the production in 1917. The bromine marketed in 1918 was 1,727,156lb., valued at £194,000., compared with 895,499lb. and £98,000. in 1917—an increase of 93 per cent. in quantity and of 97 per cent. in value. The calcium chloride output was 26,624 short tons, valued at £100,700., against 30,503 tons and £90,300. in 1917—a decrease of 12.7 per cent. in quantity and 11.5 per cent. in value.

ELECTRICAL CONDUCTIVITY OF SALT VAPOURS.—According to G. C. Schmidt, *Mitteilungen des Reichsbundes Deutsche Technik*, the vapours or the volatile halogen salts of cadmium, zinc, ammonium, iron, and aluminium are good conductors of electricity even at relatively low temperatures, whereas the vapours of the halogen salts of mercury, tin, antimony, arsenic, and iodine and other organic substances are insulators. The experiments show that the conductivity increases with time until a maximum is obtained and then falls to a constant value. Further tests, however, show that even at very high temperatures the conductivity of salt vapours is independent of time provided there is sufficient surface-constancy. The apparent inconstancy is caused by the fact that the vapours can only pass into the measuring-chamber gradually and later on the salts get caked together, thus reducing the surface and the rate of evaporation. The vapour density and ionisation also decrease.—*Technical Review*.

EXPLOSIONS.—A fatal still explosion occurred at the works of Messrs. L. B. Holliday and Company Limited, dye-makers, of Deighton, near Huddersfield, on Friday of last week, when the death of a workman and injury to another resulted. The two men—Isaac Brown and Joseph William Cheeseman, were testing the still when the explosion occurred. Brown received such severe injuries that he died almost immediately. Cheeseman, however was not so severely injured, and after treatment at the Royal Infirmary, at Huddersfield, was allowed to go home.—The story of three explosions at the British Cellulose and Chemical Company's Works, two of which were attended with fatal consequences, was told at an inquest at Derby on Monday on Arthur Dewdeney, engineer superintendent. The evidence showed that the Government during the war started a new process at the factory for the manufacture of acetic acid. Despite precautions, copper acetylide accumulated in the plant, and exploded, the actual cause being undetermined. The company undertook to adopt further safeguards, and the jury exonerated the works' chemists from blame.

BELGIAN PROHIBITION ON WHITE PHOSPHORUS MATCHES.—The Board of Trade are in receipt, through the Foreign Office, of copy of a Belgian Law, dated August 30, prohibiting the manufacture, importation, sale, and holding for sale, of matches containing white phosphorus. The Law authorises the Belgian Government to adhere to the International Convention regarding the Prohibition of the Use of White Phosphorus in Match Manufacture, signed at Berne on September 26, 1906. The provisions of the Law are to become effective six months after the date of publication, except as regards the prohibition relative to the sale and offering for sale of white phosphorus matches, which is not to become operative until twelve months after publication.

ALLEGED NEW MOTOR FUEL.—The Nottingham correspondent of the *Times* reports tests on Saturday last with a new motor fuel, the invention of a South American named Andrade. The test took place in the grounds of Alderman Ball, who has entered into a provisional arrangement with the inventor to secure the European rights. Mr. Ball states that a car travelled over thirty miles on one gallon, and that if Andrade's assertions are true a gallon can be manufactured for five-pence. The *Times* is informed that the inventor has been in this country for several weeks. Experiments have taken place in the presence of an experienced motor expert. It is stated that the inventor claims that by mixing certain chemicals with pure water a liquid is produced capable of providing motive power. Chemicals are introduced in the form of powders, and minor experiments carried out are reported to have proved very encouraging.

DUTY-FREE ALCOHOL IN BELGIUM.—In virtue of a Belgian Royal Decree of June 15, 1913, total exemption from excise duty was accorded in respect of alcohol destined for the manufacture of acetic or sulphuric ether, artificial silk, pure resin (for sale), and of alcohol employed to produce motive power; and partial exemption was accorded in respect of alcohol used for certain other specified industrial purposes. The excise duty then existing was 200 francs per hectolitre of alcohol of 50° Gay-Lussac at 15° C.; and the partial exemptions referred to were at the rates of 164, 110, and 190 francs per hectolitre, according to the use to which the alcohol was put. The excise duty having now been raised to 800 francs per hectolitre, the decree of June 15, 1913, has been superseded by a decree of September 4, 1919, which, however, only differs from the earlier decree in that the partial exemptions are now at the rates of 764, 770, and 790 francs per hectolitre respectively.

EMPIRE SUGAR RESEARCH.—The formation is announced of the British Empire Sugar Research Association with the object of establishing, in co-operation with the Government Department of Scientific and Industrial Research, an Empire scheme for the scientific investigation, either by its own officers or by universities, technical schools, and other institutions, of the problems arising in the sugar industry, and to encourage and improve the technical education of persons who are or may be engaged in the industry. The scope of the work to be done by the Association will include the investigation of problems arising in all branches of the sugar industry, including the improvement of the sugar-cane and sugar-beet, the methods of extracting the sweetening matter, the processes of refining, and the best methods for the use of sugar employed by manufacturers using sugar as one of their raw materials, as well as the discovery of the best uses of the after-products of both factory and refinery.

ELECTRIC RESISTANCE HEAT-TREATING FURNACE.—Two forms of a new type of electric resistance furnace have been developed by the General Electric Co., U.S.A., viz., a high-temperature (1,000° C.) furnace used in tempering and hardening gun forgings, and a low-temperature furnace (up to 510° C.) used for shrinking jackets on a variety of cores. According to the *Technical Review*, the furnace is built in units which may be fitted above one another to give a greater depth of heating surface. Each unit of the low-temperature furnace consists of a cylindrical casing with top and bottom castings and a heating unit of calorite ribbon mounted on, but insulated from, a cast-iron supporting plate. A one-section furnace is usually provided with automatic control. The construction of the vertical high temperature furnace involves the use of a heavy calorite ribbon supported on insulators embedded in the furnace wall of refractory bricks, so as to eliminate the inherent weakness of metal supports at high temperatures. Each section is controlled independently and automatically. The advantages claimed for this type of furnace include minimum temperature variation, uniform and maximum rate of heating, and the elimination of scale due to oxidation.

ACTION OF MURIATIC ACID ON MANILA ROPE.—At the instigation of the National Safety Council, an investigation has been undertaken by the U.S. Bureau of Standards to determine the action of muriatic acid on manila rope. The effect of this acid or its fumes on rope of this kind is a great menace, as the acid weakens the rope seriously without any superficial trace of the action being noticeable to the eye. When rope is exposed to this acid—as, for instance, when it is used in blocks and falls of swinging staging when washing down brickwork, etc.—many serious accidents have resulted, some of which have been fatal, owing to the fact that the rope has been weakened through contact with this acid or its fumes. The only practical remedy suggested is that of treatment of manila rope before using with some acid-resisting compound. An attempt will be made in this investigation to determine by testing the actual effect of the acid, and ascertain if the deterioration can be remedied by impregnating the rope with a certain compound which the National Safety Council advances as having been effective in protecting machinery and equipment from acid corrosion.

OBITUARY.—The *Times* announces the death of Mr. John Charles Umney, F.C.R., a leading authority on drugs, medicinal chemicals, and essential oils, which occurred on Thursday of last week at Berea Court, Yapton, Arundel. Mr. Umney, who was born in 1868, had for many years taken a leading part in the standardisation of these articles, and was largely responsible for the standards for medicines laid down by the Local Government Board, Ireland. He was a member of the Pharmaceutical Committee of Reference for the British Pharmacopœia. He was founder and editor of the *Perfumery and Essential Oil Record*, through which journal he stimulated aromatic plant cultivation and oil distilling in many parts of the world. His numerous publications included "Essential Oils in Relation to the British Pharmacopœia and Trade." He was a past president of the British Pharmaceutical Conference and of the Wholesale Drug Club. He had done valuable service as chairman of the Chemical Trade Section and the Toilet Soap Section of the London Chamber of Commerce. He had also been chairman of the Proprietary Articles Section of the Chamber and chairman of the Proprietary Articles Trade Association. In 1912 he gave important evidence before the Select Committee of the House of Commons on Patent and Proprietary Medicines.—Mr. Hugh S. Walker, a member of the firm of W. G. Walker and Sons, chemical manufacturers and tar distillers, Hawkhill Chemical Works, Ayr, died last week.

CORRESPONDENCE.

* * * We do not hold ourselves responsible for the opinions expressed by our correspondents.

The British Chemical Trade Association.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—If your correspondent "Dealer" (in your issue of October 11) has the courage to abandon his cloak of anonymity, and will apply to this office, I shall be very pleased to show him a list of members and also satisfy him that the Board of Trade recognises us as the Chemical Merchants' Association.

Our membership roll contains some of the most respected names in the trade—to use "Dealer's" own expression, "recognised dealers in chemicals before the war,"—and our organisation welcomes the fullest inquiry from respectable and responsible parties.—Yours, etc.,

THE BRITISH CHEMICAL TRADE ASSOCIATION.

O. F. C. BROMFIELD,

Assistant Secretary.

80, Fenchurch Street, London, E.C.3.
October 14, 1919.

COMING EVENTS.

Institution of Petroleum Technologists.—Meeting, Tuesday, October 21, at 5.30 p.m., at the House of the Royal Society of Arts, John Street, Adelphi, W.C. 2. Paper: "Some Laboratory Tests on Mineral Oils," by Arnold Philip. B.Sc., A.R.S.M., F.I.C.

College of Technology, Manchester.—Tuesday, October 21, at 4.30 p.m. Lecture by Mr. J. Allan on "Site, Layout, and Construction of Chemical Works."

Society of Chemical Industry, Birmingham and Midland Section.—Meeting, University Buildings, Edmund Street, Birmingham, on Thursday, October 23. Paper by Mr. E. C. Rossiter, on "Potash Production."

REPORTS OF COMPANIES.

American Cyanamid Company.

The report for the year to June 30 last states that operation of the cyanamide plant at Niagara Falls has been at full capacity for the entire year, and a new record has been attained from the standpoint of material produced. Improvements now being installed at this plant will give still larger production and a greater manufacturing efficiency. Under the contract between the company and the United States Government practically the entire output of cyanamide was delivered in the form of aqua ammonia. Coincident with the signing of the armistice, operations under this contract were suspended. The manufacture of ammo-phos and sulphate of ammonia was promptly resumed at the New Jersey plant, and a foreign market immediately developed for all material produced. The location of the ammo-phos works in New York Harbour has proved advantageous both in the manufacture and distribution of ammo-phos and has consistently obtained for the company a premium export price for sulphate of ammonia. Operations of the phosphate mines were on the basis of full capacity until the beginning of last May when all work was suspended by a walk out of employees. The strike was general throughout the district, and affected all mining companies. Operations have since been resumed and are now approaching normal capacity. This company has acquired membership in the Florida Pebble Phosphate Export Association, organised by the leading pebble phosphate mining companies, under the so-called "Webb Act" for the promotion of foreign trade. The outlook is promising for a profitable export business in phosphate rock during the next two years. Further improvements have been made in the manufacture of aero brand cyanide from cyanamide, and the market for this product has widened during the year. The work of Air Nitrates Corporation, a subsidiary, formed to act as agent of the United States in the construction and operation of plants for the manufacture of ammonium nitrate by way of the cyanamide processes, was vigorously prosecuted. The plant at Muscle Shoals, on the Tennessee River, for which ground was broken on February 16, 1918, began manufacture on October 26 following. In quality of product and efficiency of operation, the results obtained at this plant were from the start most gratifying, and are the more remarkable in view of the rapidity of its construction. Manufacture at Muscle Shoals and the construction of two additional plants—one at Toledo, Ohio, and the other near Cincinnati, Ohio—both well advanced, were discontinued by order of the Government soon after the signing of the Armistice. The total sales for the fiscal year have amounted to \$6,205,386, as compared with a corresponding total of \$6,194,668 for the preceding fiscal year. Active trade relations were suspended in the summer of 1917, and until December, 1918, because of the Government contracts in hand during that period, but this company has in hand as at June 30, 1919, contracts for delivery prior to June 30, 1920, of various products estimated to have a sales value of \$2,559,186.

Ducktown Sulphur, Copper, and Iron Company, Ltd.

At the annual meeting held in London on Thursday (October 9), Mr. J. G. Gordon, chairman, said: While the development work at the mines has been satisfactory, so far as a largely increased tonnage is concerned, the assays show that the copper content of these large ore bodies is considerably lower than the ore we have hitherto treated. We therefore came to the conclusion that we would have to considerably modify our present process for treating the ore, and, after careful experiments decided that a process on which we have been experimenting for some years past was well adapted for this purpose. We have taken all the necessary preliminary steps for installing such a plant, which should during the year 1920 enable us to treat about 800 tons of ore per day on a seven-day week. This will be nearly double the output we have hitherto made, and will largely reduce all the overhead costs. Careful calculations made on the basis of our long experience in mining and smelting, and on the experiments I have already alluded to, carried on for some years, and our knowledge of these processes carried out elsewhere, go to show that even with the lower copper content, the profits from the copper alone will be somewhat greater per ton of ore than those we have hitherto obtained. The general opinion of copper people in the United States when I left was that, owing to present conditions of labour and essential materials, while in pre-war days the normal price of copper was regarded as about 14 cents per pound of copper, 20 cents per pound

of copper is now regarded as the equivalent of that price; therefore we should now, with 20-cent copper, make a larger profit per ton of ore treated than we could formerly calculate on at 14 cents per pound of copper, and added to this, as I have already mentioned, we shall be treating approximately double the quantity, so that the profits in future should be materially increased. Since 1910, we have made a small profit out of the sulphur contained in the ore, which was converted into sulphuric acid. This profit was not taken into account in the calculations I have just alluded to, but here, also, we are hopeful that by improved methods, and especially by the better co-ordination of the smelting and acid plants, decidedly better results will be obtained in the future. A further encouraging feature, in my opinion, is that by the new process a considerable amount of the iron contained in the ore will be recovered in such a state that it can be made into a saleable product. Hitherto all the iron in the ore has gone into the slag, and could only be so disposed of, which added little, if anything, to our revenues.

The reports and accounts were unanimously adopted.

Pena Copper Mines, Ltd

The report for the year to December 31 last states that the total amount spent on new railway and rolling stock up to that date is £193,656. The total amount of depreciation written off to end of 1918 is £27,689, leaving a balance of £165,967. The value of buildings, fixed plant, old branch railway, etc., after allowing for depreciation, stands at £52,156. The quantity of overburden removed during the year was 21,349 cubic metres, as compared with 30,320 cubic metres in the previous year. The amount at the debit of this account is now £72,950. The total output of ore from the mine was 91,827 tons, against 160,121 tons in 1917. The output was dealt with as follows: Ore added to the heaps for leaching, 49,493; ore for export, 42,334 tons. The total value of the mineral stocks was £124,082, as against £107,010 at the beginning of the year. The production of copper precipitate totalled 554 tons, against 587 tons in 1917. The average price of best selected copper was £126. 5s. in 1918, as against £137. 14s. 11d. in 1917. The shipments of ore totalled 72,023 tons, against 145,120 in 1917. The profit on sales of produce, plus interest, registration fees, etc., after charging £7,278. for depreciation, amounted to £20,926. London administration expenses, income-tax, and French dues and charges were £17,495, and interest upon loans, etc., £10,385.—together, £27,880. Deducting the gross profit above mentioned, £20,926, there is a loss on the year's working of £6,954.; to this must be added amounts advanced to the Cala Railway Co., now written off, £12,303., making a total loss for the year of £19,257. Deducting this from the balance brought in from last year—viz., £83,038—there remains a balance to be carried forward of £63,781.

A. and F. Pears, Ltd.

The net profits for the year ended June 30 were £103,896., and £16,406. was brought forward. A dividend of 20 per cent. is proposed, adding £5,000. to the reserve, and carrying forward £14,902. The company's net profits were £91,438. for 1917-18, £90,738. for 1916-17, £90,427. for 1915-16, and £78,812. for 1914-15, and the proportions were in all respects similar to those for the past year, except that £10,000. was reserved in 1915, when £30,003. was carried over.

Wilkie and Soames, Ltd.

The report for the year to June 28 last states that the net profit, after providing for depreciation, amounts to £24,181., and £19,464. was brought in, making 30 per cent. for the year, carrying forward £21,145., subject to excess profits duty (if any).

British Platinum and Gold Corporation, Ltd.

The following circular has been issued to the shareholders. "I am instructed to inform you that a cablegram to the following effect has been received from our managing director, Mr. Thos. J. Ive, who has recently visited this Corporation's properties in Columbia:—I have entered into an agreement with Messrs. Pugliese, Figerio and Mayolo by which the British Platinum and Gold Corporation secures control of all their platinum and gold bearing properties in the Choco district, on very favourable terms to the British Platinum and Gold Corporation, Limited. One valuable property is now ready for a dredger. This property is estimated to contain 5,000,000 cubic yards, having a value of 2s. per cubic yard. This value is calculated on a basis of 12lb. per oz. crude plati-

num, being the same basis on which the British Platinum and Gold Corporation, Limited, based their calculations for their own properties. Full instructions have been given by me to the consulting engineers of the British Platinum and Gold Corporation, Limited (Messrs. Inder, Henderson and Dixon), for the construction of a dredger as early as possible. The terms of the agreement entered into with Messrs. Pugliese, Frigerio and Mayolo involve no payment in cash, but provide for a division of profits after paying working expenses and providing the necessary funds in repayment of cost of dredger and equipment. Mr. Mayolo, of Messrs. Pugliese, Frigerio and Mayolo, joins the board of directors of the British Platinum and Gold Corporation, Ltd."

DIVIDENDS.

BORAX CONSOLIDATED, LTD.—A dividend of 6 per cent. per annum, less tax, on preferred ordinary in respect of half-year ending September 30, 1919.

VIRGINIA CAROLINA CHEMICAL COMPANY.—A quarterly dividend of 2 per cent. per annum (2 dols. per share) on preferred, and dividend of 1 dol. per share (1 p.c.), on common.

NEW COMPANIES.

British Ulco Company, Ltd.—Capital £40,000., £1. shares. Agreement with United Lead Company, the Broken Hill Associated Smelters' Production, Ltd., Messrs. Locke, Lancaster and W. W. and R. Johnson and Sons, Ltd., and Cookson and Co., Ltd. Buyers, sellers, and manufacturers of and dealers in ores, minerals, and mineral substances of all kinds, including alloys. Solicitors: Broad and Co., 1, Great Winchester Street, E.C.

Federation of Bone Users and Allied Trades, Ltd.—Registered September 17 as a company limited by guarantee, with 200 members, each liable for £5. in the event of winding up. Objects: To promote, develop, and protect the interests of the glue, bone fertilisers, fats, bone products, etc., trades. The management is vested in a general council, the first members of which are R. Duncalfe, A. Macdonald, H. J. Cotes, G. Jones, J. S. Hegarty, E. H. Quibell, W. S. Corder, J. W. Stevens, E. R. Brown, and T. Somerville. Solicitors: Coward and Hawksley, Sons and Chance, 30, Mincing Lane, E.C.

Martin's Oilfields of Madagascar (Parent) Company, Ltd.—Capital £10,000., £1. shares. Secretary: E. S. G. Greene, Clifford Chambers, 10, New Bond Street, W.

South Africa Carbide and By-products Company, Ltd.—Capital £307,500., in 300,000 shares of £1. each and 150,000 shares of 1s. each. Registered office: 2, Broad Street Buildings, E.C.

Archibald Stevenson and Co., Ltd.—Private company. Capital £30,000., £1. shares. Manufacturers of soap, lubricating oils, etc. Office: 23, Philpot Lane, E.C.

Charles Knott, Ltd.—Private company. Capital £3,000., £1. shares. Importers and exporters of general produce and raw materials of all kinds, dealers in chemicals, etc. Registered office: 44, Bedford Row, W.C. 1.

Derby Fertilisers, Ltd.—Private company. Manufacturing chemists, manufacturers of, agents for, and dealers in chemical and other manures, fertilisers, etc. Registered office: 3, Market Place, Derby.

Donald Campbell and Co., Ltd.—Private company. Capital £500,000., £1. shares (499,700 ordinary and 300 employees'). Wax and oil merchants, dealers in Eastern and general produce, etc. Registered office: 10, St. Mary Axe, E.C.

Hirst and Co., Ltd.—Private company. Capital £1,000., £1. shares (700 preference). Soap manufacturers, pharmaceutical, manufacturing, and general chemists and druggists, etc. Registered office: The Soap Works, Dronfield, Derby.

Midland Metallurgical, Ltd.—Private company. Capital £1,000., £1. shares. Manufacturers, importers, and exporters of and dealers in metals, ores, etc. Office: Norfolk House, 36, Cannon Street, Birmingham.

Shotter and Dare-Mordle, Ltd.—Private company. Capital £50,000., £1. shares. Object: To acquire a freehold factory at Perry Barr, Birmingham, with certain starch manufacturers' stock-in-trade and plant and trade-marks, an invention of a starch drying machine, etc., belonging to F. B. Shotter and L. Dare-Mordle, etc. Registered office: Wellhead Works, Aldridge Road, Perry Barr, Birmingham.

Premier Oil Company, Ltd.—Capital £3,750,000., 15s. shares. Office: 2, Gresham Buildings, Basinghall Street, E.C.

Cement Developments, Ltd.—Private company. Capital £1,000., £1. shares. Office: 1, Broad Street Place, E.C.

John Wheeldon and Co., Ltd.—Private company. Capital £5,000., £1. shares. Objects: To take over the business of oil refiners, tallow melters, etc., carried on by Lillie Wheeldon at 90, Eyre Lane, Sheffield, as "John Wheeldon and Co." and "John Thomas and Co." Registered office: 90, Eyre Lane, Sheffield.

Metal Deposition, Ltd.—Private company. Capital £5,000., in 4,000 preference shares of £1. and 20,000 deferred ordinary shares of 1s. each. Object: To acquire, exploit, and turn to account any process for the deposition of metal on aluminium or other substances, etc. Registered office: 52, Charing Cross, Whitehall, S.W. 1.

Richards Turpin (Minerals), Ltd.—Private company. Capital £25,000., £1. shares. Objects: To take over the business of merchants, shipowners, and ore importers carried on at Gloucester House, Swansea, and elsewhere as "William Turpin and Co." Registered office: "Gloucester House," Gloucester Place, Swansea.

J. W. Kitson and Co., Ltd.—Private company. Capital £17,500., in 16,000 10 per cent. preference shares of £1. each and 30,000 ordinary shares of 1s. each. Boiler and steam-pipe coverers and manufacturers of Kitson's Eureka non-conducting compositions. Registered office: 21, Brunswick Street, Blackwall, Poplar, E.

Vulcan Trading Corporation, Ltd.—Private company. Capital £1,010., in 10 preference shares of £100. each and 10 ordinary shares of £1. each. Object: To carry on the business of manufacturers of and dealers in iron, steel, metals, machinery, chemicals, materials and goods of all kinds, shipowners, brokers, importers, exporters, and producers of raw and manufactured products, metals, machinery, minerals, chemicals, manures, oils, fats, etc. Registered office: 35, New Broad Street, E.C.

Walter Everitt, Ltd.—Private company. Capital £10,000., £1. shares. Object: To take over the business of an analyst and manufacturing chemist formerly carried on by W. Everitt and Co., Ltd., at Norwood Wharf, Southall. Solicitors: J. B. and F. Purchase, 14, Regent Street, S.W. 1.

Fine Chemicals, Ltd.—Private company. Capital £25,000., £1. shares (15,000 ordinary and 10,000 7 per cent. cumulative preference). Object: To take over the business of wholesale and retail chemists carried on by the Apothecaries Hall, 40, Mary Street, Dublin. Registered office: 40, Mary Street, Dublin.

Goonvean China Clay and Stone Company, Ltd.—Private company. Capital £150,000., £1. shares. Registered office: 3, Bodmin Road, St. Austell, Cornwall.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

(SPECIALLY CONTRIBUTED.)

Prospects are brighter this week, though there is not yet a full return to normal conditions. There is, however, an under-current of uneasiness on account of the diminishing demand for iron. There should be no decrease in output for ten or twelve weeks yet, production to the end of the year having been sold long ago; but there is not now much new business being booked, and there is not a strong anticipation of trade reviving until the steelworks can secure a larger share of Continental rail orders. At present the 380 by-product coke ovens in this district are not working at more than half their capacity, and as a result more small coal has been shipped to Ireland than at any time since August of 1914. With twenty-five furnaces in draught between Workington and Carnforth, however, a substantial increase in the production of coke will be necessary. East Coast coke supplies have already risen, the consumption between Millom and Carnforth having mounted this week to 12,000 tons, and in West Cumberland to 8,000 tons. By-product output has of course suffered a reduction. There is still a very weak demand for acids, and as a result a portion of the plant of the chemical works on this coast is idle. Benzole is fully absorbed. There is a brisk inquiry for sulphate of ammonia for home users, and pitch is fairly strong. Cresote is duller.

FERTILISER NEWS.

(SPECIALLY CONTRIBUTED.)

Nitrate of Soda.—Last month's shipments from Chili were again on a very moderate scale—in fact, smaller than those in August, the total being in round figures 44,000 tons, of which 20,000 tons went to Europe and 24,000 tons to the United States and other parts. There was also a further slight falling-off in the production at 103,000 tons, but an increase of 59,000 tons in the stocks on the Coast to 1,712,000 tons; this quantity is more than double that on hand a twelvemonth ago, and compares with 754,000 tons on October 1, 1913, before the dislocation of the industry by the European War. There were then 171,000 tons "loading" and 340,000 tons "afloat" for Europe, whereas the corresponding figures were only 28,000 and 30,000 tons on the 1st inst., the present European stocks being as well unusually small. On the other hand, those in Chili, it will be seen, exceed by about one million tons the quantity available in normal times, and the disposal of this surplus prevents a serious problem in view of the scarcity of tonnage. As regards the sale itself of the nitrate, a good beginning has been made, the Producers' Association having placed at 9s. 4d. for November and 9s. 6d. for January-February delivery a further 50,000 tons, making 800,000 tons since the middle of September. Not only this, but offers for other large quantities on similar terms are said to have been refused, and a further advance in the "fixed" prices is on the tapis, although second-hand parcels are freely offered at less money. The buyers of all this nitrate have presumably secured the necessary tonnage, but it must have been at rates rendering the Chilean fertiliser an *article de base* when 250s. per ton freight is paid for a steamer carrying 12,000 tons November-December loading to the Continent. The British farmer so far takes no interest in nitrate of soda, but holders of nitrate shares are once more hoist into the seventh heaven!

Sulphate of Ammonia.—Trading in this fertiliser shows a fair undertone, but is not particularly active. The home price is rising slightly month by month in accordance with the control arrangements. This, apparently, offends some consumers, although it can easily be shown that they would have to pay a good deal more per ton in a free and unrestricted market. It is believed that the American producers expect to figure larger and larger in the outside markets formerly supplied from this country, but all that remains to be seen. News from the Pacific Coast districts of the United States says that sulphate of ammonia for later delivery is being sold at a reduced price, but spot stocks command a premium owing to the scarcity of local supplies. On the coast the delivered price is believed to have dropped in sympathy with nitrates, but it is doubted there whether it will go any lower. Autumn business has pretty generally been adjusted on a basis of the new nitrate and sulphate of ammonia costs, and this would seem to point to a certain expected stability in the market quotations. That there will be a popular demand for sulphate of ammonia in the far West seems assured. Effective publicity work has created a special interest in this fertiliser the last few years. At the 58th annual convention of the American Chemical Society many interesting papers were read in the Fertiliser Division. In one of these the writer found that the tendency of ammonium sulphate to cake, even after drying and screening, was due to pyridine sulphate, and was overcome by treating the dry ammonium sulphate with ammonia gas, thus setting free the pyridine and permitting its removal. The exports of sulphate of ammonia from Great Britain for the first nine months of this year are returned at 56,318 tons, as against only 12,370 tons in the corresponding nine months of last year and 51,213 tons in the corresponding period of 1917. The biggest buyer this year has been Japan, with 18,410 tons, after which comes France with 10,558 tons. The third place is occupied by the Dutch East Indies with 7,938 tons, and the fourth by Spain and the Canary Islands with 4,820 tons.

Fish Guano.—Developments are promised in the utilisation of fish wastes in this country. We read that one of the largest plants on the East Coast is now doubling its capacity in order to raise its output from 20 tons to 40 tons per 24 hours, or somewhere about 12,000 tons of fish guano per annum. With the new process which is now being used the ammonia value is increased from $7\frac{1}{4}$ per cent. to 12 per cent., and it is pointed out that every rise of 1 per cent. in the ammonia content is worth about twelve times as much as the improvement of the phosphatic content to a corresponding degree.

Nitrate of Lime.—Despite its widely recognised efficiency, nitrate of lime in pre-war days was used only in very limited quantities as a fertiliser in this country. The handicap from which it suffered was its proportion of dust, which accentuated its natural tendency to absorb moisture from the air and become wet and sticky before the operation of sowing could be completed. It is interesting to note, therefore, that the manufacturers have now succeeded in granulating nitrate of lime and evolving practically a dust-free product, which can be conveniently and efficiently spread either by hand or machine. The removal of the sowing difficulty must be regarded as an important advance towards the wider appreciation and adoption in this country of this particular form of synthetic nitrate for fertilising purposes.

Bone Meals, Blood, Etc.—Bone meals and allied substances are still in very short supply. Prices are firm, but at the moment there is little doing on agricultural account. In River Plate tankage there is practically nothing offering, and the nominal value is 30s. per unit of ammonia. The same remark applies to dried blood, with very little offered, the nominal price being 30s. to 32s. 6d. At times a good inquiry is reported to have been manifested for meat meal with values as above.

German Fertiliser Difficulties.—The *Frankfurter Zeitung* has news from the Central Society for the Supply of Agricultural Requirements that the situation in respect to supplies of fertiliser is a very poor one. For the present harvest, in consequence of the scarcity of coal, which prevents the nitrogen-producing factories from reaching their possible production, the quantities of available nitrates are remarkably reduced. Superphosphate also is only to be had in very small quantities. The greater portion of the goods produced is delivered in the form of a mixture of ammonia-superphosphate. With regard to the supply of potash salts, the delivery facilities have considerably worsened. Of kainit and chloride of potash, some of the orders given in the first half of last year are still unexecuted. The Potash Syndicate does not grant any preferences. It is not yet decided whether, and in what respect, basic slag will be available for this year. Generally, a very great scarcity is in view for the whole series of fertilisers for the beginning of the coming year.

Alsatian Potash.—The deliveries of Alsatian potash salts in the United Kingdom during August and September were 2,576 tons. Shipments for the week ending October 11 were 1,928 tons of sylvinit, 14 per cent., (French kainit). Current quotations for Alsatian potash salts are as follows: Sylvinit, 14 per cent., £7. per ton; sylvinit, 20 per cent., £8. 7s. 6d. per ton; and muriate of potash, 80 per cent., £19. 7s. 6d. per ton.

SOUTH WALES NOTES.

(SPECIALLY CONTRIBUTED.)

It was not until the commencement of the week that the whole of the tinplate mills were fully operating, owing to the difficulty of transport of coal and steel bars. The outputs show a gradual increase over those of a few months ago, but they are still below the demand for all kinds of plates. The largest cargo ever loaded at Swansea left that port for Japan with 10,000 tons of tinplates and galvanised sheets.

The patent-fuel trade was not so seriously affected by the railway strike, and many of the factories were enabled to carry on without interruption owing to the stocks of small coal on hand. Messrs. T. P. Rose Richards and Co. have acquired a site from the Swansea Harbour Commissioners for the erection of a new fuel factory, and a lease for 99 years has been agreed to.

As the demand for coke keeps very active, the by-product ovens are yielding good supplies of ammonia, benzole, etc. A few more ovens are now in operation, and with the commencement of next year it is anticipated that many more will be ready. As regards sulphate of ammonia, there is a steady trade, and as stocks are low there is no indication that any vigorous export business will be seen during the next three months. Home inquiries are numerous, but as yet no volume of trade is being booked, farmers withholding their orders, but manufacturers in South Wales are confident that there will be a very active season for this fertiliser.

There is much activity in the basic slag trade, but the production of this manure has not increased much since the cessation of hostilities. Stocks are very low; in fact in some instances there is a difficulty in executing orders.

IMPORTS OF CHEMICALS AND ALLIED PRODUCTS.

THE following returns, which are taken from the import statistics of the United Kingdom, give the amount and value of chemicals and allied products imported during the month ending Sept. 30th, 1919, as compared with Sept., 1918.

ARTICLES.	QUANTITIES.		VALUE.		ARTICLES.	QUANTITIES.		VALUE.	
	Month ended		Month ended			Month ended		Month ended	
	1919.	1918.	1919.	1918.		1919.	1918.	1919.	1918.
CHEMICALS :			£	£	MANURES :			£	£
ACETIC ACID other than for table use cwt.	4,601	7,592	14,426	38,892	Basic Slag..... tons			—	—
Bleaching Materials,,					Bones for Manure (whether burnt or not)	555	418	6,788	10,829
Boracite, Borate of Lime, Borate of Magnesium, and Borax	34,576	8,675	40,876	12,177	Guano	—	—	—	—
Brimstone.....	986	102,040	1,152	84,532	Nitrate of Soda (Cubic Nitre) ..			—	—
Carbide of Calcium ..	31,164	16,161	35,666	22,824	Phosphate of Lime and Rock Phosphate	22,423	29,061	67,716	141,504
Coal Products, not									
Dyes	1,818	428	1,228	4,159	OIL SEEDS :				
Cream of Tartar ..	460	2,085	4,678	33,714	Castor	6,026	60,210	11,676	90,700
Glycerine : Crude ..	—	1,656	—	7,723	Cotton :				
Distilled					From Egypt .. tons	4,423	4,072	122,217	76,753
Potash Compounds—					„ British India ..	16,246	—	412,633	—
Saltpetre (Nitrate of Potash ..	2,000	39,519	4,250	89,229	„ Oth'r C'tries ..	4,538	901	111,267	17,742
Other Sorts...val. £	—	—	140,663	68,382	Total	25,207	4,973	646,117	94,495
Soda Compounds cwt.	2,765	11,765	10,237	56,453					
Tartaric Acid ..	2,189	1,560	32,276	25,501	Flax or Linseed :				
Unenumerated, including Acetate of Lime, Acetone, Muriate of Ammonia, and Sulphuric Acid ..val. £	—	—	135,638	2,209,317	From Russia .. Qrs.	870	—	8,700	—
DRUGS & MEDICINES :					„ U.S.A.			—	—
Bark, Peruvian cwt.	3,350	490	20,203	3,095	„ Argentine Republic ..	265,536	23,751	1,949,401	156,569
Quinine and Quinine Salts oz.	1,005,840	10,776	91,992	720	„ British East Indies ..	240,124	58,649	2,155,793	339,537
Unenumerated ..val. £	—	—	294,128	198,424	„ Canada ..		34	—	659
DYESTUFFS (other than DYE WOODS) and SUBSTANCES used in Tanning or Dyeing :					„ Oth'r C'tries ..	3,153	5	25,117	67
Cutch	5,634	5,775	15,688	19,560	Total	509,683	82,439	4,139,011	496,832
Dyes and Dye-Stuffs obtained from Coal Tar :					Rape :				
Alizarine and Anthracene ..	197	458	240	485	From Russia .. Qrs.	—	—	—	—
Aniline and Naphthalene ..	5,103	2,367	132,000	85,486	„ British East Indies ..	32,071	14,014	227,025	79,334
Synthetic Indigo ..	—	—	—	—	„ Oth'r C'tries ..	371	—	2,857	—
Other Coal Tar Dyestuffs	74	—	2,000	—	Total	32,442	14,014	229,882	79,334
Ex'ts for D'ing val. £	—	—	43,081	63,913	Sesame (or Sesamum, Benni, Gingelly, or Teel) :				
Indigo	85	—	3,410	—	From China .. Qrs.	—	—	—	—
Unenumerated ..	23,089	16,531	74,179	69,706	„ Oth'r C'tries ..	301	167	3,225	1,051
Tanning Substances :					Total	301	167	3,225	1,051
B'k for Tanning cwt.	70,325	39,568	58,662	34,393	Soya Beans :				
Ex'ts for .. val. £	—	—	606,591	208,685	From Russia .. tons	—	—	—	—
Gambier	15,311	15,054	41,651	47,199	„ China	200	—	5,150	—
Myrobalans ..	27,433	56,461	21,074	62,222	„ Japan	32,909	—	860,904	—
Sumach	4,441	32,741	4,176	34,003	„ Oth'r C'tries ..	—	—	—	—
Valonia	2,410	—	2,824	—	Total	33,109	—	866,054	—
Unenumerated ..	48	44	364	92	Unenumerated Qrs.	4,939	242	40,207	4,719
PAINTERS' COLOURS AND PIGMENTS :					NUTS AND KERNELS for expressing Oil therefrom :				
Barytes	33,426	—	15,991	—	Copra	9,448	359	525,657	16,335
Nickel Oxide ..	2,000	—	12,050	—	Ground Nuts (or Arachide Nuts, Monkey Nuts, or Pea Nuts) ..	1,415	7,713	68,542	249,837
Red Lead	—	—	—	—	Palm Kernels ..	36,526	22,635	592,558	600,452
White Lead	20,149	—	49,912	—	Other Sorts	2,058	556	101,364	24,113
Zinc Oxide	4,902	5,557	14,941	17,384	Total	49,447	31,263	2,288,121	890,737
Unenumerated ..	49,644	6,075	122,325	22,467					
Total	110,121	11,632	215,220	39,851					

(To be concluded.)

EXPORTS OF CHEMICALS AND ALLIED PRODUCTS.

THE following returns, which are taken from the export statistics of the United Kingdom, give the amount and value of chemicals and allied products exported during the month ending Sept. 30th, 1919, as compared with Sept., 1918.

ARTICLES.		QUANTITIES.		VALUE.		ARTICLES.		QUANTITIES.		VALUE.	
		Month ended Sept. 30th.		Month ended Sept. 30th.				Month ended Sept. 30th.		Month ended Sept. 30th.	
		1919.	1918.	1919.	1918.			1919.	1918.	1919.	1918.
				£	£					£	£
BLEACHING POWDER : To U.S.A. cwt.		—	—	—	—	MEDICINES, comprising DRUGS and MEDICINAL PREPARATIONS : Opium, dried and powdered in the United Kingdom lbs.		258	2,513	792	9,572
" Other Countries ..		23,028	6,173	16,477	6,412	Quinine and Qui- nine Salts ozs.		123,997	40,042	25,353	7,084
Total "		23,028	6,173	16,477	6,412	Other Sorts val. £		—	—	296,369	239,165
COAL PRODUCTS, NOT DYES :						Total "		—	—	322,514	255,821
Aniline Oil and Toluidine lbs.		29,823	119,756	1,730	7,895	MURIATE OF AMMONIA cwt.		10,405	2,805	28,957	8,322
Anthracene "		133,419	—	610	—	PAINTERS' COLOURS AND MATERIALS : Barytes cwt.		99	—	99	—
Benzol and Toluol gals.		87,715	959,270	8,206	95,813	White Lead "		13,090	1,594	38,584	4,486
Carbolic Acid .. cwt.		7,197	15,605	15,027	41,222	Zinc Oxide "		1,273	284	4,572	1,163
Coal Tar, Crude ..		5,720	117	1,836	23	Unenumerated ..		90,158	38,940	350,983	108,862
Refined .. and Varnish gals.		244,363	28,247	9,810	861	Total "		104,620	40,818	394,238	114,511
Naphtha "		57,547	—	6,220	—	POTASH COMPOUNDS : Saltpetre (Nitrate of Potash) British prepared cwt.		3,728	2,224	10,563	7,114
Naphthalene .. cwt.		4,305	14,537	6,477	23,881	Chromate and Bi- chromate of Pot- ash		1,752	42	15,796	471
Pitch		326,228	244,006	49,801	35,847	Other Sorts val. £		—	—	7,172	1,938
Tar Oil, Creosote, etc. gals.		1,058,567	16,442	31,904	1,002	Total "		—	—	33,531	9,523
Other sorts cwt.		13,633	7,019	14,563	11,663	SODA COMPOUNDS : Soda Ash cwt.		196,082	324,497	61,098	115,779
Total Value £		—	—	146,184	218,207	" Bicarbonate ..		40,253	42,563	18,475	19,732
COPPER, Sulphate of tons		61	1,539	2,943	103,028	" Caustic "		106,633	112,795	106,893	164,486
DYE STUFFS : Products of Coal Tar cwt.		6,664	7,106	91,468	88,699	" Chromate and Bichromate ..		6,973	4,505	19,855	16,334
Other Sorts "		4,878	849	16,937	5,511	" Crystals "		5,798	459	1,852	173
Total "		11,542	7,955	108,405	94,210	" Sulphate (Salt- cake)		29,029	80,666	4,876	12,886
GLYCERINE : Crude cwt.		310	1,860	630	5,770	" Other Sorts ..		60,822	60,163	65,770	77,875
Distilled		5,590	3,560	30,534	16,330	Total "		445,590	625,648	278,819	407,265
Total "		5,900	5,420	31,164	22,100	SULPHURIC ACID cwt.		1,363	339	2,601	408
MANURES : Sulphate of Ammonia : To France..... tons		2,465	—	60,434	—	TARTARIC ACID ..		723	84	11,795	1,446
" Spain and Canaries .. "		56	—	1,536	—	CHEMICALS, other sorts val. £		—	—	381,897	468,708
" Italy		70	—	1,957	—	SALT, Rock and White (except Table Salt) : To Belgium .. tons		680	49	2,376	223
" Dutch East Indies "		1,609	—	39,832	—	" U.S.A. "		994	250	4,210	792
" Japan		6,720	—	131,419	—	" British East Indies "		5,325	1,550	16,425	3,488
" U.S.A. "		—	—	—	—	" Australia "		407	374	1,385	1,542
" British West India Islands (including Ba- hamas) and British Guiana ..		280	328	6,041	9,853	" New Zealand ..		455	1,585	2,859	6,893
" Other Countries .. "		409	165	9,311	2,938	" Canada "		7,021	2,550	20,579	8,184
Total "		11,609	493	250,530	12,791	" Other Countries .. "		14,345	18,164	65,101	64,762
Superphosphates ..		819	530	6,838	3,330	Total "		29,227	24,522	112,935	85,884
Basic Slag		2,112	71	8,124	227	GREASE & UNREFINED TALLOW & ANIMAL FAT cwt.		87,576	3,594	339,327	9,346
Unenumerated ..		3,533	2,874	50,825	32,378						
Total of Manures ..		18,073	3,968	316,317	48,726						

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

October 6th to 11th (inclusive).

Solidifying Kerosene. Akker, J. J. 24,665.
Drying Liquids. Akkerman, J. H. 24,704.
Delivering Pulverous and Granulated Materials. Aktiebolaget Svensk Färgämnesindustri. 24,634.
Furnaces or Retorts for Subjecting Ores, etc., to Action of Gases, etc. Balfour, I. H.; Bray, S. W.; and British Oxygen Co. 24,721.
Para-cymene. British and Foreign Chemical Producers, Ltd. (Rheinische Kampferfabrik-Ges.). 24,331 and 24,388.
Disazo-colouring Matters. Brotherton and Co.; Merriman, R. W.; and Mersey Chemical Works. 24,870.
Sedimentation Apparatus. Dorr Co. 24,936.
Roasting Zinc Oxides Preparatory to Leaching. Electrolytic Zinc Co. 24,744.
Cracking Hydrocarbon Oils. Holmes, R. C.; and Manley, F. T. 24,615.
Separators for Granular and Pulverulent Materials, Matter in Suspension, etc. Hooke, H. 24,708.
Sheep and Cattle Dips and Insecticides. Howles, F.; and McDougall, I. 24,915.
Coating-Compositions or Paints. Isaacs, M. R. 24,606.
Solder for Aluminium, etc. Iversen, R. 24,410.
Purification, etc., of Liquids, etc. Llewellyn, I. P.; and Spence and Sons, P. 24,688.
Aluminous Compounds. Llewellyn, I. P.; Spence, H.; and Spence and Sons, P. 24,875.
Solvents for Acetylene, etc. Marks, E. C. R. (Prest-o-lite Co.). 24,848.
Resin-like Bodies. Melamid, M. 24,916 and 24,917.
Machine for Mixing Paint, etc. Mellor, S. C.; Niehuus, R. H.; and Shearer, J. A. 24,501.
Viscose from Cellulose. Müller, R. 24,737.
Deodoriser. Newth, W. H. D. 24,572.
Detergent Composition. Newth, W. H. D. 24,594.
Automatically Indicating Depth of Liquids in Tanks, etc. Nicholson, A. I. 24,687.
Explosives. Nobel's Explosives Co.; Nolan, T. J.; Rintoul, W.; and Stickland, O. W. 24,841.
Sulphuric Acid. Parrish, P.; and South Metropolitan Gas Co. 24,386.
Purifying Liquids by Electricity. Perrett, I. G.; and Wilson, J. 24,502.
Vulcanisation of Rubber. Stevens, H. P. 24,333.
Liquid Fuel. U.S. Industrial Alcohol Co. 24,852.
Thorium Compounds. Wade, H. (Lindsay Light Co.). 24,925.
Oxide of Zinc. Walkey, W. R. 24,426.
Evaporating or Concentrating Apparatus. Webb, E. T. 24,898.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 6d. in stamps to the Comptroller, Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane, W.C.

1916.

Treatment of Hydrocarbons. Forwood, G. F.; and Taplay, J. G. 17,869. **133,059**

1917.

Extracting Oils, Fats, and Other Greases from Garbage, House Offals, and Other Refuse Containing also Water. Dehn, F. B. (Cobwell Corporation). 11,252. **133,075**
Controlling and Regulating Devices for Gaseous Fluids. Parade, J. C. J. de Lastang. 16,305. **133,084**

1918.

Producing Substantially Pure Cyanogen Compounds. Nitrogen Corporation. 3,415. **133,095**
Carbide. Reid, J. H. 4,445 and 4,447. **133,098** and **133,100**
Electrical Furnaces. Reid, J. H. 4,446. **133,099**
Preparation of Crude Materials for Manufacture of Calcium Carbide. Slocum, F. L. 4,448 and 4,450. **133,101** and **133,103**
Preparation of Crude Materials for the Manufacture of Metal Carbides. Slocum, F. L. 4,449. **133,102**
Fixation of Nitrogen. Slocum, F. L. 4,451. **133,104**
Cyanogen Compounds and Ammonia. Slocum, F. L. 4,452. **133,105**

Treating Material with Gas or Vapour. Stutz, C. C. 4,456. **133,106**
N-aryl-thio-morpholines. Robinson, R.; Kay, F. W.; and British Dyes, Ltd. 10,503. **133,108**
Recovery of Gaseous Products from Plants for the Destructive Distillation of Organic Materials. Bury, E.; Ollander, O.; and Bury, A. F. 16,121. **133,159**
Coating or Covering the Surface or Surfaces of Metal with Lead or Its Alloys. Thompson, R. W.; and Morrison, J. 16,695. **133,179**

Vitamine Preparations. Inray, O. (Soc. of Chemical Industry in Basl.). 16,830. **133,183**
Cement. Bärnhielm, B. 17,717. **121,728**
Treatment of Liquids with Gases. Magrath, H. J. 20,270. **133,217**

Recovery of Proteids from the Waste Liquors of the Hide-treating Art. Dorr Co. 20,284. **123,974**

1919

Ore-roasting Furnaces. Goldthorpe, E. T. 1,461. **133,236**
Coke Ovens. Soc. C. M. Stein et Cie. 3,128. **123,527**

Separation of Thorium Compounds from Material Containing the Same. Lindsay Light Co. 3,585. **129,624**
Mineral Selective Agent. Marks, E. C. R. (Luckenbach Processes Inc.). 14,332. **133,277**

COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

1919.

Aliphatic Nitrites. Wilde, P. R. de. 23,881. **133,304**
Zinc Chloride. Burgess Laboratories, C. F. 24,129. **133,319**
Enriching Poor Phosphates. Poupard, C. 24,187. **133,320**
Drums for Drying Materials. Gerlach, A. 24,228. **133,327**

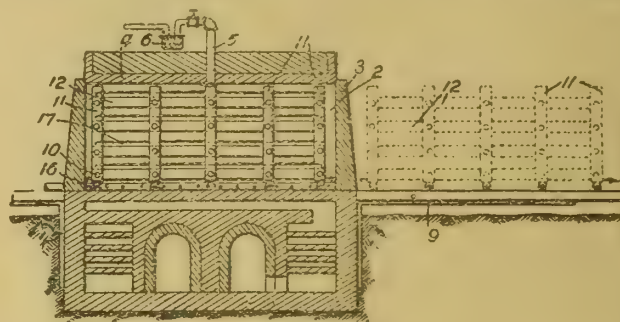
ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Nitrocellulose. W. B. Thomson, W. D. Severn, and G. Twy-cross, Cape Town. British Patent, 130,665, of 1918.

The wood of the baobab tree is used as the raw material for making nitrocellulose. The wood is disintegrated, boiled in weak caustic-soda solution, and washed; it is then treated with dilute hydrochloric acid in a pulping-apparatus until the fibre is substantially separated into single strands, and then washed, dried, and nitrated in the usual manner.

Cyanogen Compounds. F. L. Slocum, Pittsburg, U.S.A. British Patent, 130,680, of 1918.

Apparatus for treating materials with gases, particularly for obtaining nitrogen compounds from carbides and ammonia from these compounds, comprises a series of furnace-chambers 2 each having end doors 3 and a top 4 with an outlet 5 for the gases passing through a trap 6. Extending from



one end of the heating-chamber is a platform 9 for the charging-rack. The rack consists of a frame 10 comprising up-rights 11, side-pieces 12, and cross-pieces. The rack is provided with rollers 16 and carries perforated trays 17, which may be provided with a lining of wire mesh. The rack is moved into and out of the heating-chamber by mechanically operated means.

Luminous Paints. G. A. H. Muller and J. Macfarlane, Montreal, Canada. British Patent, 130,885, of 1919.

A luminous paint is manufactured by heating together sublimed sulphur and carbonates of strontium, calcium, and magnesium. The strontium carbonate is preferably the predominant constituent of the carbonates, the proportions in one example described being sulphur 26 parts, strontium carbonate 19 parts, calcium carbonate 6 parts, and magnesium carbonate 1 part. The mixture is furnace in a crucible at a temperature of about 1500° F., then ground, and made up into a liquid paint by mixing with a colourless varnish prepared from mastic and similar gums with turpentine, spirit, or drying oils.

Vulcanisation of Rubber. North British Company, Edinburgh. British Patent, 130,857, of 1918.

A previously prepared compound of sulphur and a nitrogen-containing body is used for vulcanising. The compound of the sulphur and nitrogenous substance may be prepared in the presence of an aromatic amine such as aniline. Examples of nitrogenous bodies are substituted thio-ureas such as thio-carbanilide, methylene bases such as methylene aniline, para-nitroso compounds such as para-nitro-dimethyl-aniline, and guanidine derivatives such as tri-phenol guanidine, cyanides, proteids and their decomposition, and hydrolysis products, including amino acids, animal glue, or gelatine. Sulphur may

be added to the sulphur compound. With the exception of a few of the compounds mentioned, the nitrogen-containing bodies contain the amino group or a substituted amino group.

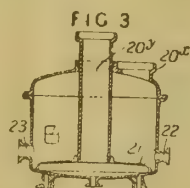
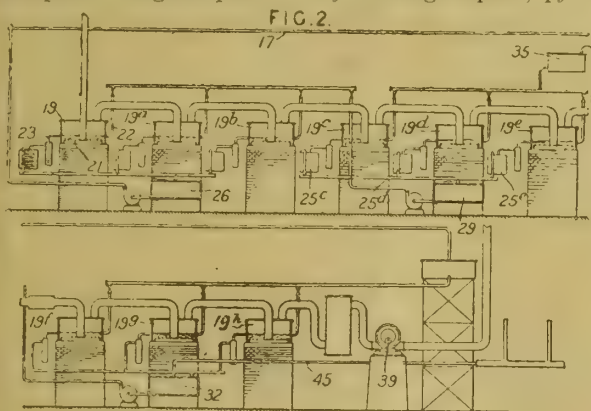
Ammonia. E. B. Maxted, Highgate Road, Walsall, Staffordshire. British Patent, 130,063, of 1918.

Ammonia is produced synthetically by heating a gas mixture containing hydrogen and nitrogen to flame temperature under an elevated pressure—for example, 50 atmospheres—by partial combustion with air, oxygenated air, or oxygen in a pressure flame burning under such conditions that no free oxygen is present after combustion, the heating being followed by rapid cooling of the flame gases for the retention of the ammonia formed. The flame temperature must be at least $1,500^{\circ}\text{C}$. The residual gases after the removal of the ammonia may be re injected into the pressure flame. The process may be carried out in apparatus as shown in which the mixture containing hydrogen and nitrogen, and the oxygen, etc., are introduced, under pressure through inlets J, L and burnt in a combustion-chamber M, the flame gases being rapidly cooled and the ammonia absorbed by direct contact with water or acid contained in the vessel N and circulated by a pump P through a cooling-coil Q. In a modified

form of apparatus, the gases from the combustion-chamber are passed through a cooling-coil surrounded by running water, and are then led away to an absorber.

Sulphuric Acid Manufacture. K. B. Quinan, Somerset West, Cape Province, South Africa. British Patent, 130,712, of 1918.

In the process of preparing sulphuric acid involving the use of nitric oxide, reactions between liquids and gases are brought about by distributing the liquid over perforated horizontal diaphragms through which the gas is passed. The reactions are effected in a series of vessels through which liquid flows from an inlet 22, Fig. 3, to an outlet 23 over a perforated diaphragm 21, below which gas is supplied by a pipe 20*. The gas passes away by an outlet 20*. In a complete plant the gases produced by burning sulphur, pyrites,



etc., are passed through a dust-separator and a tower down which weak denitrified acid flows. The gases are passed in succession through a series of reaction vessels 19, 19^a . . . 19^h, Fig. 2, and are withdrawn by an exhaustor 39. Acid from the washing-tower is pumped through pipe 17, and supplied in

parallel to the three last reaction vessels 19^f, 19^g, 19^h, which discharge into a tank 32 to which nitric acid and water are added by pipe 45. The acid from the tank 32 is pumped into a tank 35, and supplied in parallel to the next vessels 19ⁱ, 19^j, 19^k, which discharge through coolers 25^c, 25^d, 25^e to a tank 29. The acid is supplied to the first vessels 19, 19^a, 19^b, and passes through coolers to a tank 26, and thence to the washing-tower.

Acetic Anhydride. H. Dreyfus, London. British Patent, 130,660, of 1918.

The production of acetic anhydride by the reaction of sulphur trioxide upon sodium acetate or other acetates, alone or diluted with acetic anhydride, is effected by using gaseous sulphur trioxide diluted with inert gases, such as the gaseous mixture produced in the contact process or manufacturing sulphur trioxide, and working at low temperatures (0 to 20°C or lower).

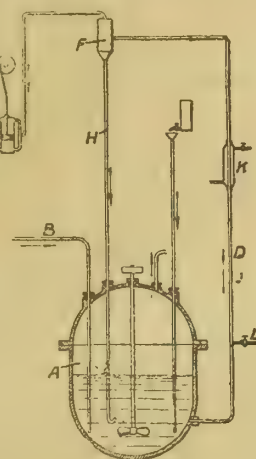
Removing Sulphur Compounds from Gases. E. K. Rideal and H. S. Taylor, London. British Patent, 130,654, of 1918.

Sulphur compounds contained in coal gas, water gas, producer gas, etc., are converted into sulphuretted hydrogen by passing the gas, mixed with a quantity of water vapour insufficient to produce reduction of the catalyst, over heated iron oxide mixed with one or more of the oxides of chromium, nickel, cobalt, cerium, thorium, zirconium, manganese, or molybdenum, which serve as promoters for the reaction. The catalyst is maintained at a temperature of 300° to 650°C . The sulphuretted hydrogen may be removed from the gas by known methods, such as absorption by iron oxide.

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Acetaldehyde. Compagnie des Produits Chimiques d'Alais et de la Camargue, Paris. British Patent, 130,650. Convention date, January 12, 1917.

In the production of acetaldehyde by passing acetylene into acid solutions of mercury salts, the aldehyde is continuously removed from the liquid by applying a vacuum. Using the apparatus shown, acetylene is passed by a pipe B into the reaction liquid in a vessel A; the liquid passes by the pipe D to a receiver F in which a partial vacuum is maintained by a pump G; the vapour of aldehyde and steam pass off to the pump, while the liquid feed from aldehyde returns by a pipe H to the vessel A. The rise of the liquid in the pipe D may be assisted by a steam jacket K, by admitting air by a pipe L, or by other means.



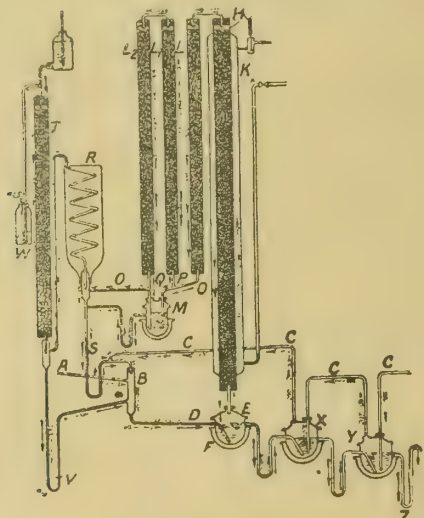
Ammonium Chloride. L'Air Liquide Soc. Anon. pour l'Etude et l'Exploitation des Procédés G. Claude, Paris. British Patent, 130,365. Convention date, August 25, 1917.

Ammonium chloride is prepared by treating synthetic ammonia according to the ammonia-soda process, the carbon dioxide for the process being obtained in part from the water-gas used in making the hydrogen for the synthesis of the ammonia, and in part by calcining the sodium bicarbonate to produce sodium carbonate. To obtain the ammonium chloride free from bicarbonate so that it may be used as a manure, it is purified by fractional crystallisation, or the solution, after separation of the precipitated sodium bicarbonate is neutralised by acid before the ammonium chloride is crystallised out. The manufacture of the water-gas may be so conducted that the gas consists of hydrogen, carbon monoxide, and carbon dioxide, the carbon monoxide being in such proportion that it is sufficient, in conjunction with the waste hydrogen from the ammonia synthesis, to supply the power necessary

for the process. The hydrogen may be obtained from the water-gas by cooling and compressing the gas to liquify the carbon dioxide and then treating the cooled and compressed gas with a solvent as described in Specification 130,358 to extract the carbon monoxide. Alternatively, a water-gas consisting of carbon monoxide and hydrogen may be produced and then catalysed with steam to produce carbon dioxide and hydrogen.

Acetic Acid. Compagnie des Produits Chimiques d'Alais et de la Camargue, Paris. British Patent, 130,651. Convention date, March 6, 1917.

In the production of acetic acid by the oxidation of aldehyde vapour by air or oxygen in towers in the absence of a catalyst, accumulation of peracetic acid in the towers is prevented by providing a supplementary heating-chamber below the towers, into which the liquid acetic acid falls, carrying with it any peracetic acid present, which then decomposes. Using the apparatus shown, a current of aldehyde entering by a pipe A, and a current of oxygen or air entering by a pipe C mix in the vessel B, and pass to a decomposing-vessel E kept at about 100° C. by a steam-jacket F; the gaseous mixture then flows into an oxidation tower H packed with quartz, broken glass, etc., and provided with a water-jacket K; the liquid acetic acid formed, together with any undecomposed peracetic acid, drops into the vessel E, in which the peracetic acid decomposes. The gaseous mixture from the



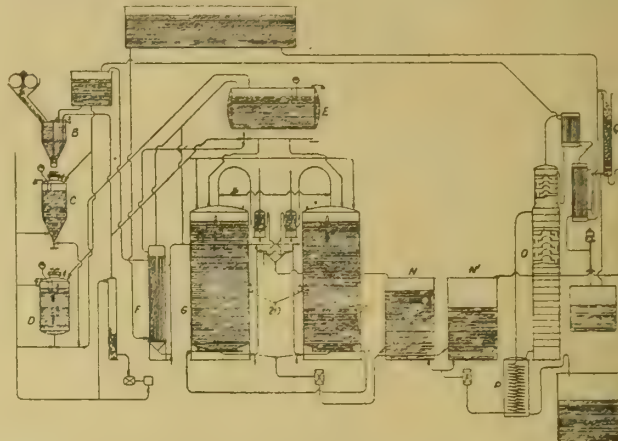
tower H passes on to similar towers L, L¹, L², in which most of the remaining aldehyde is oxidised; the liquid products from these towers pass by the pipes, O, P, Q, S, B, D, and a liquid seal M, to the vessel E; the seal M is also steam-jacketed to prevent any accumulation of peracetic acid therein. The gases finally pass to a reflux condenser R any condensed aldehyde returning to the plant by pipe S, and the last traces of aldehyde are absorbed by acetic acid in a tower T, the solution flowing back to the plant by pipe V. A flask W through which the gases exhaust serves to indicate the rate of gas-flow. From the vessel E the acetic acid flows through a series of vessels X, Y, through which the entering current of air or oxygen bubbles to remove aldehyde, and the pure acetic acid flows off by a pipe Z.

Fertilisers. C. Rossi, Legnana, Italy. British Patent, 130,963. Convention date, August 9, 1918.

The potassium content of a rock such as leucite, volcanic ash, felspar, orthoclase, granite, and the like, is obtained by strongly heating the rock in a finely ground condition with calcium carbide in a stream of nitrogen. The potassium compound is volatilised, whilst the nitrogen is fixed by the calcium carbide as calcium cyanamide and by the rock forming a complex nitrogen-bearing compound. The nitrogenous residue, with or without the addition of the potassium compound, can be used as a fertiliser. Lime may be added to the reacting bodies in addition to that present in the calcium carbide; and carbon may be added in addition to that produced in the formation of calcium cyanamide. By using a lower temperature, the volatilisation of the potassium compound may be prevented.

Butyl Alcohol and Acetone. E. Ricard, Melle, Deux-Sèvres, France. British Patent, 130,666. Convention date, August 8, 1917.

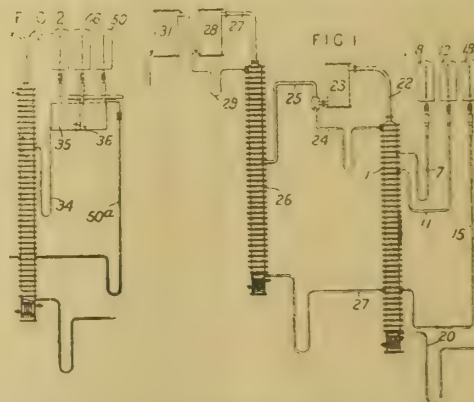
Butyl alcohol and acetone are produced by fermentation of worts made from starchy materials by means of a special bacillus, named *bacillus butylicus* BF, found in animal refuse such as the liquid refuse of slaughter-houses. The bacillus, a description of which is given, is optionally anaerobic, and is cultivated and isolated by ordinary methods. It can be



used in worts which have been boiled with acid to aid liquefaction. The illustration shows a plant suitable for carrying out the process. The material is mashed in a mash-tun B, boiled in a boiler C, and mixed with water to the proper degree of dilution in a mixer D. The material thus treated is heated by steam to a temperature of about 120° C., and raised by steam-pressure to a reservoir E, whence it passes to the fermenting-vats G, G' through a heat-interchanger F, where it is cooled to 37° C. The hot water from the interchanger F is used in the mash-tun B and dilution vessel D. The fermenting-vats G, G' are provided with flexible connections 20, whereby fermented liquid can be passed from one vat into another to start fermentation. An appropriate quantity is about 5 per cent. of the contents of a vat. Pipe connections are provided whereby the apparatus can be sterilised by filling it with steam, which is afterwards replaced by sterilised air. The fermented liquid passes from the vats G, G' to storage chambers N, N', and thence to a still and rectification column O. The spent liquor from the still is used to heat the incoming liquor in a heat-interchanger P. The gases escaping from the condensers are freed from acetone in a washing-column Q.

Distilling Esters. U.S. Industrial Alcohol Company, New York, U.S.A. British Patent, 130,968. Convention date, August 7, 1918.

Esters are prepared in a continuous manner by feeding an alcohol, an organic acid, and a catalyst to a column still. The production of methyl acetate from methyl alcohol, dilute or



glacial acetic acid, and sulphuric acid is described. Using the apparatus shown in Fig. 1, sulphuric acid, dilute acetic acid, and methyl alcohol are fed continuously in regulated amounts from tanks 8, 12, 18 respectively by pipes 7, 11, 15

to a column still 1 of ordinary construction; at the commencement sufficient methyl alcohol is run in to seal all the plates in the still. Vapours of methyl acetate and alcohol pass off by pipe 22 to a dephlegmator 23; condensed alcohol runs back from the dephlegmator to the still by pipe 24, while methyl acetate vapours pass off by pipe 25 to a second column still 26. From this still the methyl acetate vapours pass by pipe 27¹ to a dephlegmator 28, condensed alcohol flows back by pipe 29 to the top of still 26, while the methyl acetate vapours pass on to a condenser 31. A pipe 27 leads methyl alcohol from the lower part of still 26 to the still 1. Water and sulphuric acid flow from the bottom of still 1 by a pipe 20. The apparatus shown in Fig. 2 is similar in all respects except the feed device. Sulphuric acid, acetic acid (in this case glacial), and methyl alcohol are fed from tanks 42, 46, 50 respectively to a mixing-tank 35 which contains a rotary stirrer 36, and after undergoing partial reaction in the mixing-tank, the mixture is fed to the still by pipe 34; an initial charge of methyl alcohol, as before, is fed to the still by pipe 50^a.

Calcium Nitrate. Nitrum Akt-Ges., Zurich, Switzerland. British Patent, 130,979. Convention date, August 6, 1918.

A concentrated solution of calcium nitrate is obtained from nitrous gases by neutralising with lime the acid solution obtained by dissolving the gases, and using the neutralised solution for further absorption. The neutralisation may be effected by passing the solution over limestone in the absorption-apparatus, or by adding lime or limestone to the solution outside the absorption-apparatus, the neutralised solution being returned thereto.

Treatment of Nitrosulphonic Acids. Norsk Hydro-Elektrisk Kvaestofaktieselskab, Christiania, Norway. British Patent, 130,966. Convention date, August 9, 1919.

A small quantity of nitric acid—for instance, less than 1 per cent.—is added to nitrosyl-sulphuric acid or to sulphuric acid which has been denitrated by boiling, and contains a small quantity of nitrogen oxide to render these acids incapable of attacking iron, so that they can be handled in iron apparatus or stored in receptacles.

Recovering Solvents. E. I. du Pont de Nemours and Co., Wilmington, Delaware, U.S.A. British Patent, 130,962. Convention date, August 8, 1918.

Volatile solvents are recovered from coated surfaces such as split hides and aeroplane wings by passing a current of air over the surface and passing the vapour-laden air through an absorbent consisting of a distillate boiling at 205-245° C. obtained from wood tar after it has been freed from its alcoholic and acid constituents. This absorbent is particularly applicable for recovering vapours of methyl, ethyl, and butyl alcohol, methyl and ethyl acetate, benzole, acetone, ethyl methyl ketone and ether.

GAZETTE NEWS.

LIMITED COMPANIES.—Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions, Orders, and Official and Other Notices.

Fersan Islands Oil Company, Ltd.—Resolved September 11, confirmed September 29: That the company be wound up. J. Barber, 19, Basinghall Street, E.C., liquidator.

Scientific Manufactures, Ltd., London, W.C.—W. H. King ceased to act as receiver September 22.

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 4, Queen Anne's Gate Buildings, London, S.W.1, whence further information may be obtained:—

British West Indies.

A firm of importers in Trinidad desire to represent United Kingdom manufacturers of Portland cement on a commission basis. (Reference No. 802.)

Belgium.

A business man, established for 30 years at Verviers, desires to obtain an agency for aniline dyes. (Reference No. 808.)

France.

An agent in Montauban (Tarn-et-Garonne) desires to obtain agencies for United Kingdom manufacturers and exporters of chemical manures, sulphate of copper, superphosphates, etc. (Reference No. 813.)

A firm of manufacturers' agents in Paris, with branches in Australia, Sweden, Poland, Finland, and Russia, desire to obtain agencies, on a commission basis, for United Kingdom manufacturers of heavy chemicals, nitrates, phosphates, and sulphates. (Reference No. 814.)

Germany.

A German inquirer desires an agency, on commission, for the sale of edible and technical oils. (Reference No. 821.)

A German inquirer desires an agency, on commission, or on his own account, for the sale of soap and oils. (Reference No. 824.)

Italy.

A firm of export agents in Genoa desire to obtain agencies for United Kingdom exporters of fish-oil, sesame and cotton-seed oil, pistachio-oil, hogs' grease, and vegetable and animal oils and fats. (Reference No. 828.)

A firm of insurance, forwarding, and shipping agents in Naples desire to obtain agencies for United Kingdom manufacturers of chemicals and dyes. (Reference No. 829.)

Spain.

A Spanish commission agent at Madrid desires to get into touch with United Kingdom firms dealing in chemical products. (Reference No. 838.)

Canada.

A firm of manufacturers' agents at Winnipeg desire to represent United Kingdom manufacturers of soap, from Port Arthur to British Columbia, on a commission basis. (Reference No. 791.)

BOOKS RECEIVED.

"Reminders for Company Secretaries," 4th edition; 11d., post free. "Private Companies," 9th edition; 1s. 4d., post free. London: Jordan and Sons, Ltd.

"Cardiff."—An illustrated handbook descriptive of the commercial and industrial advantages of the Welsh metropolis, and covering also its institutions, attractions, and general development. Publishers: The Business Statistics Company, Ltd.; 5s.

BRYANT AND MAY, LTD.—Dividend at the rate of 7 per cent. for the half-year on the preference shares, and an interim dividend of 4 per cent., free of income tax, on the ordinary shares for the half-year.

MARKET REPORTS.

TAR AND AMMONIA PRODUCTS.

WEDNESDAY.

Benzole: London, 90%, 2s. to 2s. 1d.; North, 1s. 11d. to 2s.; 50%, 1s. 10d. to 1s. 11d.; North, 1s. 9d. to 1s. 10d. naked. Carbohc acid, crude, 60%, East and West Coast, nominally 1s. 7d. to 1s. 8d.; crystals, 39-40%, 8½d. to 9d., f.o.b. Crude tar, London, 45s. to 50s.; Midlands, 44s. to 46s.; North, 45s. per ton, ex works. Pitch, 77s. 6d. to 80s.;

East Coast, 70s. to 75s., f.o.b.; West Coast, 62s. 6d. to 65s., f.a.s. Solvent naphtha, naked, London, 90-100%, 2s. 5d.; North, 2s. 3d. to 2s. 4d.; 90-100%, naked, London, 2s. 5d.; North, 2s. 2d. to 2s. 3d. Crude naphtha, naked, 30%, 9d.; North, 8d. to 8½d. Refined naphthalene, £16. to £18.; salts, £6. to £7. Toluol, naked, London, 2s. 6d.; North, 2s. 5d. Creosote, naked, London, 6½d.; North, 5½d. to 5½d.; heavy oil, 6½d. Anthracene, 40-45%, 7d. per unit. Cresylic acid,

95%, 2s. 5d. to 2s. 6d.; 97-99%, 2s. 7d. to 2s. 8d., ex works, London, and f.o.b. other ports. Sulphate of ammonia: home trade, October £20. 10s., November £20. 15s., basis 24½%. Nitrate of soda, £22. to £22. 10s.

FERTILISER MATERIALS. LIVERPOOL, THURSDAY.

Nitrate of soda continues firm, the quotation on spot for 95/96% quality remaining at £20. per ton, net cash, f.o.r. Liverpool, prompt delivery. East Indian bone meal: Shippers still maintain a firm attitude, the quotation for October-December shipment, being £17. 10s. per ton, net cash, ex ship Liverpool, for 4½% ammonia and 52% phosphates quality. On spot Liverpool, holders ask £16. per ton, net cash, for 4½% and 45% quality. Mineral phosphates are without alteration, and values at present are only nominal. Dried blood continues scarce, the nearest value being about 30s. per unit of ammonia per ton, net cash.

LONDON METAL MARKET.

THURSDAY.

Copper: Standard brands, £105. 15s. to £106. cash; £106. 5s. to £106. 10s. three months; electrolytic, £115. to £122. Tin: Standard, £278. 15s. to £279. cash; £280. to £280. 5s. three months; Straits, £279.; English, £277. to £278. Lead: Soft foreign, £28. 10s.; English, £29. 10s. Spelter, £44.; hard, £31. to £32. Antimony, English regulus, 90%, £45. Aluminium £150. Nickel £205. delivered, packages extra. Quicksilver, £16. 10s. Bismuth, 12s. 6d. Platinum 442s. per oz. Wolfram 32s. 6d. per unit.

TURPENTINE MARKET REPORT.

Messrs. James Watt and Son, Ltd., of 101, Leadenhall Street, London, E.C.3., report that the stocks of turpentine on October 11 were: American, 37,729 barrels, compared with 4,828 barrels at the corresponding date of 1918; French 506 barrels (63 barrels); and Spanish, 446 barrels (1,387 barrels). Deliveries during the week ended October 11 were 1,435 barrels against 579 barrels last year, and since January 1, 56,996 barrels, compared with 19,769 barrels in 1918. The price on Saturday last was 125s. per cwt., compared with 105s. at the corresponding date of last year. October-December delivery was quoted at 125s., and January-April (1920) 127s.

SWANSEA MARKET REPORT.

THURSDAY.

Tinplate prices are very strong on the basis of 38s. 6d. to 39s. per standard box. Copper active at £106. 10s. per ton prompt and three months. Tin firm at £283. 10s. cash and £284. 10s. three months. Lead: Spanish, £27. 15s. English, £29. per ton. Spelter, £43. 10s. per ton. Silver, 62½d. per ounce. Antimony nominal, with English regulus, 90%, £45. Nickel in strong movement at £205., including delivery London or equal. Aluminium, £150. Quicksilver, £19. 10s. per bottle. Palm oil on small offer: Lagos and Benin, £82.; hard, £80. Petroleum steady, and in fair demand: refined, 1s. 6½d. to 1s. 7½d. per gallon, in casks. Turpentine, quiet and easier at 126s. per cwt. Sulphate of copper remains dull at £40. per ton, f.o.b. Sulphate of ammonia is very steady at £20. 10s. per ton. Nitrate of soda, 21s. 9d. per cwt. in bags. Arsenic in better call at £60. per ton. Oxalic acid, 1s. 2½d. per lb. Pitch still remains scarce and dear at 62s. 6d. per ton ex ship. Copperas selling more freely round £3. 10s. per ton at maker's works. All seed oils are steady and sparingly offered.

MANCHESTER CHEMICAL MARKET.

THURSDAY.

There is an active demand for all heavy chemicals both on home and export account, and prices as a whole are well maintained. Caustic soda and 58% alkali are steady at recent advance. Bicarbonate of soda, bags, £8. 5s. to £8. 10s. per ton. Chlorate of soda easy at 6d. per lb. Potash 1s. per lb. Bleaching powder dull at £17. per ton on rails. Roasted saltcake quiet at 70s. per ton in bulk carriage paid. Recovered rock sulphur £17. per ton in bulk on rails. Sulphate of copper is unchanged in position, and price nominal at £40. per ton f.o.b. Commercial hypo. soda steady at £16. 10s. rails. Phosphate of soda £27. per ton. Concentrated sodium sulphide, 60/65%, easier at £21. 10s. casks. Nitrate of soda scarce and firm at £60. per ton. Bichromate of soda is short on the spot, and resale lots higher at 9½d. per lb. White powdered arsenic is more freely offered, but price unchanged at £60. per ton. Yellow prussiate of potash dull at 1s. 9d. per lb. Soda dearer at 11d. per lb. Carbonate of potash 85% £103. per ton. Lead salts are in steady

request. White acetate at £83. and brown £68. per ton. Nitrate £56. Business is quiet in acetate of soda, and price easy at £50. per ton. Acetic acid is offering at lower prices. English brown acetate of lime is short on the spot, and price dearer at £12. per ton. Grey unchanged at £17. per ton. Miscible wood naphtha firm at 10s. 6d. per gallon. Oxalic acid is lower at 1s. 1d. owing to arrival of Continental supplies.

LIVERPOOL CHEMICAL MARKET.

THURSDAY.

An active inquiry for chemicals has been experienced since the resumption of railway transport business. The demand from the home trade has been more brisk, and that from the export trade has agreeably increased. The general situation has much improved since the termination of the railway strike. Bleaching powder has been more in request. For the home trade, £17. per ton is quoted, and for export, £15. to £18. per ton. Chloride of calcium has been in somewhat freer inquiry, and is £8. to £11. per ton, in casks, f.o.r. Caustic soda has been much in demand for export and for home trade purposes. Prices are, £24. per ton for 76%; £22. per ton for 70 to 72%, and £19. per ton for 60 to 62%. Nitrate of soda has met with a steady inquiry, and is £21. to £22. per ton. Saltcake has been more in request, and is £6. 10s. per ton, in casks f.o.b. Soda crystals have been well inquired for, and are £5. 10s. per ton in 2cwt. bags f.o.r. at works. Bicarbonate of soda has again sold with some freedom, and is £8. 5s. to £10. per ton, according to terms of delivery. Borax has been in good request, and is scarce for prompt or early delivery. Makers are reported to be well sold for weeks ahead and prices have been advanced. Ordinary, is quoted at £50. per ton, and powdered at £51. to £52. per ton, in bags. Ammonia alkali has been freely inquired for, and is £6. 10s. to £6. 15. per ton, f.o.r. at works. Hyposulphite has been rather more in request, and is £16. per ton for ordinary, and £21. per ton for pea crystals, in 1cwt. kegs. Sulphite of sodium has been in moderate demand, and is £10. per ton for ordinary, and £16. to £18. per ton for pea crystals, in 1cwt. kegs. Bichromate of soda has been in fair request, and is 9d. per lb. Phosphate of soda has been but little called for, and is £25. per ton. Sulphide of sodium has been rather more in request, and is £20. per ton in casks, and £22. per ton in drums. Chlorate of potash has been in quietly steady demand, and is 1s. to 1s. 2d. per lb. Permanganate of potash has been in fair request, and is 3s. 3d. per lb. Sulphate of potash has been but little called for, and is £30. per ton. Carbonate of potash has sold rather freely, and is £100. per ton for 80 to 85%. Caustic potash has met with a fairly active inquiry, and has been in limited demand. It is £120. per ton. Nitrate of potash has been in very fair request, and is £55. to £60. per ton for refined, and £40. per ton for ordinary. Canadian potashes have again been quiet. First quality Montreal are £200. to £220. per ton, and second quality £190. to £210. per ton. Bichromate of potash has been in moderate request, and is 1s. 6d. to 1s. 7d. per lb. Yellow prussiate of potash has been quiet, and is 1s. 9d. to 1s. 10d. per lb. Salammuniac has been in quietly steady demand, and is scarce. Prices have advanced, and are £95. per ton for first quality lump, and £85. per ton for second quality. Crushed is £5. per ton extra. Sulphate of ammonia has been in quietly steady demand, and is £20. 10s. per ton for October; £20. 15s. for November; £21. for December; £21. 7s. 6d. for January, 1920; £21. 15s. for February, and £22. per ton for March to May, 1920. Carbonate of ammonia has met with a fair inquiry, and is 6½d. per lb. Muriate has been but little in demand, and is £50. to £55. per ton, according to quality. Magnesia has sold more freely. Carbonate is £2. 5s. per cwt., and sulphate, £10. to £16. per ton, according to grade. Alum has been in good request, and is still in very limited supply. For home trade uses, £18. 10s. per ton is being quoted, and for export, £18. 10s. to £19. 10s. per ton. Aluminoferric has been very quiet, and is £8. 10s. to £12. per ton, according to quality. Sulphate of alumina has been but little called for, and is £12. to £17. per ton, according to grade. Sulphur has been in rather active demand. English flowers are £32. per ton; roll is £28. per ton, and rock, £22. per ton, in bags, f.o.r. Sicilian grades are: flowers, £28. per ton; roll, £22. 10s. per ton, and rock, £17. 15s. per ton. Cream of tartar has been in very fair request, and is £11. 15s. to £12. per cwt. Tartaric acid has been called for more freely, and is 3s. 1d. to 3s. 2d. per lb. Boracic acid has been more in demand, and prices are higher. Crystals are £80. per ton, and powdered, £82. per ton, in bags. In casks, from £2. to £3. per ton, more, is charged. Oxalic acid has had a quietly steady sale, and is 1s. 2d. to 1s. 3d. per lb. Citric acid has

again been in very fair request, and is 4s. 4d. per lb. White acetate of lead has had a limited sale, and is £85. per ton. Arsenic has been more inquired for, and is £60. per ton for white powdered. Sulphate of copper has been neglected. Business in this article has been affected by reports of large offerings of sulphate from Government stocks in France at low prices. Quotations at Liverpool are, £41. to £42. per ton for home trade uses, and £42. to £43. per ton for export, less 5%; in casks, f.o.b.

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Wednesday.

During the past week matters have moved fairly steadily in the local chemical trade, and the demand for the heavy chemicals has shown an improved tone in certain directions. Most chemicals have been in good demand, and prices remain firm and without appreciable alteration; with, if anything, a lowering tendency with regard to saltpetre, which is now selling at £3. 2s. against £3. 4s. previously. Current quotations are:—Arsenic, £62. per ton, net, Glasgow; bicarbonate of soda, £9. 15s. and £10. 10s. per ton for 6-8 casks and 1cwt. kegs, net, Liverpool; boracic acid crystals, English refined, £72. for 2cwt. bags; and borax crystals, £39. for 2cwt. bags, carriage paid; caustic soda, white, 70-72%, £24. per ton, net, Glasgow; chlorate of potash, 1s 1d. per lb., net, Glasgow; chlorate of soda, 8d. per lb., net, Glasgow; citric acid, 4s. 4d. per lb., 5%, Glasgow; cream of tartar 98%, £11. 10s. per cwt., net, Glasgow; paraffin wax, U.K. deliveries, 125° 6½d. to 6¼d.; 121-30, 5½d. to 5¾d.; 118-200, 5d.; 110-120, 4d. to 4½d.; and 98-102°, 4d. to 4½d.; salammuniac, £80. and £75. per ton, net, any port, for first and second lump respectively; salammuniac crystals, £85. per ton, net, Glasgow; saltpetre, £3. 2s., net, Glasgow; tartaric acid, 3s. 3d. per lb., 5% Glasgow.

Among the sea oils demand is good and the general feeling of the market regarding prices is still firm and steady. Indeed, as far as quotations are concerned there are no changes, and

among the whale oils pale is still selling at 95s., brown at 76s., and black at 74s., with the yellow variety still being conspicuous by its absence. Newfoundland cod is changing hands at the old rate of 80s.; pale seal is quotable at 96s. as previously; while likewise there is no change on Menhaden at 82s.

In the West of Scotland coal trade there is little change to be recorded. With the colder weather there has been a bigger demand for fuel for household and other purposes, and with industrial matters moving more steadily the output is being cleared from the pitheads much quicker than during the past two weeks.

TYNE CHEMICAL REPORT.

TUESDAY.

Trade continues very brisk, and there is an improvement in the demand both for home and export market, caustic soda and bleaching powder in particular being in good request. Soda crystals locally are firm at £5. 10s. per ton, 2cwt. bags. Sulphur is still very scarce at £22. to £23. per ton, in bags.

The following prices are per ton, net: Bleaching powder, softs, £17.; caustic soda, 76-77%, £23. 5s.; do., 70%, £22.; do., 60%, £20.; recovered sulphur, 2cwt. bags, £22.; hypo-sulphite of soda, 5-7cwt. casks, £19.; do., 1cwt. kegs, £25.; sulphite of soda, 5-7cwt. casks, £12.; do., 1cwt. kegs, £20.; silicate of soda, 75° Tw., £9. 12s. 6d.; do., 100° Tw., £10.; do., 140° Tw., £10. 10s.; soda crystals, 2cwt. bags, £5. 10s.; sulphate of soda (saltcake), £4.; pure white sulphate of alumina, £19. 10s.; blanc fixe, £22.; sulphide of sodium, crystals, £18.; do., refined concentrated solid, 60-62%, £25.; hydrate of barium, crystals, £56.

COALS.—Market is firm, and for the moment there is a rather larger supply of coal, owing to general shortage of tonnage and licence regulations. Prices are nominally: Best Northumbrian steam, 95s. to 100s. per ton; seconds, 85s. to 90s.; Northumberland small coals, 75s. to 80s.; seconds, 70s. to 72s. 6d.; best Durham gas coals, 80s. to 85s.; seconds, 65s. to 75s.; Durham bunkers, 70s. to 80s.; seconds, 65s. to 67s. 6d.; foundry coke, 100s.; gas coke, 95s. to 100s.

IMPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LIST OF CONTRACTIONS USED IN THE IMPORT AND EXPORT LIST.

Blns.	Balloons.	Chys.	Carboys.	Gals., Gls.	Qnty.	Quantity (otherwise undeclared).	qr.	Quarters.
Bls.	Bales.	Css. or Cs.	Cases.	or Glns.			lb.	Pounds.
Brls.	Barrels.	Cks.	Casks.	Hf. pps.	Rnlt.	Runlets.		
Bgs.	Bags.	Chts.	Chests.	Hhds.	Sks.	Sacks.		
Btls.	Bottles.	Cylds.	Cylinders.	Krs.	Sls.	Slabs.		
Blls.	Bundles.	Dms. Drs.	Drums.	Ozs.	Tcs.	Tierces.		
Bskts.	Baskets.	Djns.	Demijohns.	Pks.	t. c.	Tons.		
Bxs.	Boxes.	Frkns.	Firkins.	Pns. Puns.		Cwts.		

Note.—There is no information available as to the net weights of the various items, nor do we recognise in them any standard.

BRISTOL.

Publication of Official Returns Suspended.

GLASGOW.

Week ending October 11.

ACETATE OF LIME—
Gothenburg, 581 bgs.
ARSENIC—
Antwerp, 74 cks.
BARIUM SULPHATE—
Antwerp, 300 bgs.
BEES WAX—
Boston, 10 cs.
CHEMICALS (otherwise undescribed)
Rouen, 250 drms.
DEXTRINE—
Baltimore, 215 bgs.
DISINFECTANTS (otherwise undes.)
Gothenburg, 1 pkg.
DYESTUFFS—
Dyewood Extract
Philadelphia, 85 brls.
Tanning Extract
Philadelphia, 800 brls.
GELATINE—
Gothenburg, 3 pkgs.
GLUE—
Gothenburg, 142 bgs.
OCHRE—
Bordeaux, 38 cks.

OLEO STEARINE—
Philadelphia, 21 tcs.

ROSIN—
Bordeaux, 300 cks.; Helva, 179 cks.; Gothenburg, 235 brls.

SCALE WAX—
Philadelphia, 200 brls.

SOAP—
Gothenburg, 15 brls.; Philadelphia, 2,000 bxs.

STEARINE—
Boston, 200 brls.

TAR—
Gothenburg, 156 brls.

TAR (PINE)—
Philadelphia, 600 brls.

TAR (WOOD)—
Gothenburg, 150 brls.

TARTAR—
Bordeaux, 29 cks.

ULTRAMARINE BLUE—
Antwerp, 16 cks.

GOOLE.

Week ending October 11.

BARYTES—
Rotterdam, 195 cks.

CARBON (DECOLOURISING)—
Amsterdam, 40 bgs.

GRANGEMOUTH.

Week ending October 11.

NIL.

GRIMSBY.

Week ending October 11.

DYESTUFFS (otherwise undescribed)
Antwerp, 508 cks.

HULL.

Week ending October 11.

CARBON BLACK—
New York, 570 cs.

COPPER PRECIPITATE—
Lisbon, 218 t.

HEMATINE CRYSTALS—
New York, 12 brls.

PYRALIN—
New York, 33 cs.

SILICATE (otherwise undescribed)
New York, 3,641 bgs.

TAR—
Gothenburg, 65 brls.

WAX—
New York, 810 brls.

LEITH.

Week ending October 11.

NIL.

LIVERPOOL.

Week ending October 11.

ACETATE OF LIME—
Boston, 2,343 bgs.

BEES WAX—
Boston, 5 cs.; Cenco, 326 sks.

BORACITE—
Panderma, 500 t.

CHEMICALS (otherwise undescribed)
Havre, 4 cs.

COPPER PRECIPITATE—
Huelva, 1,806 bgs.; Secondee, 4 bxs.

CREAM OF TARTAR—
Oporto, 31 cks.

DYESTUFFS—
Argols
Messina, 33 cks.

Logwood Extract
Kingston, 615 cks.

Myrabolans
Calcutta, 2,699 bgs., 5,084 pkts.

Sumac
Palermo, 1,040 bgs.

GLUE—
Boston, 50 brls.

PYRITES—
Huelva, 6,474 t.

ROSIN—
Bordeaux, 712 cks.; Lisbon, 138 cks.; Para, 8 cs.

SOAP—
Boston, 1,500 brls.; Catania, 100 cs.; New Orleans, 1,000 brls.

SULPHUR—
Catania, 67 brls.

LONDON.*Week ending October 11.*

ACETIC ACID U.S.A., 37 pkgs.	DIESTUFFS — Indigo British India, 8 cfts.; Guatemala, 7 cfts. Myrabolans B. India, 4,550 t., 30,715 pkgs. Tanners' Bark Natal, 2,322 t. Turmeric British India, 833 pkgs.	STEARINE — Holland, 68 pkgs.	PARAFFIN WAX — Philadelphia, 112 bgs.
ALUMINA SULPHATE Germany, 250 pkgs.	FERRO VANADIUM — France, £7,000.	TALLOW — China, 261 t. 9 c.; New Zealand, 100 t. 4 c., 20 cks.; Sweden, 101 brls.; U.S.A., 833 brls., 90 drms.	PETROLEUM PITCH — New York, 1,537 brls.
AMMONIUM PHOSPHATE U.S.A., £1,820.	FISH OIL — Azores, 13 brls., 71 cks.; Japan, 1,010 cs.; Spain, 7 brls.	TANNIC ACID — Canada, £900.; Switzerland, £68.	PHOSPHORUS — Montreal and Quebec, 500 cs.
ARSENIC — Straits, 8 t. 9 c.	FORMALDEHYDE — U.S.A., £2,550.	TAR — Norway, 166 cks.; Sweden, 470 brls.; U.S.A., 100 cks.	SCALE WAX — Philadelphia, 100 brls.
BARIUM CHLORATE — Switzerland, £168.	GELATINE — Belgium, £5,217.; France, £596.; Holland, £1,547.	TARTARIC ACID — Italy, 50 pkgs.	SOAP — Philadelphia, 2,000 bxs.; Valencia, 640 cs.
BARYTES — Spain, 1,000 bgs.	GLUE — Belgium, £160.; France, £217.	THORIUM NITRATE — U.S.A., £3,155.	STEARINE — Belgium, 138 bgs.
BEES WAX — B.W.I., 10 pkgs.; Chili, 2 sks.; Morocco, 39 bgs.; Portugal, 88 pks.	GUALIACOL CARBONATE — Belgium, £126.	ULTRAMARINE — Belgium, 40 brls.	SULPHUR — New York, 44 brls.
CALCIUM GLYCEROPHOSPHATE U.S.A., £100.	LITHIUM CARBONATE — Canada, £407.	WHITE LEAD — Canada, 62 cks.; Spain, 1,018 kgs.; U.S.A., 322 cks.	TAR (WOOD) — Gothenburg, 2 brls.
CALCIUM LACTATE — Canada, £90.	PARAFFIN SCALE — U.S.A., 13 t. 6 c.	WOOD OIL — China, £1,701.; Hong Kong, 2,700 cs.	TARTAR EMETIC — Rouen, 30 cks.
CITRATE OF LIME B.W.I., 215 pkgs.; British Guiana, 15 pkgs.	PARAFFIN WAX U.S.A., 104 t. 4 c.	ZINC OXIDE — Belgium, 30 cks.	ZINC OXIDE — Antwerp and Ghent, 40 brls.
COPPER ACETATE France, £121.	PLUMBAGO — Japan, 120 brls.		
CREAM OF TARTAR — France, 60 pkgs.	POTASSIUM BROMIDE — U.S.A., £140.		
DIESTUFFS (otherwise undescribed) Switzerland, £61.	ROSIN — France, 535 cks.; Portugal, 145 cks., 91 brls.; U.S.A., 5,090 brls.		
DIESTUFFS — Aniline Dye Belgium, 21 pkgs.; Switzerland, 174 pkgs. Annatto Belgium, 20 pkgs. Cutch British India, 350 pkgs. Gambier Straits, 131 pkgs.	SALTPETRE — British India, 654 t.		
	SOAP — Spain, £850.; U.S.A., £85.		
	SODIUM BROMIDE — Switzerland, 4 c.; U.S.A., 1 t.		

MANCHESTER.*Week ending October 11.*

ANTIMONY SALTS — Rouen, 71 cks.	DIESTUFFS — Aniline Colours Belgium, 37 brls. Wood Extract Belgium, 3 cks.
BARYTES — Philadelphia, 215 brls.; Rotterdam, 194 cks.	FORMIC ACID — Rouen, 68 cks.
DEXTRINE — Philadelphia, 430 bgs.	

MIDDLESBROUGH.*Week ending October 11.*

NIL.

NEWCASTLE-ON-TYNE*Week ending October 11.*

MANGANESE — Gothenburg, 11 cs.	WHITE LEAD — Antwerp, 5 cks.
STEARINE — Antwerp, 68 bgs.	
TAR — Gothenburg, 3 brls.	

N. & S. SHIELDS.*Week ending October 11.*

NIL.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

BRISTOL.*Publication of Official Returns Suspended.***GLASGOW.***Week ending October 11.*

AMMONIUM PHOSPHATE — Algiers, 4 t.; Piraeus, 1 t.	DISINFECTANTS (otherwise undes.) Barcelona, £133.	SODA CRYSTALS — Singapore, 1 t. 7 c.	BORAX — Helsingfors, 50 bgs.; Naples, 10 bgs.
AMMONIUM SULPHATE — Kobe, 580 t.; Yokohama, 341 t.	DIESTUFFS (otherwise undescribed) Brisbane, 8 t. 2 c.; Bordeaux, £41.	SODIUM BICHRIMATE — Bombay, £358.	CHEMICALS (otherwise undescribed) Abo, 700 cks.; Belgian Congo, 1 cks., 6 cs.; Christiansund, 1 cs.; Genoa, 29 drms., 200 cks., 430 cs.; Helsingfors, 4 cks., 130 t.; Lisbon, 6 cks., 10 cs.; Oporto, 100 drms.; Pasages, 50 bgs.; Rotterdam, 145 cks., 12 cs.; Stavanger, 7 cks.; Stockholm, 29 cks.; Santander, 10 cs.; Trondhjem, 20 kgs., 110 cks.; Tammerfors, 2 kgs.; W.C. Africa, 33 cs.
BITUMASTIC SOLUTION — Hong Kong, 4 c.	DIESTUFFS — Quebracho Extract Alexandria, £772.	STEARINE PITCH — Helsingfors, 5 t. 4 c.	DISINFECTANTS (otherwise undes.) Belgian Congo, 383 drms., 67 pkgs.
CARBON BISULPHIDE — Madras, £37.	GELATINE — Montreal, £165.	SULPHURIC ACID — Colombo, £55.	DIESTUFFS (otherwise undescribed) Abo, 1 kg., 3 cks.; Genoa, 10 kgs., 78 pkgs., 37 cks.
CAUSTIC SODA — Palermo, 30 drms.	GLUE, SIZE, AND GELATINE — Bilbao, £59.; Bombay, £75.; Hong Kong, 10 c.; Montreal, 7 c.; Singapore, 1 t.	WAX — Bombay, £41.	FERRO MANGANESE — Bilbao, 25 brls.; Newfairwater, 130 t.; Rotterdam, 78 cks.
CHEMICALS (otherwise undescribed) Antwerp, 240 pkgs.; Barcelona, 133 pkgs.; Batavia, 15 pkgs.; Bombay, 130 pkgs.; Boston, 167 pkgs.; Brisbane, £155.; Kobe, 490 pkgs.; Padang, 100 pkgs.; Sourabaya, 14,161 pkgs.; Totok, 10 pkgs.; Singapore, 156 pkgs.	IODINE (CRUDE) — Montreal, £890		GLUE — Trondhjem, 2 bgs.
COAL PRODUCTS (otherwise undes.) Bombay, £868.; Calicut, £12.; Cochín, £132.; Demerara, £60.; Naples, £700.; Natal, £140.; Samarang, £58.	LEAD NITRATE — Montreal, 5 t.		PITCH — Antwerp, 1,502 tins.; Belgian Congo, 4 tins.
COAL PRODUCTS Pitch Alexandria, 73 t. 18 c.; Gothenburg, 17 t.; Helsingfors, 10 t. 10c.	MAGNESIUM SULPHATE — Alexandria, £80.		PLUMBAGO — Bergen, 1 ck.
Tar Colombo, 2,000 gals.; Madras, 4,000 gals.; Penang, 10,840 gals.; Pt. Swettenham, 4,810 gals.; Singapore, 2,000 gals.	NITRIC ACID — Madras, £100.		SALT — Belgian Congo, 13,566 bgs., 12 cs.; Bilbao, 25 cs.; Christiania, 350 bgs.
DEXTRINE Alexandria, £7.; Genoa, £150.	PARAFFIN WAX Bilbao, £83.; Bordeaux, 50 t.; Genoa, £6,383.		SOAP Abo, 100 cs.; Belgian Congo, 10 bxs., 48 drms., 6 kgs., 538 cs.; Christiansund, 5 drms., 50 kgs.; Genoa, 2,000 cs.; Helsingfors, 1 cs.; Newfairwater, 24 bxs.; Stavanger, 12 brls., 25 cs.; Trondhjem, 16 cs.

GOOLE.*Week ending October 11.*

NIL.

GRANGEMOUTH.*Week ending October 11.*

CAUSTIC SODA — Rotterdam, 36 t. 5 c.	GRIMSBY.
PARAFFIN WAX — Rotterdam, 10 t.	<i>Week ending October 11.</i>
PITCH — Rotterdam, 204 t.	NIL.
TALLOW — Rotterdam, 12 t.	

HULL.*Week ending October 11.*

NIL.

BASIC SLAG — Coruna, 200 t.; Lisbon, 180 t.; Oporto, 50 t.	HULL.
BLEACHING POWDER Rotterdam, 7 cks.	<i>Week ending October 7.</i>

SODA—

Danzig, 28 cks.

TAR—

Rotterdam, 35 brls.; Wiborg, 100 brls.

WOOD PRESERVATIVE—

Belgian Congo, 1 drin.

LEITH.

Week ending October 11.

ALUM (CHROME)—

Antwerp, 19 c., £110.

BORAX—

Antwerp, 9 t. 1 c., £380.

BORIC ACID—

Antwerp, 2 t. 19 c., £221.

COAL PRODUCTS (otherwise undes.)

Antwerp, £57.

MAGNESIUM OXIDE—

Antwerp, 1 t., £80.

POTASSIUM BICHROMATE—

Antwerp, 3 t. 10 c., £562.

LIVERPOOL.

Week ending October 9.

ACETIC ACID—

Bahia, 1 c., £10.; Bombay, 1 c., £6.; Kilindini, 10 c., £67.; Penang, 1 t. 18 c., £206.; Rio de Janeiro, 1 c., £16.

ALUM—

Bahia, 15 c., £11.; Bathurst, 1 c., £1.; Calcutta, 7 t. 14 c., £490.; Desterro, 2 c., £3.; Maceio, 1 t., £21.; Pernambuco, 10 c., £11.; Piraeus, 8 t., £140.; Pto. Alegre, 2 t. 19 c., £67.; Sierra Leone, 1 c., £1.

ALUM AMMONIA—

Constantinople, 2 c., £2.; Rio de Janeiro, 8 c., £35.; Rio Grande do Sul, 2 c., £20.

ALUMINA SULPHATE—

Pasages, 2 t., £32.; Pernambuco, 10 c., £17.

AMMONIA—

Sierra Leone, 2 c., £25.

AMMONIA (ANHYDROUS)—

Bombay, 2 t. 12 c., £230.

AMMONIUM CARBONATE—

Bahia, 3 t. 3 c., £206.; Barcelona, 2 t. 10 c., £175.; Bombay, 2 t. 10 c., £204.; Bilbao, 4 c., £19.; Florianopolis, 1 c., £5.; Kobe, 10 t., £525.; Madras, 1 t., £92.; Marseilles, 4 t. 9 c., £310.; Melbourne, 21 t. 18 c., £255.; Mollendo, 9 c., £84.; New York, 4 t., £240.; Pernambuco, 1 t. 5 c., £195.; Penang, 5 c., £19.; Piraeus, 5 c., £14.; Rio Janeiro, 4 t. 3 c., £258.; Santos, 4 c., £24.; Yokohama, 14 t. 19 c., £915.

AMMONIUM CHLORIDE—

Barcelona, 5 c., £13.

AMMONIUM MURIATE—

Adelaide, 5 c., £14.; Amsterdam, 3 t. 2 c., £157.; Barcelona, 7 t. 15 c., £412.; Constantinople, 2 t., £130.; Kobe, 10 t., £525.; Madras, 5 t., £286.; Moji, 5 t., £270.; Montreal, 8 t. 1 c., £364.; New York, 5 t. 17 c., £260.; Toronto, 4 t. 11 c., £204.

AMMONIUM PHOSPHATE—

Barcelona, 6 c., £30.

ANILINE OIL—

Amsterdam, 5 t., £650.

ANTIMONY REGULUS—

Cologne, 60 cks.

ARSENIC—

Aracaju, 15 c., £100.; Bahia, 1 t., £130.

ARSENIC SULPHIDE—

Pernambuco, 55 lbs., £8.

BARIUM CARBONATE—

Bordeaux, 20 t., £276.

BARIUM CHLORIDE—

Barcelona, 17 t. 6 c., £460.

BLEACHING POWDER—

Algoa Bay, 5 c., £4.; Barcelona, 15 t., £268.; Calcutta, 35 t., £524.; Colombo, 2 c., £4.

BLEACHING POWDER—

Corunna, 8 t. 5 c., £132.; Hong Kong, 30 t., £524.; Melilla, 3 t., £56.; Natal, 2 c., £10.; Rio de Janeiro, 12 t. 7 c., £200.

BORAX—

Bahia, 5 c., £20.; Belize, 3 c., £16.; Bombay, 5 t., £210.; Mauritius, 1 c., £8.; Paranagua, 5 c., £11.; Rio Grande do Sul, 3 c., £22.; Rotterdam, 10 t., £480.

BORIC ACID—

Pernambuco, 1 c., £5.; Rio Grande do Sul, 2 c., £12.

CALCIUM CHLORIDE—

Durban, 4 t. 19 c., £37.; Havre, 57 t. 11 c., £666.; Lisbon, 3 t. 19 c., £27.; Natal, 15 t. 16 c., £118.; Singapore, 5 t. 1 c., £37.

CALCIUM PHOSPHATE—

Cape Town, 3 t., £255.; Stockholm, 12 c., £68.

CARBONATE OF LIME—

Lisbon, 1 t. 1 c., £18.

CARNAUBA WAX—

Rangoon, 1 bg.

CAUSTIC SODA—

Alicante, 24 pkgs.; Kobe, 124 drms.; Madras, 76 drms.; Piraeus, 723 drms.; Samarang, 50 brls., 25 drms.; Singapore, 20 drms.; Sydney, 35 drms.; Sourabaya, 50 drms.; Stockholm, 75 drms.; Valparaiso, 10 drms.; Yokohama, 558 drms.; Zanzibar, 18 drms.

CHEMICALS (otherwise undescribed)

Melbourne, 5 c., £15.; Stockholm, 1 c., £23.; Stamboul, 1 t., £52.

CHINA CLAY—

Bombay, 40 t.

CHLORIDE OF LIME—

Barcelona, 5 t., £70.; Rio de Janeiro, 9 t. 8 c., £158.; Laurence Marques, 10 c., £10.

CHROME ACETATE—

Rio de Janeiro, 10 c., £62.

CITRIC ACID—

Havana, 10 c., £223.; Porto Alegre, 10 c., £227.; Seville, 4 c., £96.; Stockholm, 5 c., £120.

COAL PRODUCTS—Carbolic Acid
Baku, 1 c., £6.; Calcutta, 1 c., £6.; Kobe, 19 t. 15 c., £1,196.; Melbourne, 1 t. 17 c., £62.; Montreal, 3 t., £196.**Cresoline**

Para, 3 c., £14.; Pto. Alegre, 2 t. 10 c., £210.; Santos, 7 t. 1 c., £761.

Cresote

Lagos, 3 t., £130.

Cresylic Acid

San Francisco, 19 t. 13 c., £715.

Dye

Bombay, 22 t. 16 c., £10,096.; Genoa, 9 t. 3 c., £4,815.; Halifax, 1 t. 6 c., £225.; Lagos, 1 c., £57.; Shanghai, 2 t. 10 c., £5,991.

Naphthalene

Amsterdam, 7 c., £15.; Rio Grande do Sul, 1 c., £18.

Pitch

Bordeaux, 243 t. 7 c., £1,300.

Tar

Accra, 5 t., £37.; Axim, 10 c., £10.; Burutu, 1 t. 12 c., £12.; Cape Coast, 13 c., £13.; Koko, 12 c., £5.; Lagos, 2 t. 10 c., £125.; Sawan, 1 t. 5 c., £6.; Opobo, 12 c., £5.; Winnebuh, 2 t. 1 c., £26.

COPPER SULPHATE—

Callao, 6 t. 16 c., £273.; Bombay, 69 t. 5 c., £1,361.; Rio de Janeiro, 5 t. 2 c., £37.

COPPERAS—

Bombay, 49 t. 5 c., £442.; Rio de Janeiro, 5 t. 2 c., £37.

CREAM OF TARTAR—

Bahia, 1 c., £20.

DISINFECTANTS (otherwise undes.)

Accra, 1 c., £6.; Algoa Bay, 1 t. 2 c., £56.; Bombay, 12 t. 1 c., £547.; Calcutta, 1 t. 11 c., £75;

DISINFECTANTS (otherwise undes.)

Colombo, 4 c., £15.; Delagoa Bay, 1,500 gals., £319.; Durban, 11 t. 9 c., £505.; Malacca, 500 gals., £78.; Penang, 2 t. 2 c., £67.; Pt. Harcourt, 1 c., £5.; Rangoon, 1 c., £6.; Rufisque, 3 c., £7.; Sapele, 3 c., £7.; Secondee, 5 c., £18.

DYES/STUFFS—Aniline Dye
Antwerp, 35 t., £2,611.; Barcelona, 3 t. 13 c., £175.; Calcutta, 1 t. 13 c., £917.; Copenhagen, 1 t. 3 c., £591.; Hong Kong, 16 c., £413.; Kobe, 5 t. 6 c., £2,571.; Madeira, 12 lbs., £11.; Manaos, 12 lbs., £9.; Melbourne, 3 t. 15 c., £1,003.; Meltown, N.B., 10 c., £57.; Montreal, 1 t. 7 c., £535.; New York, 5 t. 19 c., £3,128.; Patras, 1 c., £56.; Rio de Janeiro, 1 t. 3 c., £516.; Saigon, 1 t. 15 c., £280.; Singapore, 1 c., £16.; Toronto, 11 t. 15 c., £3,600.; Vera Cruz, 10 c., £340.; Yokohama, 3 t. 5 c., £832.**FERRO MANGANESE—**

Bilbao, 12 t.; Dantzig, 280 t.

GLUE, SIZE, AND GELATINE

Algoa Bay, 1 pkg.; Calcutta, 76 pkgs.; Ferrol, 21 pkgs.; Kingston, 4 pkgs.

HYDROCHLORIC ACID—

Lisbon, 66 lbs., £2.; Rio de Janeiro, 44 lbs., £2.

HYDROCYANIC ACID—

Burutu, 1 c., £12.

HYDROFLUORIC ACID—

Bahia, 2 c., £11.

HYDROGEN PEROXIDE—

Rio de Janeiro, 8 c., £45.; Rio Grande do Sul, 3 c., £15.

LEAD NITRATE

Stockholm, 2 c., £11.

MAGNESIUM CHLORIDE—

Alexandria, 1 t., £18.; Madras, 1 t., £19.; New Orleans, 1 t. 5 c., £27.; Piraeus, 10 c., £11.; Pt. Louis, 10 c., £11.; Rouen, 30 t. 4 c., £573.

MAGNESIUM SULPHATE—

Bahia, 6 c., £8.; Lagos, 7 c., £87.; Malta, 1 t., £13.; Rio de Janeiro, 3 t. 2 c., £54.; Rouen, 2 t., £220.; Santos, 10 c., £8.; Valparaiso, 2 t., £40.

MERCURY PERCHLORIDE

Bahia, 2 qrs., £25.

OXALIC ACID—

Pernambuco, 1 c., £11.

PARAFFIN WAX—

Galatz, 184 bgs.

PHOSPHORIC ACID—

Rio de Janeiro, 2 qrs., £10.

PITCH—

Melbourne, 3 c., £11.; Toronto, 1 t., £70.

POTASSIUM BICHROMATE—

Galatz, 1 t., £159.; Lisbon, 2 t. 1 c., £358.; Rotterdam, 10 t. 3 c., £1,607.

POTASSIUM CHLORATE—

Bahia, 10 c., £45.; Calcutta, 5 c., £27.; Delagoa Bay, 1 t., £110.; Piraeus, 6 c., £38.

POTASSIUM CYANIDE—

Bahia, 1 c., £25.; Pto. Alegre, 1 c., £21.

POTASSIUM IODIDE—

Bahia, 1 c., £45.

POTASSIUM NITRATE—

Seville, 1 c., £18.

POTASSIUM PERMANGANATE—

Constantinople, 2 c., £45.

POTASSIUM PRUSSIAN—

Rio de Janeiro, 10 c., £100.

POTASSIUM SULPHATE—

Teneriffe, 2 t., £82.

SALAMMONIAC—

Bilbao, 1 t., £75.; Bahia, 9 c., £29.; Marseilles, 1 t., £75.; New York, 3 t., £270.; Pasages, 1 c., £3.; Rangoon, 4 t. 13 c., £340.; Seville, 2 c., £11,

SALT—

Aalborg, 200 t.; Abidjan, 54 t.; Accra, 35 t.; Algoa Bay, 20 t.; Attuaboe, 9 t.; Abonema, 20 t.; Bakoua, 15 t.; Barbados, 323 t.; Bergen, 577 t.; Bodoe, 2,500 t.; Burutu, 1,160 t.; Christiania, 1,722 t.; Conakry, 150 t.; Degama, 20 t.; Freetown, 70 t.; Gaboon, 30 t.; Halifax, N.S., 4,194 t.; Havana, 2 t.; Iddo, 168 t.; Iquitos, 50 t.; Kano, 516 t.; Kingston, 129 t.; Koko, 21 t.; Lagos, 470 t.; Manaos, 225 t.; Mauritius, 264 t.; Montreal, 3,593 t.; Monte Video, 53 t.; Nantes, 56 t.; New Orleans, 329 t.; Norrkopping, 50 t.; Opobo, 140 t.; Puerto Barrios, 75 t.; Saltpound, 17 t. 14 c.; Sapele, 9 t. 9 c.; Secondee, 86 t. 3 c.; Shanghai, 7 t. 4 c.; Trondhjem, 25 t.; Vera Cruz, 10 t.

SALTPETRE—

Bathurst, 2 c., £8.; Funchal, 2 c., £7.; Las Palmas, 1 t. 3 c., £65.; Sierra Leone, 4 c., £14.; Pernambuco, 25 t., £1,200.

SHEEP DIPNovorossisk, 2 t. 6 c.
Pt. Stanley, 2 t. 4 c., £143.**SOAP—**

Alexandria, 1,877 bxs., 495 cs.; Accra, 1 cs.; Amsterdam, 12 brls., 107 cs.; Antwerp, 24 brls., 200 cs.; Axun, 400 bxs.; Bangkok, 180 bxs.; Bahia, 336 bxs.; Belgrade, 8 pkgs.; Calabar, 360 bxs., 16 cs.; Calcutta, 1,410 bxs.; Colombo, 10 cs.; Cape Town, 56 cs.; Casablanca, 670 bxs.; Ceuta, 6 bxs.; Colombo, 25 cs.; Funchal, 102 bxs.; Guayaquil, 712 bxs.; Helsingfors, 2,150 cs.; Hong Kong, 16 cs.; Iquitos, 500 bxs., 125 cs.; Karachi, 50 bxs., 65 cs.; Kingston, 400 bxs., 1,008 cs.; Koko, 50 cs.; Lanzerette, 75 bxs.; Lagos, 250 cs.; Larache, 325 pkgs., 540 bxs.; Larissa, 216 bxs.; Larnaca, 106 bxs.; Las Palmas, 764 bxs.; Limassol, 83 bxs.; Madras, 89 cs.; Malta, 1,918 bxs.; Manta, 304 bxs.; Mauritius, 10 cs.; Melilla, 50 bxs.; Messina, 50 cs.; Nantes, 1,000 cs.; Paphos, 50 pkgs.; Palma, Balearic Is., 50 pkgs.; Penang, 35 bxs.; Phillippeville, 50 pkgs.; Piraeus, 8 bxs.; Punta Arenas, 16 bxs.; Pt. of Spain, 2,900 pkgs.; Pt. Sudan, 530 pkgs.; Quittah, 53 pkgs.; Rabat, 30 pkgs.; Rangoon, 2,104 bxs.; Rio del Rey, 20 pkgs.; Rufisque, 315 pkgs.; St. John, N.F., 215 bxs.; San Juan del Sur, 274 pkgs.; San Thome, 80 pkgs.; Secondee, 8 bxs.; Sherbro, 18 pkgs.; Singapore, 204 bxs.; Surinam, 50 pkgs.; Tangiers, 100 bxs.; Teneriffe, 340 pkgs., 977 bxs.; Varna, 1,000 cs.; Victoria, W.C. Africa, 60 bxs.; Yokohama, 3 bxs.; Zanzibar, 200 pkgs.

SODA ASH—

Brisbane, 72 pkgs.; Kobe, 1,352 bgs., 4,732 pkgs.; Leghorn, 185 pkgs.; Malmo, 400 bgs.; New Orleans, 2,000 bgs.; Piraeus, 50 pkgs.; Singapore, 87 pkgs.; Shanghai, 3,213 pkgs.; Sourabaya, 300 brls.; Stavanger, 100 brls.; Stockholm, 700 brls.; Sydney, 226 brls.; Tientsin, 21,160 brls.; Valparaiso, 100 brls.; Vancouver, 350 brls.; Victoria, 150 bgs.

SODA CRYSTALS—

Bombay, 25 pkgs.; Piraeus, 100 pkgs.; Rosario, 1,000 pkgs.; Santa Cruz de Teneriffe, 10 pkgs.

SODIUM BICARBONATE—

Abo, 415 pkgs.; Adelaide, 365 pkgs.; Amsterdam, 975 pkgs.; Bordeaux, 367 pkgs.; Brisbane, 367 pkgs.; Colon, 10 pkgs.; Genoa, 370 pkgs.; Madras, 500 pkgs.; Singapore, 67 pkgs.; Stamboul, 40 pkgs.; Sydney, 159 pkgs.; Trinidad, 60 kgs.; Valparaiso, 220 pkgs.; Victoria, 7 cks.; Yokohama, 1,276 pkgs.

SODIUM SILICATE—
Adelaide, 285 pkgs.; Alexandria, 99 pkgs.; Boston, 20 cks.; Lisbon, 1,500 cks.; Santos, 20 pkgs.; Talcahuano, 34 cks.; Townsville, 120 bgs.; Valparaiso, 50 pkgs.; Victoria, 32 cks.

SODIUM SULPHIDE—
Galatz, 5 t. 7 c., £126.

STEARINE—
Durban, 280 bgs.; Galatz, 24 brls.

SULPHUR—
Havre, 2 t. 10 c., £60.; Rio Grande do Sul, 2 c., £13.

SULPHUR (FLOWERS)—
Rouen, 2 t., £50.

SULPHUR (SUBLIMED)—
Stockholm, 10 c., £15.

SULPHURIC ACID—
Lisbon, 3 qrs., £3.; Rio de Janeiro, 1 c., £78.; Valparaiso, 18 c., £48.

TALLOW—
Marseilles, 171 brls.; Pernambuco, 60 pkgs.

TANNIC ACID—
Barcelona, 7 c., £160.

TARTARIC ACID—
Melbourne, 1 t., £303.; Stockholm, 5 c., £85.

WAX—
Barcelona, 2 pkgs.; Copenhagen, 35 brls.

WOOD PRESERVATIVE—
Jesselton, 4 t., £180.; Monte Video, 14 c., £21.

LONDON.

Week ending October 8.

ACETIC ACID—
Antwerp, 3 cks., £40.; Beyrou, 3cs., £19.; Barbados, 1 ck., £12.; Genoa (F.), 23 cks., £350.

ACETO SALICYLIC ACID—
Danzig, 16 pkgs., £508.; Melbourne, 3 cs., £76.; Sydney, 2 cs., £40.

ALUM—
Cartagena, 1 t. 11 c., £41.; Panama, 10 c., £14.

ALUMINA SULPHATE—
Brussels, 10 t. 1 c., £176.

AMMONIA—
Alexandria, 25 cs., £42.; Bombay, 67 cs., £242.; Buenos Ayres, 16 pkgs., £47.; Boulogne, 29 drms., £405.; Calcutta, 20 cs., £39.; Beira, 3 cs., £6.; Colombo, 13 pkgs., £23.; Demerara, 4 cs., £6.; Durban, 67 cs., £128.; Havre, 15 drms., £140.; Jamaica, 10 cs., £20.; Karachi, 8 cs., £15.; Lisbon, 18 cs., £34.; Lourenco Marques, 10 cs., £19.; Monte Video, 5 cs., £14.; Piraeus, 8 cs., £18.; Pt. Elizabeth, 5 cs., £10.; Italy, via Treport, 10 cs., £32.; Trinidad, 4 cs., £8.

AMMONIA (ANHYDROUS)—
Alexandria, 18 cylds., £181.; Malta, 6 cylds., £53.

AMMONIUM ACETATE—
Bombay, 1 cs. (pt.), 2 cs., £31.

AMMONIUM BROMIDE—
Calcutta, 2 cs. (pt.), £16.

AMMONIUM CARBONATE—
Adelaide, 6 c., £20.; Amoy, 2 c., £10.; Alexandria, 1 t. 8 c., £90.; Bombay, 1 c., £7.; Cartagena, 4 c., £17.; Piraeus, 1 c., £6.; Rio de Janeiro, 2 t. 14 c., £250.

AMMONIUM CITRATE—
Calcutta, 1 cs. (pt.), £14.

AMMONIUM HYDRATE—
Calcutta, 1 cs. (pt.), £6.

AMMONIUM IODIDE—
Sydney, 1 cs., £26.

AMMONIUM MURIATE—
Belgrade, 4 c., £13.

AMMONIUM PHOSPHATE—
Barcelona (F.), 12 cs., £66.; Montreal, 2 cs., £43.

AMMONIUM SULPHATE—
Dunkirk, 298 t. 3 c., £2,910.

AMMONIUM SULPHOCYANIDE—
Bilbao, 2 cs., £22.

AMYL ACETATE—
Germany, 13 drms., £1,300.; Switzerland, 3 drms., £287.

ANTIMONY—
Rotterdam, 3 cks., £140.

ANTIMONY OXIDE—
Dunkirk, 1 ck., £15.; Gothenburg, 1 ck., £11.

ANTIMONY REGULUS—
Rotterdam, £600.

ANTIMONY SULPHIDE—
Boulogne, 42 cks., £582.; Dunkirk, 16 cks., £220.; Gothenburg, 3 cks., £50.; Rotterdam, 1 cks., £24.

ARSENIC—
Bombay, 1 t., £45.; Paris (F.), 4 t. 5 c., £250.; Rouen, 5 t. 2 c., £340.

BASIC SLAG—
Antigua, 5 t., £20.; Bilbao, 200 t. £800.; Malraix, 49 t. 5 c., £172.

BEEES WAX—
Amsterdam, 5 c.

BISMUTH—
Calcutta, 1 cs. (pt.), £40.; Gothenburg, 1 cs., £13.; Rosario, 2 cs., £84.

BISMUTH CARBONATE—
Amsterdam, 1 cs., £43.; Buenos Ayres, 1 cs. (pt.), £11.; Calcutta, 1 cs. (pt.), £6.; Durban, 1 cs. (pt.), £6.

BISMUTH SALICYLATE—
Constantinople, 1 cs. (pt.), £77.; Rangoon, 1 cs. (pt.), £18.

BISMUTH SUBGALLATE—
Buenos Ayres, 1 cs., £32.

BISMUTH SUBNITRATE—
Amsterdam, 1 cs. (pt.), £114.; Bombay, 1 cs. (pt.), £8.; Calcutta, 1 cs. (pt.), £20.; Durban, 1 cs. (pt.), £5.; Rangoon, 1 cs. (pt.), £39.

BLEACHING POWDER—
Dunkirk, 5 t. 5 c., £67.

BORAX—
Switzerland, via Antwerp, 6 t., £234.; Antwerp, 15 t., £750.; Cologne, 2 t., £84.; Danzig, 10 t. 8 c., £409.; Galatz, 2 c., £7.; Havre, 20 t., £870.; Rotterdam, 14 t. 1 c., £563.; Salonika, 3 c., £9.

BORIC ACID—
Switzerland, via Antwerp, 4 c., £16.; Amoy, 2 c., £10.; Calcutta, 1 t. 11 c., £97.; Canton, 1 c., £5.; Danzig, 4 t. 10 c., £469.; Danzig (F.), 7 t. 17 c., £582.; East London, 1 c., £6.; Galatz, 12 c., £47.; Gijon (F.), 1 t. 9 c., £122.; Liban (F.), 1 t., £73.; Mormugao, 1 c., £6.; Peking, 2 c., £11.; Piraeus, 1 c., £6.

BROMINE—
Calcutta, 27 pks. (pt.), 1 cs., £10.

CALCIUM & PHOSPHORIC ACID—
Pt. Elizabeth, 2 pkgs., £9.

CARNAUBA WAX—
Lisbon, 10 c.

CAUSTIC POTASH—
Bombay, 3 cs. (pt.), £20.; Calcutta, 1 ck., £8.

CAUSTIC SODA—
Beira, 3 c., £8.; Bilbao, 32 t., £800.; Cologne, 41 t. 7 c., £720.; Fremantle, 1 t. 1 c., £50.

CERESINE WAX—
Amsterdam, 2 t. 10 c.; Galatz, 5 t. 3 c.; Genoa, 19 c.; Gothenburg, 1 t.; Havre, 1 t.; Lisbon, 15 c.; Nantes, 3 t.; Paris, 9 t., £440.

CHEMICALS (otherwise undescribed)
Alexandria, 1 cs., £10.; Calcutta, 36 pkgs. (pt.), £599.; Copenhagen, 1 cs., £10.; East London, 1 pkg., £6.; Famagusta, 2 cs., £16.; Karachi, 12 cs. (pt.), £80.; Melbourne, 4 pkgs. (pt.), £32.

CHLORIDE OF LIME—
Bombay, 2 c., £7.

CHRYSOROBIN—
Rangoon, 2 cs. (pt.), £34.

CITRIC ACID—
Adelaide, 5 c., £113.; Bilbao, 10 c., £302.; Calcutta, 2 c., £55.; London, 2 c., £33.; Karachi, Cape Town, 10 c., £226.; East 2 c., £54.; Karachi (F.), 5 c., £126.; New York (F.), 4 t., £1,848.

COAL PRODUCTS—

Alizarine
Bombay, 14 cks., £424.

Aniline Colour
Salonika, 8 kgs., £148.; Shanghai 1 ck., £26.

Aniline Dye
Antwerp, 1 kg., £25.; Bangkok, 1 cs., £59.; Brussels (F.), 2 cs., £23.; Brussels, 10 kgs., £550.; Calcutta, 2 cks., £307.; Italy, 1 ck., £79.

Betanaphthol
Constantinople, 3 cs. (pt.), £74.

Bitumen
Dunedin, 2 cks., £7.

Carbolic Acid
Shanghai, 1 cs. (pt.), £7.; Wellington, 1 ck., £8.

Creosote
Montreal, 50 cks., £183.

Cresylic Acid
Cape Town, 403 drms., £705.

Naphthalene
Bombay, 5 cs., £11.; Calcutta, 20 cs., £54.; Durban, 5 kgs., £14.; Montreal, 266 cks., £1,091.; Penang, 30 pkgs., £75.; Rosario, 15 brls., £82.

Pitch
Antwerp, 251 t., £960.; East London, 5 cs., £5.

Tar
Bangkok, 3 cks., £6.; Beira, 275 drms., £58.; Mauritius, 10 cks., £22.; Malmo, 250 cks., £401.; Pt. Elizabeth, 290 pkgs., £170.

Tar Oil
Monte Video, 50 cks., £133

COBALT OXIDE—
Rotterdam, 3 cs., £213.

COPPER ACETATE—
Bilbao, 2 cs., £20.; Italy, 1 ck., £11.

CREAM OF TARTAR—
Buenos Ayres, 2 c., £31.; Bombay, 2 t., £480.; Bombay (F.), 10 c., £128.; Calcutta, 1 c., £17.; Cartagena, (F.), 4 c., £72.; Cologne, 7 c., £80.; Durban, 2 c., £24.; Fremantle, 6 c., £79.; Karachi (F.), 4 c., £80.; Limon, (F.), 1 cs., £9.; Madras, 1 cs., £8.; Melbourne (transit), (F.), 1 t., £360.; Rotterdam (F.), 5 c., £61.; Thursday Island (F.), 1 c., £13.

DIETHYLBARBITURIC ACID—
Brussels (F.), 1 cs., £29.

DISINFECTANTS (otherwise undescribed)
Antofagasta, 19 c., £23.; Alexandria, 1 t., £61.; Barcelona, 13 c., £61.; Bilbao, 8 c., £19.; Barbados, 17 c., £30.; Brisbane, 10 c., £7.; Bombay, 18 c., £75.; Brussels, 1 t. 2 c., £43.; Buenos Ayres, 58 t. 10 c., £3,393.; Cartagena, 4 t. 14 c., £250.; Calcutta, 2 c., £25.; Canton, 4 c., £11.; Colombo, 2 c., £5.; Demerara, 17 c., £30.; Durban, 9 c., £10.; East London, 9 c., £49.; Hong Kong, 11 t., £445.; Jaffa, 1 c., £6.; Madras, 3 c., £24.; Madrid, 1 t. 3 c., £108.; Montreal, 1 t. 17 c., £120.; Newcastle, N.S.W., 1 c., £9.; Penang, 1 t. 3 c., £38.; Peking, 4 c., £30.; Piraeus, 8 c., £22.; Pt. Swettenham, 1 t. 8 c., £62.; Puerto Barrios, 2 t. 6 c., £75.; St. Lucia, 7 c., £26.; Sandakan, 1 t. 17 c., £95.; Suez, 4 c., £11.; St. John's, N.F., 1 t. 13 c., £60.; Wellington, 7 c., £21.

ETHER—
Beyrou, 6 cs. (pt.), £7.; Calcutta, 27 pkgs. (pt.), 1 cs., £14.

ETHER (ACETIC)—
Bombay, 1 cs., £9.

ETHER (OZONIC)—
Bombay, 1 cs., £8.

ETHER (SULPHURIC)—
Alexandria, 2 cs., £50.; Bombay, 1 cs., £6.

ETHYL CHLORIDE—
Durban, 1 cs., £7.

FATTY ACIDS—
Nantes, 38 t. 10 c.

FERRO TUNGSTEN—
Rotterdam, £4,080.

FORMALDEHYDE—
Alexandria (F.), 3 cs., £42.; Antwerp, 5 cks., £134.

GLUE, SIZE, AND GELATINE—
Antwerp, 2 c.; Bombay, 1 t. 8 c.; Brisbane, 1 t. 7 c.; Calcutta, 1 c.; Cape Town, 1 c.; Dunedin, 1 c.; Durban, 8 c.; East London, 1 t.; Hong Kong, 1 t.; Karachi, 14 c.; Kobe, 4 t.; Madras, 1 t. 7 c.; Melbourne, 2 c.; Rotterdam, 57 t. 5 c.; Shanghai, 1 c.; Stockholm, 2 c.; Sydney, 1 t. 15 c.; Trinidad, 1 c.

GLYCERINE—
Alexandria, 5 c., £35.; Amoy, 1 c., £8.; Bangkok, 1 c., £8.; Bombay, 1 c., £7.; Calcutta, 2 c., £25.; Cape Town, £6.; Danzig, 5 t., £630.; Durban, 10 c., £59.; Galatz, 3 c., £22.; Peking, 1 c., £7.; Piraeus, 6 c., £45.; Pt. Elizabeth, 1 t. 13 c., £195.; Shanghai, 1 c., £14.

HYDROCHLORIC ACID—
Bombay, 1 c., £6.; Durban, 8 c., £44.

HYDROFLUORIC ACID—
Bombay, 1 cs., £17.; Durban, 1 cs., £6.

HYDROGEN PEROXIDE—
Alexandria, 2 cs., £12.; Beira, 1 cs., £5.; Durban, 2 cs., £13.; Paris, 5 cks., £40.

HYDROXIDE—
Karachi, 1 cs. (pt.), £15.

IODINE—
Boulogne, (F.), 9 cks., £4,775.

IRON & AMMONIUM CITRATE—
Buenos Ayres, 1 cs. (pt.), £6.; Calais, 3 cs. (pt.), £68.; Durban, 1 cs., £6.; Sydney, 1 cs. (pt.), £11.

IRON AND POTASSIUM TARTRATE—
Calais, 3 cs. (pt.), £25.

LACTIC ACID—
Genoa (F.), 1 ck., £70.; Sydney, 26 cks., £156.

LEAD SULPHATE—
Bombay, 8 cks., £160.

LITHIUM CARBONATE—
Bombay, 1 cs. (pt.), £6.; Boulogne (F.), 1 cs., £43.

MAGNESIA—
Alexandria, 3 cs., £22.; Brussels, 1 cs., £17.; Lisbon, 50 bgs., £70.

MAGNESIUM CHLORIDE—
Montreal, 4 drms., £29.

MAGNESIUM CITRATE—
Beyrou, 5 cs. (pt.), £7.

MAGNESIUM OXIDE—
Boulogne, 1 cs., £11.

MAGNESIUM SILICATE AND FLUORIDE—
Copenhagen, 1 brl., £19.

MAGNESIUM SULPHATE—
Bombay, 1 t. 4 c., £56.; Calcutta, 8 c., £28.; Cartagena, 10 c., £24.; Durban, 10 c., £10.; Karachi, 4 c., £11.; Newcastle, N.S.W., 1 t. 3 c., £46.; Panama, 6 c., £16.; Paris, 1 t., £29.; Peking, 5 c., £8.; Sydney, 10 c., £10.

MAGNESIUM SULPHATE (GLAUBER SALTS)—
Cartagena, 11 c., £5.

MANGANESE BORATE—
Amsterdam, 3 c., £29.

MANGANESE SULPHATE—
Stockholm, 1 ck., £76.

MERCURIALS—
Sydney, 1 cs. (pt.), £15.

MERCURY BICHLORIDE—
Beyrou, 11 cs. (pt.), £12.

MERCURY PERCHLORIDE—
Colombo, 1 cs. (pt.), £5.

MERCURY SUBCHLORIDE—
Calcutta, 1 cs., £42.

METHYL SALICYLATE—
Beyrouth (F.), 5 cs. (pt.), £6.;
Constantinople (F.), 1 cs., £22.

METHYLENE BLUE—
Calcutta, 1 cs., £8.

MINERAL WAX—
Galatz, 4 t.

NICKEL CHLORIDE—
Italy, 1 ck., £16.

NITRIC ACID—
Bombay, 1 c., £7.; Durban, 6 c.,
£36.

PARAFFIN WAX—
Antwerp, 1 t. 4 c.; Genoa, 20 t.

PARALDEHYDE—
Calcutta, 1 cs. (pt.), £7.

PHOSPHORIC ACID—
Bombay, 2 cs., £18.; Calcutta,
1 cs., £7.; Melbourne, 4 cs., £39.;
New York, 38 pkgs., £170.;
Paris, 8 cs., £36.; Sydney,
89 cs., £374.

PLUMBAGO—
Constantinople, 2 c.; Marseilles,
1 t.

POTASSIUM ACETATE—
Sydney, 1 cs (pt.), £5.

POTASSIUM BICARBONATE—
Brussels, 10 cks., £61.

POTASSIUM BICHROMATE—
Danzig, 5 t., £790.

POTASSIUM BROMIDE—
Calcutta, 2 cs. (pt.), £19.;
Colombo, 1 cs. (pt.), £9.

POTASSIUM CARBONATE—
Alexandria, 3 cs., £32.; Brussels,
1 kg., £15.; Bombay, 1 kg. (pt.),
£7.

POTASSIUM CITRATE—
Bombay, 4 cs., £67.; Calcutta,
1 cs. (pt.), £7.; Singapore, 3 cs.
(pt.), £7.; Sydney, 1 cs. (pt.), 3
cs., £101.

POTASSIUM CYANIDE—
Buenos Ayres, 1 cs., £10.;
Constantinople, 2 cs., £66.

POTASSIUM HYDROXIDE—
Calcutta, 27 pkgs. (pt.), £10.

POTASSIUM IODIDE—
Beyrouth, 6 cs. (pt.), £11.;
Calcutta, 1 cs. (pt.), £20.;
Danzig, 5 cs., £336.; Naples,
3 cs. (pt.), £85.

POTASSIUM METABISULPHITE
Bombay, 10 cks., £145.; Paris,
8 cks., £422.

**POTASSIUM OXIDE, AND
HYDRATE**—
Rangoon, 1 cs. (pt.), £19.

POTASSIUM PERMANGANATE—
Alexandria, 1 cs., £24.; Con-
stantinople (F.), 2 cs., £42.;
Constantinople, 2 cs. (pt.), £19.;
Danzig, 36 cs. (pt.), £96.;
Perth, 1 c., £18.; Rangoon, 1 cs.
(pt.), £5.

POTASSIUM PHOSPHATE—
Demerara, 25 t., £625.

POTASSIUM PRUSSATE—
Colombo, 1 cs., £12.

POTASSIUM SULPHIDE—
Melbourne, 2 cs., £14.

SALAMMONIAC—
Alexandria, 2 c., £9.; Constanti-
nople, 2 t. 11 c., £254.; Durban,
5 c., £18.; Salonika, 2 t. 2 c.,
£168.

SALICYLIC ACID—
Bombay, 1 cs., £5.; Sydney,
1 cs., £7.; Switzerland, 20 cks.,
£112.

SALPETRE—
Barcelona, 3 t., £165.; Bilbao,
26 t., £1,248.; Buenos Ayres,
6 t. 9 c., £368.; Durban, 10 c.,
£29.; Gijon, 1 t., £55.; Lisbon,
12 t. 2 c. (F.), £428.; Lisbon,
5 t. 17 c., £315.; New York, 50 t.
(F.), £1,929.; Panama, 2 c., £7.;
Salonika, 2 c., £11.; Toronto,
5 t., £300.

SHEEP DIP—

Beira, 4 c., £29.; Buenos Ayres,
2 c., £6.; Durban, 4 t. 9 c., £396.

SILVER NITRATE—

Constantinople, 1 cs. (pt.), £30.;
Rangoon, 1 cs. (pt.), £5.

SILVER PROTEINATE—
Buenos Ayres, 1 cs. (pt.), £5.

SIZE—

Montreal, 4 c.

SOAP—

Aden, 1 c.; Alexandria, 1 t. 2 c.;
Amsterdam, 3 t.; Antwerp,
138 t. 10 c.; Auckland, 2 c.;
Bangkok, 4 t. 6 c.; Bordeaux,
34 t. 6 c.; Boston, 16 c.; Bou-
logne, 4 t. 6 c.; Bombay, 2 t.
19 c.; Calais, 1 t. 9 c.; Callao,
8 c.; Calcutta, 17 c.; Canton,
3 c.; Cape Town, 1 t. 6 c.;
Channel Islands, 3 t. 7 c.;
Cologne, 42 t. 19 c.; Colombo,
2 c.; Constantinople, 15 c.;
Cyprus, 2 c.; Djibouti, 1 c.;
Dunedin, 1 c.; Durban, 14 c.;
Ghent, 1 t. 16 c.; Grenada, 1 c.;
Guayaquil, 4 t. 9 c.; Havre, 2 t.;
Hong Kong, 5 c.; Italy, 1 t. 2 c.;
Jamaica, 3 c.; Karachi, 17 c.;
Libau, 18 t. 10 c.; Lulea, 17 c.;
Lisbon, 17 c.; Malmo, 3 c.;
Melbourne, 14 c.; Monte Video,
3 c.; Napier, 2 c.; Naples,
18 c.; Penang, 3 c.; Paris,
13 t. 7 c.; Piraeus, 11 c.;
Rotterdam, 24 t. 2 c.; Salonika,
18 c.; Santos, 1 c.; Sourabaya,
1 c.; Shanghai, 1 c.; Stockholm,
19 t. 2 c.; St. Vincent, 1 c.;
Trinidad, 3 c.; Valparaiso, 6 c.;
Vancouver, 5 c.; Wellington, 6 c.

SODA ASH—

Cologne, 99 t. 14 c., £935.;
Switzerland, 50 t., £350.

SODA CRYSTALS—
Danzig, 3 c., £6.

SODIUM BENZOATE—

Batoum, 2 cs. (pt.), £15.

SODIUM BICARBONATE—

Alexandria, 11 c., £50.; Bilbao,
11 c., £28.; Calcutta, 3 c., £6.;
Cartagena, 10 c., £20.; Con-
stantinople, 1 c., £8.; Kilindini,
1 t. 10 c., £19.; Karachi, 2 c.,
£8.; Limassol, 10 c., £10.;
Panama, 6 c., £13.; Shanghai,
1 c., £8.; Yokohama, 4 c., £6.

SODIUM BISULPHITE—
Antwerp, 2 t., £59.

SODIUM BROMIDE—
Danzig, 36 cs. (pt.), £125.

SODIUM CITRATE—
Calcutta, 1 cs. (pt.), £11.;
Sydney, 1 cs., £22.

SODIUM CYANIDE—
Bilbao, 4 cs., £32.

SODIUM FORMATE—
Barcelona, 1 cs., £21.

SODIUM GLYCEROPHOSPHATE—
Gothenburg, 2 cs., £26.

SODIUM IODIDE—
Constantinople, 1 cs. (pt.), £11.;
Danzig, 1 cs., £93.; Naples,
3 cs. (pt.), £60.

SODIUM PHOSPHATE—
Calcutta, 3 c., £6.

SODIUM PRUSSATE—
Kobe, 14 t. 19 c., £1,138.

SODIUM SALICYLATE—
Bombay, 1 cs., £5.; Calcutta,
1 cs., £10.; Rotterdam, 2 cks.,
£70.; Sydney, 4 cks., £42.

SODIUM SILICATE—
Durban, 1 t. 9 c., £71.; Gothen-
burg, 8 t. 1 c., £128.

SODIUM SULPHIDE—
Boulogne, 22 t. 13 c., £383.

SODIUM SULPHITE—
Antwerp, 2 t., £72.; Sydney,
2 t., £70.

SODIUM TARTRATE—
Melbourne, 1 t., £114.

SPERMACEITI WAX—
Genoa, 14 c.

SULPHUR—

Amsterdam, 1 c., £5.; Dantzig,
2 t., £160.; Hankow, 6 c., £13.

SULPHUR CHLORIDE—

Barcelona, 2 drms., £54.

SULPHURIC ACID—

Bombay, 1 c., £6.; Calcutta,
27 pkgs. (pt.), £16.; Durban,
6 c., £30.

SUPERPHOSPHATES—

Colombo, 50 t.
Genoa, 31 t. 3 c.; Rotterdam,
141 t. 8 c.; Trinidad, 4 c.

TANNIC ACID—

Auckland (F.), 1 cs. (pt.), £5.;
Constantinople (F.), 1 cs., £53.;
Danzig (F.), 11 brls., £220.;
Paris (F.), 2 cks., £55.

TARTARIC ACID—

Amsterdam, 10 c., £155.; Bar-
bados, 1 kg., £9.; Bombay (F.),
1 c., £22.; Bombay, 13 c., £233.;
Dunedin, 1 c., £18.; Durban, 1 c.
(F.), £24.; Durban, 14 c., £258.;
East London, 2 c., £50.; Fre-
mantle, 1 cs. (pt.), £11.; Karachi,
1 c., £19.; Karachi (F.), 7 c.,
£145.; Limon (F.), 1 c., £21.;
Melbourne, 2 t. 10 c., £731.;
New York, 6 t., £1,842.; Rotter-
dam, 3 t., £930.; Vera Cruz, 3 c.,
£58.; Yokohama, 5 t., £1,618.

TIN OXIDE—
Antwerp, 8 cks., £277.

WAX—

Dominica, 2 c.; Melbourne, 8 c.;
Piraeus, 1 t.

WHITE LEAD—

Aden, £63.; Calcutta, £4.;
Channel Islands, £20.; Danzig,
£63.; Fremantle, £65.; New
York, £14.; Paris, £600.; Penang,
£17.; Sydney, £380.; Taitai, £15.;
Trinidad, £17.

ZINC ACETATE—
Calcutta, 1 cs. (pt.), £16.

ZINC SULPHATE—
Amoy, 1 ck., £8.; Bilbao, 1 cs., £6.

MANCHESTER.

Week ending October 8.

ACETIC ANHYDRIDE—
Antwerp, 86 pkgs.

ALUM (LUMP)—
Alexandria, 1 ck.

AMMONIA—
Rouen, 44 drms.

COAL PRODUCTS—
Carbolic Acid
Antwerp, 16 cks.

DISINFECTANTS (otherwise undes.)
Alexandria, 46 cs.; Dakar, 192 cs

FERRO MANAGNESE—
Philadelphia, 1,500 t.

GLUE—
Alexandria, 1 bg.

IODIFORM—
Opobo, 1 cs.

LEAD NITRATE—
Antwerp, 8 cks.

MAGNESIUM SULPHATE—
Opobo, 5 brls.

MANGANESE SULPHATE—
Melbourne, 1 ck.

PITCH—
Antwerp, 150 t.

POTASSIUM BICARBONATE—
Melbourne, 3 kgs.

SALAMMONIAC—
Alexandria, 80 cs.

SALT—
Abonema, 2,776 bgs.; Bakana,
138 bgs.; Cape Palmas, 3,800
bgs.; Degama, 1,000 bgs.;
Ghent, 5,600 bgs.; Iddo, 920
bgs.; Lagos, 1,825 sks.; Lome,
8 cs.; Monrovia, 5,000 bgs.; Pt.
Harcourt, 2,000 bgs.; Sassandra,
100 bgs.; Secondee, 100 sks.;
Winnebah, 10,422 cks.

SOAP—
Alexandria, 130 cs.; Antwerp,
48 cs.; Cape Palmas, 40 cs.;

SOAP—

Dakar, 76 cs.; Lagos, 41 cs.;
Lome, 60 cs.; Monrovia, 80 bxs.;
Opobo, 560 cs.; Rufisque, 611
cs.; Sierra Leone, 1 cs.; Win-
nebah, 425 bxs., 2 cs.

SODIUM BISULPHATE—
Rouen, 10 cks.

SODIUM PHOSPHATE—
Melbourne, 5 cks.

SODIUM SULPHIDE—
Melbourne, 20 drms.; Rouen,
38 drms.

WOOD PRESERVATIVE—
Dakar, 36 cs.

MIDDLESBROUGH.

Week ending October 11.

ACETIC ACID—
Kilindini, 1 t. 6 c., £89.

AMMONIA—
Havre, 20 t. 6 c., £588.

AMMONIUM SULPHATE—
Kobe, 298 t. 17 c., £5,714.;
Rouen, 95 t., £1,768.; Yoka-
hama, 214 t. 11 c., £4,164.

BARIUM BINOXIDE—
Yokohama, 1 t., £133.

CHEMICALS (otherwise undescribed)
Sydney, 2 t., £33.

COAL PRODUCTS—

Naphthalene
Aden, 20 t. 9 c., £327.; Mombasa,
16 t. 4 c., £276.

Pitch
Antwerp, 805 t., £2,414.

Solvent Naphtha
Rouen, 1 t. 11 c., £600.

MAGNESIA (CALCINED)—
Rouen, 9 c., £59.

MAGNESIUM CARBONATE—
Rouen, 10 t., £391.

SALT—
Antwerp, 70 t., £195.; Faroes,
130 t., £404.; Malmo, 234 t.,
£593.

NEWCASTLE-ON-TYNE

Week ending October 11.

ANTIMONY—
Antwerp, 11 t. 10 c.; Aarhus,
1 t.; Rotterdam, 51 t.

BLEACHING POWDER—
Antwerp, 25 t. 4 c.; Aarhus, 2 t

CREAM OF TARTAR—
Bergen, 1 t.

GELATINE—
Aarhus, 8 c.; Bergen, 5 c.

PITCH—
Rotterdam, 17 t.

RED LEAD—
Aarhus, 7 t. 10 c.

SALT—
Aarhus, 3 t.

SOAP—
Antwerp, 65 t.

SODA CRYSTALS—
Rotterdam, 20 t.

SODIUM CARBONATE—
Antwerp, 1 t.

SODIUM SULPHITE—
Antwerp, 5 t.

TAR—
Antwerp, 20 brls.

WAX—
Bergen, 2 c.

WHITE LEAD—
Aarhus, 5 t. 14 c.; Rotterdam,
4 t.

N. & S. SHIELDS.

Week ending October 12.

NIL.

SWANSEA.

Week ending October 11.

NIL.

PRICES CURRENT.

THURSDAY, Oct. 16, 1919.

PREPARED BY MESSRS. HIGGINSBOTTOM AND CO., 21, SPRING GARDENS, MANCHESTER.

The values stated are F.O.R. at makers' works, or at usual ports of shipment in U.K., unless otherwise specified
The prices in different localities may vary

Acids:—

£ s. d.

*Acetic 40%, and 60% per cwt.	29/- & 44/-
" " Glacial per ton	85 0 0
Arsenic, S.G. 2,000 ² per ton	70 0 0
Boric, Crystals "	72 0 0
*Fluoric per lb.	0 0 7
*Muriatic (Tower Salts), 28° Tw. per carboy	0 6 6
*Nitric, 80° Tw. per ton	32 0 0
Oxalic per lb.	0 1 1
Phosphoric, 1,750 ² "	0 1 9
*Sulphuric (tanning, 70%) per ton	—
" " (Pyrites, 168°) "	7 18 9
" " (" 140°) "	4 10 0
" " (free from arsenic, 144°) "	5 7 4
Tannic (commercial) per lb.	0 2 6
Tartaric (crystals) "	0 3 2
*Acetone per ton	80 0 0
*Alum, loose lump (delivered) "	17 0 0
Alumina Sulphate (pure) "	17 0 0
Alumoterric (in slabs) "	8 10 0
Aluminium (Ingot Metal, 98/99%) per ton	150 0 0
*Ammonia, Anhydrous per lb.	0 1 10
" " 880 per ton	33 0 0
" " 920 per ton	20 0 0
" " Carbonate per lb.	0 0 6½
" " Muriate (grey) per ton	47 10 0
" " (sal ammoniac) 1st & 2nd, per cwt.	80/- & 75/-
" " Nitrate per ton	60 0 0
" " Phosphate "	110 0 0
" " Sulphate (grey), London, net "	—
" " " Hull "	—
" " " Manchester "	—
*Aniline Oil (pure) per lb.	0 1 2
Aniline Salt "	0 1 2
Antimony per ton	45 0 0
" " (tartar emetic), 43/44% per lb.	0 3 4
" " (golden sulphide) "	0 1 3
Arsenic, white powdered per ton	60 0 0
Barium Chloride (in casks) "	23 0 0
" " Carbonate (native), 92/94% "	11 10 0
" " Sulphate (native levigated) "	£7 to £14
Baryta Chlorate per lb.	0 1 3
*Bisulphide of Carbon per ton	55 0 0
*Bleaching Powder, 35% "	17 0 0
" " Liquor, 7% "	6 0 0
Casein (commercial) "	90 0 0
Chromium Acetate (crystals) per lb.	0 1 0
Calcium Chloride per ton	8 0 0
China Clay (at Runcorn), in bulk "	70/- to 90/-

Coal-tar Products and Dyes:—

Alizarine (artificial), 20% per lb.	0 2 0
Magenta "	18/- to 35/-
Anthracene, 40/50% A, f.o.b., L'don, per unit.	0 0 7
Benzol, 90's (naked) per gal.	0 2 0½
" " 50/90's "	0 1 10½
Carbolic Acid (crude, 60) "	0 1 7½
" " (crystallised, 40°) per lb.	0 0 9½
" " Acid (pale liquid, 97/98%) per gal.	0 2 9
*Creosote (ordinary), naked "	0 0 6½
*Crude Naphtha, 30% at 120°C. "	0 0 9
*Grease Oils, 18° Tw. (naked) per ton	6 10 0
Pitch, f.o.b., Liverpool or Garston "	3 2 9
*Solvent Naphtha, 90% at 160° per gal.	0 2 5
Copper per ton	106 0 0
" " Sulphate "	40 0 0
Dross Salts "	39 0 0
*Glycerine (crude), 80% "	72 0 0
" " (industrial, S.G. 1,260) "	110 0 0
*Iodine per oz.	0 1 0
*Iron Nitrate, 80° Tw. per ton	12 0 0
" " Sulphate (copperas), delivered "	4 5 0
" " Sulphide "	9 0 0
Lead (Foreign Pig) "	28 10 0
" " Litharge Flake "	45 0 0
" " Acetate (white) "	83 0 0
" " (brown) "	68 0 0

Lead, Carbonate (White lead), pure per ton	50 0 0
" " Nitrate "	50 0 0
Lime, Acetate (brown) "	12 0 0
" " (grey), 80% "	17 0 0
Magnesium Chloride "	15 10 0
" " Carbonate (light) per cwt.	2 7 6
" " Calcined Magnesite per ton	21 10 0
" " Sulphate (Epsom Salts) (coml.) "	12 0 0
" " (druggists) "	16 0 0
Manganese, Sulphate "	75 0 0
" " Borate "	95 0 0
*Methylated Spirit, 64° (industrial) per gal.	0 5 7
*Naphtha (Wood), Solvent "	0 10 0
" " Miscible, 60° p. "	0 10 0

Oils:—

*Cottonseed per ton	95 0 0
*Linsced "	90 0 0
Stearine, 115-120° M.P. "	105 0 0
Potassium, Bichromate per lb.	0 1 5
" " Carbonate, 85% per ton	103 0 0
" " Chlorate per lb.	0 1 0
" " Hydrate (Caustic Potash) 90% per ton	160 0 0
" " " 75/80% "	140 0 0
" " Potash Hydrate Liquid, 50° B. "	95 0 0
" " Nitrate (refined) "	55 0 0
" " Permanganate (commercial) per lb.	0 3 3
" " Prussiate (yellow) "	0 1 9
" " (red) "	0 5 6
" " Sulphate, 90% (ex ship) per ton	30 0 0
" " Muriate, 80% "	30 0 0
Silver (metal) per oz.	0 5 3½
Sodium (metal) per lb.	0 1 3
" " Acetate per ton	50 0 0
" " Arseniate, 45% "	60 0 0
" " Borate (Borax), Crystals "	39 0 0
" " Bicarbonate (2 cwt. bags) "	8 5 0
" " Bichromate per lb.	0 0 11
" " Carb. (Caustic Soda-ash), 48% per ton	12 10 0
" " (Alkali), 58% (bags) f.o.r. {	6 10 0
" " (Soda Crystals), (bags) car. pd. wks. {	5 10 6
" " Chlorate per lb.	0 0 6
" " Cyanide (100% basis) for export "	0 0 11
" " Hydrate (70% C. Soda) (f.o.r.) per ton	24 0 0
" " (74% C. Soda) "	23 5 0
" " (70% C. Soda) "	22 0 0
" " (60% C. Soda) "	21 0 0
" " (pure liquid, 90° Tw.) "	10 2 6
" " 77/78% Powdered (99%) Hydrate "	24 10 0
" " Hyposulphite (commercial) "	16 10 0
" " Manganate, 25% "	65 0 0
" " Nitrate, 96% refd., f.o.r., L'pool "	21 0 0
" " Nitrite, 100% "	60 0 0
" " Phosphate "	27 0 0
" " Prussiate per lb.	0 0 11
" " Silicate (glass) Alkaline per ton	12 5 0
" " (liquid, 100° Tw.) "	9 10 0
" " Sulphate (Saltcake), delivered "	8 10 0
" " (Glauber's Salt) "	4 0 0
" " Sulphide (conc.), 60/65% casks "	22 0 0
" " Sulphite "	10 0 0
Sulphocyanide, Ammonium, 95% per lb.	0 2 0
" " Barium, 95% "	0 1 4
" " Potassium "	0 2 4
" " Calcium, 70% per lb.	0 1 4
Sulphur, (Flowers) Sicilian per ton	21 0 0
" " (Roll Brimstone) "	21 0 0
" " Brimstone (best thirds) "	—
" " (ex ship) "	14 10 0
Tallow "	100 0 0
Tin Crystals per lb.	0 1 10
" " English Ingots per ton	278 0 0
Titanium, Potass. Oxalate per lb.	0 1 6
Titanous Chloride per cwt.	4 10 0
Zinc (Spelter) per ton	44 0 0
" " Powder, 88/92% "	70 0 0
* " Chloride (solution, 102° Tw.) "	24 0 0
" " Sulphate, Crystal "	22 0 0

* Pickings extra or returnable; otherwise, prices usually include packages.

THE CHEMICAL TRADE JOURNAL

AND CHEMICAL ENGINEER.

No. 1692.

LONDON, SATURDAY, OCTOBER 25, 1919.

VOL. LXV.

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Readers are invited to forward items of intelligence, company reports and balance-sheets, or cuttings from local newspapers of interest to the trades concerned.

CURRENT TOPICS.

STANDARD METHODS OF ANALYSIS.

NOT the least interesting portion of the paper by Mr. Arnold Philip, read at a meeting of the Institution of Petroleum Technologists this week, was his reference to the standardisation of methods of testing materials. In one or two branches of analytical work attempts to effect some standardisation of methods have been persistently made for some time, but the wider growth of the movement is a matter of comparatively recent development. So far as the testing of petroleum products in particular is concerned, the position has been very ably summed up by Mr. Alexander Duckham, who, a short time ago, stated that even in the simplest tests, carried out on well standardised apparatus, there will be found to be variations in results in the hands of different operators, this being due to small differences in manipulation. Apart from the standardisation of the actual methods of testing is the policy of issuing standard samples of materials, in this case the method of testing being left to the choice of the individual analyst. The recognised standards are then used as a check upon the various methods employed. This procedure, as our readers will be aware from recent articles published in these columns, has been adopted in the case of iron and steel analysis. As the result of a conference convened by the Institute of Chemistry a few months ago, and attended by representatives of other bodies, the matter was carried a good deal further by the decision that the preparation and issue of authoritative samples of chemical substances, metals, etc., of ascertained composition was desirable. Moreover, it was decided that as such standards could not be provided without reference to methods of analysis the scheme should not aim at restricting the choice of methods but always their revision and improvement. Because of the difficulties inherent to the storage and transmission of a sample of oil large enough to carry out a complete set of tests, Mr. Philip did not consider the policy of issuing standardised samples feasible in respect of the testing of mineral oils, although, at the same time, he recognised the necessity for effecting a standardisation of the methods of testing employed. This latter view received a great measure of

support, as will be seen from the report of the discussion on another page. "One objection to the standardisation of methods consists," said the author, "in the real difficulty which is experienced in describing any method of test in such a way that different operators having different experiences in testing will all apply it in the same manner. It is believed that most chemists who have had experience of the difficulties in testing on the large scale must have realised that although a method of test used in a given laboratory may as a general rule be carried out in the same manner, yet even under such conditions, with a large staff of analysts, the members of which change from time to time, a good deal of careful supervision is required in order to secure that the routine of testing is carried out in all its necessary detail, even although full written instructions for the methods are supplied for information. Usually, these must be supplemented by direct verbal instruction. If this is true of one large laboratory it must prove a still more difficult matter to secure uniformity of method of test by means of written instruction in all laboratories." That difficulty is certainly a real one, but it is also one that might very easily be exaggerated. At any rate, we do not think it formidable enough in itself to render a system of standardisation unworkable.

SITES FOR CHEMICAL WORKS.

MR. JOHN ALLAN, on Tuesday, delivered the first of two lectures on "Site, Lay-out, and Construction of Chemical Plant," at the College of Technology, Manchester. The lecturer confined his remarks to the consideration of the choice of a site for a works, with particular reference to finished products, raw material, fuel, water, and labour supply, and to the disposal of the trade effluents.

Closely involved in the selection of a suitable site, said Mr. Allan, was the question of transport facilities, and the more favourable these were, particularly with regard to the carriage of imported raw materials, the more suitable, as a general rule, the site. Rail or waterway connection with the port of entry of the imported material was a distinct advantage. A method of conducting raw material to the works which was often lost sight of was by means of pipe-lines, and reference was made to the establishment of works in the salt areas. Salt was a very essential material in the processes carried on at those works, but by the adoption of pipe-lines for the purpose of conducting the brine long distances, some of the factories could very well, having regard to the many other factors involved in the selection of a site, have been advantageously set up in districts more suitable in numerous ways. The supply of coal was a question which should be dealt with in conjunction with that of raw materials, and the site of a works for the manufacture of chemical products was in a large measure determined by the balance which could be struck between the cost of bringing raw materials into the works and the cost of bringing coal. It should not be forgotten also that fuel was to be used for various other purposes, and it might be necessary to decide which particular class of coal they were going to locate their works near. In certain cases where the consumption of coal was a large factor in the chemical processes which were being carried

out it might well be good practice to transfer the works bodily to where the coal was readily available, in spite of the frequent necessity for carrying other articles that were required at high, or even excessive, costs.

A cheap supply of electricity was very often an important consideration, and the nature of the operations carried out in the works would determine whether electricity at low rates would be a decisive factor in the location of a works. In this respect Mr. Allan instanced the case of a large factory making caustic potash on a big scale. The factory referred to was situated on the banks of a river right in the heart of an agricultural area, and it was there simply because electricity and labour were cheap. The works had easy connection by barges for their product, and the potassium chloride used in the process was supplied to them also in barges. Such a works, by virtue of the process, was, of course, peculiarly well situated for adopting a site of that type.

It was important that a suitable supply of water should be available, and it often happened that that which was quite satisfactory for purposes of steam-raising could not be used in the processes for the manufacture of chemicals. In that case, Mr. Allan suggested, river water could be used for the boiler plant, and the public supply, or, preferably, condensed water produced in the works, for manufacturing purposes. A very difficult and complex problem was presented in disposing of the effluents arising from chemical processes. As an example, it was stated that whilst an effluent from a chemical works might not in itself be harmful, yet if it were discharged indiscriminately into a stream without considering the effect of its admixture with discharges from other works serious consequences might result. Trouble might also follow if certain effluents were sent down the drains without care being exercised. There were other forms of effluents arising from the solid wastes. It sometimes happened that certain solid wastes which were discharged on to a tip produced effects which were detrimental. Moreover, the location of the tip should be taken into consideration. A certain works close to Manchester, concerned with the manufacture of caustic soda, was depositing waste containing small quantities of caustic soda which could not be profitably recovered. That waste was deposited in a heap in what seemed a desirable place for it. Some time after a peculiar disturbance was noticed in a stream a considerable distance away from the heap. Between the stream and the waste deposit ran a canal, and finally it was shown that the drainage from the heap was finding its way underneath the intervening canal and thus affecting the stream. So much was the right of the riparian owner concerned that it was necessary to take all possible precautions with regard to contamination.

In conclusion, Mr. Allan stated, with regard to the supply of labour, that it was of no use erecting a chemical works in a district where labour was practically unobtainable, unless the owners were in a position to house their workmen and thus attract labour from outside districts. Dealing with the actual erection of the works, first of all the constructional materials should be available cheaply, for the cost of plant and buildings was a capital charge on the process, although, at the same time, the buildings themselves should be of a substantial character. Careful investigation should also be made before heavy buildings or plant were erected, and drilling to determine the nature of the soil should not be scamped, as a weak foundation might be discovered which would be affected by heavy buildings or plant.

NEW LIGHT ON SULPHUR.

Some Microscopical Crystallisations.

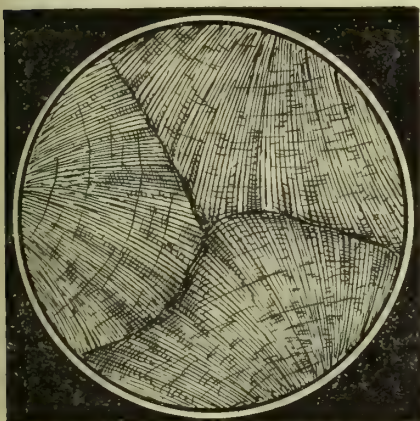
By JAMES SCOTT.

THE allotropicism of sulphur has always afforded investigators plenty of scope for making fresh discoveries; and even now, although new facts have been learnt concerning the modifications of the element, it appears that finality in this respect has not been reached. The latest assumption, based on very careful observation, is that beside the better known, more conspicuous, rhombic, prismatic, octahedral, and plastic forms of sulphur, there are at least two, and probably three or four, others. For my own part, I think that the number could be easily added to by men who will make the requisite experiments.

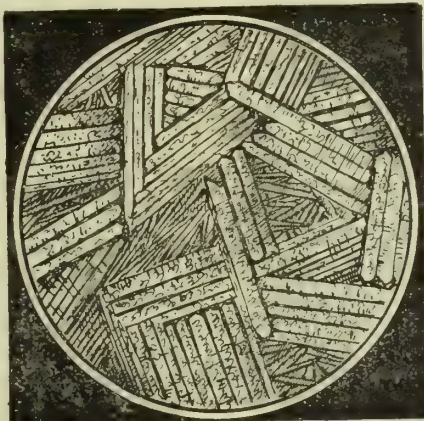
A nacreous form of sulphur can be obtained by heating the element to 150°C ., then cooling it to 98°C ., and scratching the tube containing it with a glass rod. Lustrous needle crystallisation is then induced. A very peculiar colloidal form of sulphur is obtainable by adding a solution of sodium thiosulphate (hypo) to cold sulphuric acid. The liquid is then diluted, heated, and filtered through glass wool. The result is that a cloudy yellow

tions which are traceable in it. It has been reasonably concluded that there are at least two distinct modifications or dynamic isomerides, and these are now termed $\text{S } \lambda$ and $\text{S } \mu$. They appear to depend principally upon the influence of temperature. $\text{S } \lambda$ is comparatively mobile, and stable below a temperature of 160°C . $\text{S } \mu$ is viscous and dark. All liquid sulphur contains both of these phases up to a definite temperature, when changes begin to manifest themselves. $\text{S } \mu$ is completely dissolved in $\text{S } \lambda$, and equilibrium is maintained at temperatures below 160°C . The two kinds are, however, only partly miscible in each other under certain circumstances.

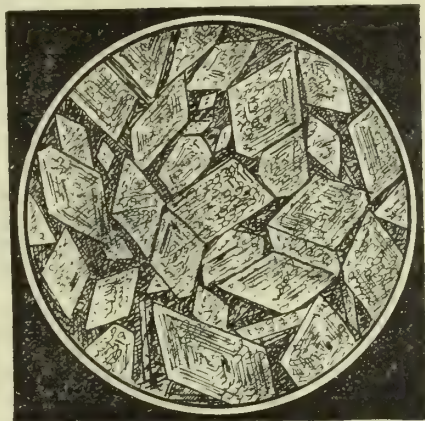
At a temperature of 160°C a saturated solution of $\text{S } \mu$ in $\text{S } \lambda$, and a saturated solution of $\text{S } \lambda$ in $\text{S } \mu$ are evident. Above 160°C only $\text{S } \mu$ is stable, and the percentage of $\text{S } \lambda$ decreases as the temperature rises. The changes can be retarded or accelerated by means of the action of various compounds, but a consideration of this side of the subject does not come within my present purview.



No. 1.—One twenty-fourth inch of a layer of sulphur slowly cooled from the molten state between two glass slides; magnified.



No. 2.—One twenty-fourth inch of a layer of sulphur rapidly cooled from the molten state between two glass slides; magnified.



No. 3.—One twenty-fourth inch of a layer of sulphur suddenly cooled from the molten state between two glass slides; magnified.

mass is left, which upon the application of warmth becomes quite clear and transparent. But as it cools it again becomes turbid. If the mass is separated by means of a centrifuge, some remarkable tests may be made upon it.

From direct observation of the precipitate of sulphur produced in this reaction—*viz.*, sodium thiosulphite and acid,—I find that the sulphur occurs in the shape of minute, glistening, translucent globules, without any obvious crystalline structure. It is no doubt due to some difference between the "skins" of these globules and their internal portions that alternate cloudiness and clearness follows, according to whether the fused mass is cold or hot, because the "skins" must be locked up in the enveloping remainder. Heat reduces them to the same composition as the remainder, but as the mass cools it tends to resolve itself into a cellular form, and the "skins" must then resemble "walls" of the united globules.

Everyone who has examined the subsequent conduct of molten sulphur must have been struck by the varia-

The solid form of $\text{S } \lambda$ is crystalline, and it is soluble in carbon disulphide. On the other hand $\text{S } \mu$ is amorphous, and insoluble in the solvent just named.

When common sulphur is heated the quantity of sulphur dioxide which has arisen, owing to the combination of oxygen with it, retards some of the alterations, and the result differs slightly from that obtained in the laboratory when pure sulphur is dealt with. When the pure element only is used no amorphous sulphur is detectable by rapidly cooling it from its boiling point.

It is only to be expected that disputes are still prevalent in connection with some of these matters; more especially over the melting and freezing points. The latter, for instance, are divided into the *natural* and *ideal freezing points* respectively. The *natural freezing point* of $\text{S } \lambda$ and $\text{S } \mu$ is 114.5°C ., and the mixture then contains 3.7 per cent. of $\text{S } \mu$. The freezing point varies, however, with the proportion of $\text{S } \mu$ sulphur present in the molten state, and the species of solid tested. The following are reliable figures bearing upon the *ideal freezing points* of sulphur wholly devoid of $\text{S } \mu$, and the

natural freezing points of sulphur when the usual equilibrium portion of S_{μ} is present—in other words, after common sulphur has been melted:—

Solid Sulphur.	Natural Freezing Point.	Ideal Freezing Point.
Rhombic S or alpha sulphur	114.5° C. (3.6% S_{μ})	119.3° C.
Prismatic S_2 or beta sulphur	110.2° C. (3.4% S_{μ})	112.8° C.
Nacreous S_8 or gamma sulphur	103.2° C. (3.1% S_{μ})	106.8° C.

A few years ago attempts were made to establish the identity of a form of sulphur called S_{π} , which is deep yellow. A saturated solution of sulphur in sulphur chloride at ordinary temperatures will, of course, take up no more sulphur, yet when the solution is heated to 150° C. and then cooled, quite a lot more of the element can be absorbed in the solution. Since this phenomenon is still in the controversial stage I will not further dwell upon it.

It is claimed that a fourth modification of sulphur is procurable—viz., S_{ϕ} . Add hydrochloric acid at zero to a cold solution of sodium thiosulphite, and then shake the solution with toluene. After a short time S_{ϕ} will separate from the toluene as orange-coloured crystals.

Judging from the preceding details, it would seem that as sulphur loses its yellowness and tends to become brown the original amount of S_{λ} is permanently converted into S_{μ} . But we cannot be sure on this speculative phase. When molten sulphur in its red-brown state is poured into cold water it becomes plastic and non-crystalline; but this form, if removed, dried, and kept awhile, gradually changes into the bright yellow, brittle, and crystalline form. Intricate problems are involved in the study of these alterations, and it would be necessary almost hourly to examine thin layers of this plastic sulphur for a long period—until it had changed into the crystalline stage—to be able to say what really happens in it.

Now, whatever may be one's opinions upon these things, the study of sulphur changes, from the molten to the solid condition, is very attractive if it is assisted by the microscope. I will recount my own experiences while adopting a plan which I believe originated with me—that is, to keep the sulphur between two glass slides. The pressure thus exerted may be compared to that which must occur in a mass of sulphur as it is solidifying from the molten state, yielding formations which cannot, of course, be observed meantime.

I began by heating some flowers of sulphur on ordinary micro-slides, and when this was molten I pressed another slide—a cold one—upon the fluid sulphur. Following this, some sulphur was melted between two glasses and allowed to cool without additional pressure. I made some dozens of tests, but will describe only the main results. Not only can the structural detail be varied according to rapidity of melting and length of the heating period, but a great deal depends on whether it is allowed to cool and solidify in warm or cold surroundings.

If the molten sulphur is cooled slowly between two glasses, both of which were at first hot, it crystallises by the development of the slenderest possible needle-groups. The figures flow, as it were, quickly across the transparent fluid, and turn it into an opaque solid. This result can be hastened by touching the molten sulphur—this time melted on one glass only—with a needle-point. Almost instantaneous solidification occurs. This result is shown in No. 1.

If the molten sulphur is pressed by a cold slide it quickly solidifies into one or another striking crystalline series of forms. In No. 2 is shown that which most usually arises, the crystals often being very symmetrically arranged. In many cases these results are exceptionally fine, and dendritic to the extreme. A variety of dimensions occurs in a small space.

Octahedral (with suppressed features) and kindred rhombic forms can also be obtained, but have to be carefully manipulated for. Some are shown in No. 3. The more sudden the change the more likely are they to appear. Either of these forms can soon be changed into the other, and may sometimes be found together in the space of a single inch. Smaller quantities of sulphur yield different results from larger ones. Sometimes needles and prisms cross one another in an entangled manner.

I noticed that even when the molten sulphur was brown it became yellow after pressure.

I melted some sulphur on glass and tilted and moved the hot slide to and fro for some time. Some of it, as globules, could be made to travel in and out among others which had hardened and become stationary. This aspect is worth following up.

Some of the cooled sulphur, even when pressed, consists solely of clusters of minute globules. Other portions are so finely crystalline as to be practically amorphous. The films of sulphur will often be surrounded by distinct white margins, very wide, due, no doubt, to partial oxidation.

Quite an interesting set of crystal formations can be obtained in the manner suggested.

LOW-TEMPERATURE DISTILLATION.

A PROCESS for low-temperature carbonisation which has attracted more or less notice in British Columbia has been experimented with at Nanaimo under the auspices of the inventor, Walter Thomas, and a Vancouver firm, McPherson and Fullerton Brothers. Originally it was tried on Nicola Valley coal; the products were a semi-coked smokeless fuel, and about 7 gallons of oil per ton of fuel, with little permanent gas. Later work, according to *Chem. and Met. Eng.* (New York), has produced a good dense charcoal from mill waste obtainable for a few cents per cord. In operation, a vertical brick-lined retort some 14ft. high and 3½ft. in diameter is filled with coarse material to be carbonised, then closed, and the air contained in the system forced by a fan through a pipe stove and into the top of the retort. This passes down through the mass to be carbonised, thence through a pipe condenser and an electrical precipitator to remove liquid hydrocarbons, and back to the fan for recirculation. As the carbonised fuel becomes hotter, gases will be given off so that after a time rich distillation gas should constitute the circulating medium.

Dr. Stansfield in his recent report on "Electric Smelting of Iron Ore in British Columbia" presents a short note on this process. He sees many drawbacks to the scheme as it was illustrated to him, such as the difficulty of forcing gas through the field retort, the slow heating of the carbonising mass by the circulating gases, which are of low temperature and low heat capacity, the inefficiency and expense of the ordinary pipe stove, and the decomposition of hydrocarbon which will take place at this point.

LABORATORY TESTS ON MINERAL OILS.*

By ARNOLD PHILIP, B.Sc., F.I.C.

AS a preliminary to the discussion of methods for the chemical testing of oils, it is necessary to make some remarks upon the method of preparing samples for laboratory tests. It must be assumed in the first place that the bulk-sample of oil, as received in the laboratory, really represents correctly the contents of the land storage or steamer-tank from which it has been drawn. The author is accustomed to adopt a routine procedure for preparing representative samples for test for all opaque or dark-coloured oils, creosotes and tars, and it cannot be insisted upon too strongly that, unless satisfactory precautions of this character are taken, all tests made on such oils may be to a large extent illusory. The procedure of preparing representative samples need not generally be rigidly followed in the case of transparent oils, whether these are motor spirits, kerosenes, creosotes, or crude oils, for when an oil is transparent the amount and distribution of any separated water or emulsion can be observed by inspection, and a more convenient and shorter method of measuring the separated water and preparing the representative sample is evidently usable. In all cases, however, it is necessary to prepare representative samples by some suitable procedure.

PREPARATION OF REPRESENTATIVE SAMPLES.

I. *Liquids possessing a density less than that of water.*—The bulk-sample on receipt is allowed to stand in the laboratory in its containing vessel at the room temperature without shaking for at least 17 hours—i.e., overnight. The vessel is then tilted, so that any separated water may collect together in an increased depth at one side at the bottom. The end of a long-stemmed 100 cc. pipette is next inserted, so as to reach to the bottom of the vessel at the side where the water has been caused to collect, and a quantity of the sample, measuring about 100 cc., is withdrawn for inspection. If no water is observed in this sample it is returned to the vessel. The whole sample is then thoroughly mixed by shaking, and the amount necessary for carrying out the requisite tests, designated *Sample A* in the following paragraphs, is withdrawn and tested as desired.

If, however, visible water, other than small drops adhering to the pipette, is observed, the 100 c.c. is returned to the containing vessel, and the whole of the bulk-sample is again allowed to stand and settle for a further period of about 17 hours. At the end of this second period three-quarters of the settled bulk-sample is cautiously decanted off, all shaking being as far as possible avoided. This decanted three-quarters of the original bulk-sample is designated *Sample B*. The remaining one-quarter of the bulk-sample left in the containing vessel, designated *Sample C*, is then poured into a large separating funnel, and the *Sample B*, which was first decanted off, and which has thus been freed from the greater portion of the larger bubbles of water, is returned to the original vessel and well shaken up, and then, like *Sample A*, used for the necessary tests.

The *Sample C* containing most of the separated water and emulsion is allowed to stand in the separating funnel for 17 hours, when all the visible emulsion and water and about one-quarter of the remaining oil is run off from the funnel and mixed with an equal volume of wet kerosene, in order to cause a more complete separation

of the water. After this kerosene mixture has been allowed to stand overnight the volume of the separated water is measured, and this, together with the mixture of oil and kerosene, is transferred to a properly labelled bottle and retained for future reference if necessary. The amount of water found in *Sample C* as described above is calculated as a percentage on the whole of the original bulk-sample, and reported as *Visible Separated Water*.

II. *Liquids possessing a density equal to or above that of water.*—Creosotes and tars usually possess a density greater than unity, and the separation of water by gravity from such liquids either does not take place at all or is extremely slow. This is particularly observable with coal-tar creosotes and low-temperature coal-tars, whose density is only slightly greater than that of water. In transparent creosotes large globules of water may sometimes be observed immersed in the creosote, and neither rising nor falling. In tars which have been obtained by high-temperature distillation, and which have higher gravities, the separation of the water on standing usually takes place at the top of the sample.

For creosotes and low-temperature tar the best method of preparing a representative sample is to proceed as for *Sample A* in Section I. For dense tars a suitable modification of the procedure described in Section I. may be employed, making the necessary alterations indicated by the water being separated on standing at the top instead of at the bottom of the sample.

DISTILLATION TESTS ON CRUDE OILS.

Mineral oils may be divided roughly into the three following groups:—

I. *Petroleum Oil Group*, including: (a) crude petroleum; (b) petrol spirit; (c) turpentine spirit; (d) kerosene; (e) solar oil, gas oil, spindle oil; (f) mineral lubricating oil; (g) petroleum residuum oil.

II. *Shale Oil Group*, including: (a) crude shale oil; (b) shale spirit; (c) shale burning oil; (d) shale gas oil; (e) shale lubricating oil.

III. *Tar Oil Group*, including: (a) tar; (b) benzole; (c) middle oil; (d) creosote oil; (e) anthracene oil.

It is important to notice that the problem of testing the crude oils of each of these three groups is radically different in its nature from that involved in the testing of the other members of the groups. That this is so, may be readily recognised when it is considered that the partially or completely refined members of these groups marked (b) to (g) are supplied to some more or less definite specification, and they are therefore tested to ascertain whether they conform to this specification or not. But crude petroleum is a natural product, the composition of which is in no way controlled by human agency.

For technical testing purposes it is of the greatest importance that a method of fractionation shall be selected which will give the most uniformly concordant results when the same sample of mixed liquids is submitted to it by repeat tests either by the same or by different operators. It is also clearly most desirable that standard methods of fractional distillation tests shall occupy as short a time to carry them out as is possible, consistently with the condition that satisfactorily accurate and uniform results are obtained. Given a sufficient degree of accuracy, it is also desirable that such tests shall be capable of being carried out on small volumes of liquid. A further fact which must be taken into consideration when dealing with the fractionation of

* Abstract of paper read at a meeting of the Institution of Petroleum Technologists in London on Tuesday.

liquids which are liable to be partially decomposed or cracked at or near their temperature of volatilisation, such as the heavier petroleum tar and shale oils, is that the method of distillation used should as far as possible avoid this cracking action. Lastly, it is desirable that the results of the laboratory fractionation of an oil should give results which approach as nearly as possible to those which will be obtained when the oil is distilled on the large scale in a refinery.

The writer is accustomed to carry out the laboratory distillation tests on crude oils or tars in two operations, each performed in a special apparatus. In the first of these the oil is submitted to a topping distillation up to a temperature of 500° F. (260° C.), by means of which in the case of a crude petroleum oil the petrol, water, and kerosene are separated together. This preliminary topping distillation is carried out on a quantity of 1,000 cc. of the crude oil or tar, heated in a glass distillation flask of about 1,500 cc. capacity. During the whole of the distillation a current of 2.4 cubic feet of air per hour is sucked through the heated liquid by means of an electric motor-driven air-pump. The current of air and vapours of distillation products are cooled down after leaving the still by passing through a water-cooled condenser; this separates the condensible vapours, and the air containing only traces of vapour is then once more heated, and passed through the hot oil, and thus continuously circulates until the distillation is complete. The vacuum in the distillation flask throughout this operation is about eight inches of water.

The second stage in the fractionation of the crude oil is next carried out on the residue left in the flask after the topping has been completed. For this purpose it is convenient to use a still of small capacity for laboratory tests. The still which the author has devised has been found to give satisfactory results when dealing with not more than 700 to 800 cc. of the topped oil.

CALORIFIC VALUE OF MOTOR-SPIRIT.

It is not desired to raise a discussion on all the details of the fractionation of motor-spirit at the present moment. The many varieties of test in use are generally so well known that it appears useless to describe or criticise them further, until it is possible to do so under the auspices of some authoritative body charged with the duty of selecting and recommending a standard method of test for general adoption. There is, however, one point in the distillation tests of petrol, concerning which a remark must be made. The usual method of determining the initial distillation-point of motor-spirit is to record it as being the temperature at which the first drop of condensed spirit falls from the thermometer or other specified part of the distillation apparatus.

The determinations of the distillation-point by this method, and by all analogous methods with which the author is acquainted, lead to somewhat discordant results in tests made on the same sample by different observers, and, indeed, even in repeat tests by the same observer. The precise meaning of the figure obtained by such tests, even if it were always found to be the same for the same sample of spirit, cannot be readily defined; it is certainly not the boiling-point of the liquid, and it can only be considered as a very rough measure of the pressure which the spirit is likely to set up when stored in hermetically-closed containers at any temperature. For these reasons the author prefers to ascertain the temperature at which the vapour-pressure of the spirit is equal to that of the atmosphere. This can be very readily done by means of

what is known as the U-tube method of determining boiling-points.

DISTILLATION TESTS OF MOTOR-SPIRIT.

It is considered that the best method for determining the calorific value of motor-spirit of high calorific value in a bomb calorimeter is as follows:—

The liquid is weighed out into a small, stoppered, glass tube, or into a sealed glass bulb, such as are used in vapour-density determinations by Victor Meyer's method. The stoppered tube or sealed bulb containing the petrol is then placed on the platinum tray of the bomb in contact with a small weighed quantity (about 0.25 gramme) of pure naphthalene which has been previously fused, and the ignition-wire adjusted so as to permit of the electric ignition of the naphthalene after the bomb has been closed. On firing, the heat liberated by the combustion of the naphthalene blows out the stopper of the glass tube, or bursts the bulb, and the spirit is thus liberated and ignited without any possibility of loss occurring, a possibility which, as far as the author is aware, is very real in all other methods of burning such volatile liquids in a bomb calorimeter in the interval between weighing out the petrol and closing the bomb.

For heavier oils about one gramme is usually taken for calorimetric tests, and if for petrol, about 0.5 gramme is used with 0.25 gramme of naphthalene, the percentage-error of test is somewhat raised, but it is less than 0.6 per cent., which is quite satisfactory for all practical purposes.

In order to carry out the determination of the calorific value and of the water value in the same operation the following procedure is adopted:—

The fuel is weighed out (one gramme for solid fuel or heavy oil fuel, and for motor-spirit about 0.5 gramme in a glass-stoppered tube, together with 0.25 gramme of naphthalene). After placing the weighed fuel in the bomb and closing it, about a litre of oxygen gas is run through in a gentle stream, in order to remove the nitrogen present, and thus to reduce the formation of nitric acid to a minimum. The exit tube is then closed, and oxygen is admitted until the pressure rises to 30 atmospheres, when the determination of the calorific value is completed in the ordinary manner.

The exit-tube of the bomb is next connected to an absorption train, consisting of the following tubes connected in series: First, a small glass U-tube immersed in broken ice, where most of the water is deposited; second, a five-inch U-tube filled with pumice saturated with strong sulphuric acid in which the remainder of the water is absorbed; thirdly, three Mohr's potash bulbs connected in series, in which the CO₂ is absorbed; and lastly, a calcium-chloride guard tube. The exit tube of the bomb is then gradually opened, and the gas is run through the absorption-tubes at the rate of about two or three bubbles per second. When the gas ceases to flow, the entry tube of the bomb, which has been connected to the usual air purifying train to remove CO₂ and moisture, is opened, and air is sucked through, whilst the bomb is heated up to a temperature of about 250° F. by means of an air bath. The whole operation of determining both the calorific value and the water value of a fuel, and also, if desired, the amount of carbon and of sulphur contained by it, is about three hours, and very concordant results can be obtained even with the most volatile motor-spirits.

There are sources of special error in this method of combustion, which, if recognised, can be reduced to a minimum by suitable precautions. These are:—First, the possibility of the formation of nitric acid during the explosion in the bomb, which acid will later be absorbed with the water, and cause this result to be too high. The second source of error is due to the sulphuric acid formed by the combustion of any sulphur in the fuel. This acid will retain a certain proportion of water in the bomb when it is heated up to 250° F., whilst the stream of air is being passed through it.

WATER IN OILS, TARS, ETC.

When water is present in tars, and also to some extent in creosotes, trouble is not infrequently experienced in driving it off by means of bubbling a stream of dry air through it whilst heated to 212° F., for great frothing may occur. This frothing appears to be due to the fact that the bubbles of water in these liquids are sometimes very small, and therefore, as the extra pressure, above that of the external atmosphere, to which the water in the bubbles is exposed from the surface tension of the film enclosing them, is inversely proportional to their diameter, it may have a considerable magnitude, and prevent the water from giving off vapour until the temperature is well above that necessary to produce a vapour-pressure equal to that of the external atmosphere. When, however, the temperature finally rises sufficiently high to cause the water in the bubbles to commence to give off vapour, they increase in diameter, but this increase at once reduces the pressure due to surface-tension of the liquid envelopes of the bubbles, and hence their condition of equilibrium is unstable, and they expend very rapidly, causing the phenomenon known as frothing, which is especially marked if the number of bubbles of water present in the tar is great, and their diameter is small.

A method of avoiding trouble due to frothing, which has been found to be very satisfactory, is to mix the 200 grammes of tar, creosote, or oil taken for test with about an equal weight of sand or of pieces of dried pumice, fire-bick, or other porous material of about $\frac{1}{4}$ inch diameter. The dried porous material should be heated to a dull-red heat, and then stored, whilst still hot, in a stoppered bottle until required for use.

It is very convenient to employ a routine method for determining water in all oil fuels, creosotes, or tars, for it is not possible to be certain by inspection that a given oil, creosote, or tar will not cause trouble due to frothing. The author therefore makes it the practice to mix dried pumice with all such samples when tested for water, and it is found that this precaution avoids the delay required for making the repeat tests which are sometimes found to be necessary if frothing takes place. It is chiefly because pumice, sand, or fire-brick are difficult to clean out of glass flasks without breakage that a conical copper-sheet flask is recommended for use in these determinations.

FREE ACIDITY OF OIL FUELS.

The methods used by the author for determining free acidities are as follows:—

(1.) *Free acidity to alcohol*: If the oil is not very dark or thick, an amount of 50 grammes is weighed into a 10-ounce bottle, and to this 100 cc. of neutralised alcohol, together with a few drops of neutralised phenolphthalein solution, is added, and the mixture is titrated with a deci-normal solution of caustic soda, in quantities of not more than one-tenth of a cc. at a time, the mixture being

well shaken after each addition, and then allowed to settle. The additions are continued until the separated alcohol just turns pink.

In the case of thick or dark-coloured oils, a quantity of 50 grammes of the sample is weighed into a 300 cc. glass flask, and an amount of 150 cc. of neutral alcohol added. The flask, covered with a watch glass, is heated on the top of a water-bath, but the alcohol should not quite boil. When hot, the mixture is well shaken up, and it will be found that the alcohol will then rapidly separate from the oil, and will be sufficiently clear within from 10 to 15 minutes to permit of its titration with deci-normal soda, using phenolphthalein as an indicator. The oil is again well shaken up after the addition of alkali, and once more heated and allowed to settle, and the titration repeated until a permanent pink colour appears. The whole operation may take as much as 6 or 7 hours to complete, but if it is attempted to carry it out in the cold, the periods required to separate the oil and alcohol will cause the test to take at least three times as long.

(2.) *Free acidity to water*: A quantity of 50 grammes of the oil is weighed into a 250 cc. separating funnel. A quantity of 100 cc. of distilled water, previously made just neutral to methyl orange is added. The mixture is then thoroughly shaken, allowed to settle and the separated water as far as possible run off into a beaker. This operation is again repeated with two further successive quantities of 50 cc. of neutralised water. The total washings are then mixed, and titrated with deci-normal caustic soda, using methyl orange as indicator. In the case of some very thick oils, separation of the water from the oil in the above operations is found to be inconveniently slow and tedious, and in such cases hot water is used, and if necessary, the whole separating funnel is heated by immersing in a hot-water bath.

EFFECT OF MOISTURE IN MINERAL OILS UPON THEIR FLASH-POINTS.

It is well recognised that the presence of moisture in an oil will cause its flash-point to vary in some way, but, as far as the author is aware, the nature of this variation and its amount is not known, or has not been recorded, whilst the connection between varying amounts of water present in a given oil and its flash-point, and the effect of the presence of a given quantity of water in oils of higher and lower viscosity and flash-point (observed in the dry state), and also in oils of different chemical character, such as petroleum oils, creosote oils, shale-oils, etc., has not it is believed been investigated hitherto.

The experiments which the author has carried out on this question appear to show that the most marked effect due to the presence of water in an oil having a flash-point above 150° F. is that it causes much greater variations in the results of a series of repeat flash-point tests made by a series of independent observers all testing the same sample of oil than are found when a similar dry oil is tested in the same way. If the oil containing water has a flash-point (when dry) of above 212° F. the variations between the results of repeat flash-point tests obtained by different observers are more marked than is the case if the oil has a flash-point less than 212° F. The variation between repeat flash-point tests on an oil containing water is, in fact, generally less the lower the flash-point of the oil.

TUNGSTEN ORDER SUSPENDED.—The Ministry of Munitions announces that the tungsten and Molybdenite Order, 1917, is suspended from October 18.

GOLD-ZINC-CYANIDE.*

BY W. R. FELDTMANN.

A DOUBLE cyanide of gold and zinc, which has, apparently, not hitherto been recorded, can be produced in two forms:—

(1) When solutions of, respectively, one equivalent of ZnCl_2 and two equivalents of KAuCy_2 are mixed and allowed to stand for some hours, crystals deposit which, although minute, are easily identified under a low-power microscope as hexagonal prisms. These are nearly colourless, with just a perceptible greenish tinge. They form slowly in dilute solutions—*e.g.*, from a mixed solution carrying $\frac{1}{4}\%$ of KAuCy_2 , crystals commenced to separate in half an hour, but continued to deposit for at least two days.

Similar crystals are obtained by adding HCl to a cold cyanide solution containing gold and zinc in the proportions above indicated, until the solution is just acid to methyl orange. Except for the resulting presence of free HCy , this amounts to the same thing as adding ZnCl_2 solution to KAuCy_2 solution. For KAuCy_2 is a neutral salt, and it has been found that K_2ZnCy_4 , in dilute solution, requires four equivalents of HCl to neutralise it, so that the point at which methyl orange shows commencing acidity is the point at which all free cyanide has been decomposed and the K_2ZnCy_4 has been converted to ZnCl_2 ($\text{K}_2\text{ZnCy}_4 + 4\text{HCl} = 2\text{KCl} + \text{ZnCl}_2 + 4\text{HCy}$).

(2) If a solution containing two equivalents KAuCy_2 is mixed with two equivalents KC_y , and then with four equivalents of HCl , heated to boiling point and allowed to cool, and if a solution of one equivalent of ZnCl_2 is then added and the mixture allowed to stand for some hours, a slow separation of crystals again takes place. But the compound produced by this method is found to be composed of hexagonal pyramids or pyramidal combinations, in which the prism faces are absent. These crystals, also, are nearly colourless, but, in bulk, have a perceptible grey or lavender tinge.

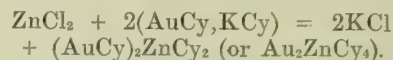
The same pyramidal crystals can be formed by adding to the acidified, heated, and recooled gold solution a cyanide solution containing zinc in the proportion indicated, provided that sufficient HCl is present to render the final mixture just acid to methyl orange. If too little acid has been added, insoluble octahedra separate, carrying an appreciable amount of gold.

If, before the pyramidal crystals have time to form in the mixed solutions described above, the solutions are heated to boiling point, no pyramidal crystals appear, but only hexagonal prisms—*i.e.*, the prismatic is apparently the more stable form of the compound.

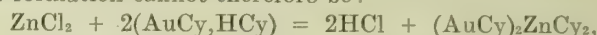
Gold and zinc were separated and estimated gravimetrically (the cyanogen being arrived at by difference) in both the prismatic and the pyramidal forms of the gold-zinc-cyanide. The percentage composition was found to be the same in both cases, *viz.*, 69% gold and 11.4% zinc, corresponding sufficiently closely to the empirical formula Au_2ZnCy_4 , with 69.9% gold and 11.6% zinc. In their general chemical characteristics the two forms of the compound have not been found, so far as observed, to differ materially. Nevertheless, there is a difference in origin, a difference in crystal habit, and a consistent difference in such slight tinge of colour as the crystals show in bulk. Collectively, these points seem to

indicate that this is a case of isomerism, and not merely physical isomerism or allotropy, but chemical isomerism, possibly as between Au_2ZnCy_4 and ZnAu_2Cy_4 , with gold as the base in the prismatic form and zinc as the base in the pyramidal form.

The formation of the prismatic isomer may be expressed as:—



But the formation of the pyramidal isomer cannot be quite analogous, as ZnCl_2 is not acted on by HCy (on the contrary, ZnCy_2 is decomposed by HCl). The reaction of formation cannot therefore be:—



but may probably be correctly represented as the action of aurocyanhydric acid on ZnCl_2 , thus:—



It should be noted that the reaction is an incomplete one, but the exact reason for this has not been ascertained.

In water, cold or hot, both forms of crystals are insoluble. They are slowly soluble in strong solutions of alkaline cyanides. Cold HCl , even if fairly concentrated, attacks them only slowly, with separation of AuCy . They dissolve readily in cold solutions of the alkalis and in ammonia. If to the alkaline solution so formed HCl is slowly added, zinc hydrate is precipitated, which, on further addition of acid, redissolves. When sufficient HCl has been added to render the solution just acid to methyl orange, the zinc-gold compound separates again (slowly, if the solution was diluted considerably), but only in the prismatic form, whether the crystals dissolved were prisms or pyramids—*i.e.*, the reaction in this case is once more between ZnCl_2 and KAuCy_2 . Sodium sulphide decomposes both crystals with separation of zinc sulphide and formation of alkaline aurocyanide. The zinc sulphide retains just a trace of gold, which can easily be separated by treatment with dilute HCl and filtering, the zinc being reprecipitated in the filtrate. The sodium sulphide method of decomposition was found to be a convenient way of separating the metals for the purpose of analysing the zinc-gold compound. When digested with a strong solution of potassium or sodium carbonate, the crystals are decomposed with formation of zinc carbonate, the gold again going into solution as alkaline aurocyanide.

The crystals can be heated at considerably above the boiling point of water without undergoing any change. When the temperature is gradually increased they first lose cyanogen, and become blackened with separated carbon. On further heating they become bright again, with a brassy gold colour, without loss of crystal form. When the temperature approaches red heat a sudden change becomes apparent, a red glow passes through the mass, the colour changes to a bronzy hue, and the crystals are then found to have fritted and lost their form.

TIN MINE ACCIDENT.—At the Levant tin mine, near Penzance, on Monday night, an engine collapsed while over 100 men were descending a shaft. A *Times* correspondent says the accident is the most serious which has occurred in the history of the industry. It is not yet known how many men were killed, but some estimates put it as high as 40. This is probably an exaggeration, but up to Tuesday evening nineteen bodies had been brought to the surface, and there were still sixteen men to be accounted for. A number of miners in different levels could not be reached, and until the shaft is cleared it will not be known definitely how many lives have been lost.

* *Journal of the Chemical, Metallurgical and Mining Society of South Africa.*

BRITISH OVERSEAS CHEMICAL TRADE IN 1918.

(Continued from page 418.)

WE give below extracts from the annual statement just issued, of the trade of the United Kingdom with foreign countries and British Possessions in 1918, compiled by the Customs and Excise Department. The figures relating to the chemical and allied trades will be found much more useful than those given in the monthly Board of Trade returns, owing to the detailed analysis of the countries of origin of imported, and the destinations of exported, chemical products. Each product is specified separately, together with the extent of the trade done with the more important countries, the corresponding figures for 1917 being in parentheses.

EXPORTS.

Aluminous Sulphates (including Alum).—Norway, 9,151 cwt. (25,288 cwt.); France, 115,845 cwt. (17,473 cwt.); Portugal, 10,142cwt. (7,353cwt.); Spain, 2,437 cwt. (6,615cwt.); Turkey, 120cwt. (80cwt.); United States, 728cwt. (5,294cwt.); Argentine Republic, 9,514 cwt. (23,723cwt.); other foreign countries, 32,778cwt. (70,386cwt.); Egypt, 28,484cwt. (19,317cwt.); Bombay, 2,931cwt. (47,824cwt.); Madras, 448cwt. (2,226cwt.); Bengal, Assam, Bihar and Orissa, 39,833cwt. (36,010 cwt.); Burmah, 338cwt. (628cwt.); Canada, 14,798cwt. (12,712cwt.); other British Possessions, 15,223cwt. (26,671cwt.); total, 282,770cwt. (301,600cwt.).

Arsenic and Its Oxides.—France, 1,581cwt. (1,049cwt.); Brazil, 2,569cwt. (1,577cwt.); Argentine Republic, 1,254cwt. (413cwt.); other foreign countries, 398cwt. (2,514cwt.); British Possessions, 408cwt. (1,016cwt.); total, 6,210cwt. (6,569cwt.).

Bleaching Powder.—Russia, — (1,000cwt.); Norway, — (9,200cwt.); France, 31,172cwt. (827cwt.); Portugal, 300cwt. (—); Brazil, — (82 cwt.); other foreign countries, 605cwt. (1,203cwt.); British India, 37,791cwt. (40,911cwt.); Canada, — (816cwt.); other British Possessions, 1,463cwt. (4,381cwt.); total, 71,331 cwt. (58,420).

Carbide of Calcium.—Foreign countries, 655cwt. (689cwt.); British Possessions, 995cwt. (976cwt.); total, 1,650cwt. (1,665cwt.).

Carbonate of Ammonia.—Russia, — (2,069cwt.); Netherlands, — (240cwt.); France, 633cwt. (4,575 cwt.); Italy, 5,122cwt. (4,973cwt.); Japan, 1,051cwt. (6,926cwt.); United States, — (1,755cwt.); other foreign countries, 1,674cwt. (6,259cwt.); British Possessions, 7,827cwt. (8,393cwt.); total, 96,307cwt. (35,190cwt.).

Coal Products, not Dyes.—Russia, — (£387,635.); Sweden, £2,003. (£5,502.); Norway, £44,696. (£134,369.); Netherlands, £75,347. (£41,484.); France, £1,494,261. (£1,533,402.); Spain, £156,522. (£25,433.); Italy, £397,624. (£426,014.); United States, £164,182. (£208,380.); China, £3,386. (£3,005.); Argentine Republic, £14,271. (£2,017.); other foreign countries, £389,445. (£201,065.); Egypt, £24,739. (£15,185.); South Africa, £30,299. (£51,998.); British East Indies, £45,118. (£62,141.); Australia, £5,624. (£7,781.); Canada, £10,260. (£3,318.); other British Possessions, £25,319 (£22,247.); total, £2,883,096. (£3,130,976.).

Copper Sulphate.—Russia, — (1,651 tons); Netherlands, — (1 ton); France, 41,073 tons (39,402

tons); Algeria, 3,516 tons (3,643 tons); Switzerland, 497 tons (106 tons); Portugal, 1,566 tons (1,469 tons); Spain, — (3 tons); Italy, — (66 tons); Greece, 589 tons (—); other foreign countries, 112 tons (95 tons); Egypt, 81 tons (39 tons); British South Africa, 59 tons (94 tons); Australia, 62 tons (386 tons); Canada, — (19 tons); other British Possessions, 41 tons (156 tons); total, 47,596 tons (47,130 tons).

Cyanide of Potassium or Sodium.—Dutch East Indies, 4,090cwt. (3,679cwt.); France, 8,132cwt. (4,133cwt.); Portuguese East Africa, 203cwt. (1,616cwt.); Spain, 2,447cwt. (1,429cwt.); Japan, 24,269cwt. (15,868cwt.); United States, 1,838cwt. (3,296cwt.); Mexico, 31,620cwt. (19,942cwt.); San Salvador, 5,296cwt. (4,149cwt.); Brazil, 3,240cwt. (4,787cwt.); other foreign countries, 7,042cwt. (12,141cwt.); Cape of Good Hope, 1,391cwt. (3,274cwt.); Natal, 8cwt. (4cwt.); Transvaal, 58,394cwt. (81,161cwt.); British India, 9,346cwt. (8,327cwt.); Australia, 19,671cwt. (24,182cwt.); New Zealand, 6,684 cwt. (6,215cwt.); Canada, 16,310cwt. (20,237cwt.); other British Possessions, 14,185cwt. (20,992cwt.); total, 214,166cwt. (235,432cwt.).

Disinfectants, Insecticides, Weed Killers, and Sheep and Cattle Dressings (except Tobacco Offal).—France, 13,900cwt. (13,466cwt.); Portuguese East Africa, 6,864 cwt. (7,359cwt.); United States, 6,395cwt. (6,572cwt.); Chili, 15,564cwt. (6,877cwt.); Brazil, 8,468cwt. (8,986 cwt.); Uruguay, 6,029cwt. (3,661cwt.); Argentine Republic, 98,043cwt. (91,863cwt.); other foreign countries, 17,907cwt. (15,816cwt.); Cape of Good Hope, 32,480cwt. (34,315cwt.); Natal, 14,252cwt. (13,796cwt.); Transvaal, 9,556cwt. (7,463cwt.); British East Indies, 39,645cwt. (43,960cwt.); Australia, 32,177cwt. (29,876 cwt.); New Zealand, 27,775cwt. (32,057cwt.); Canada, 2,151cwt. (2,364cwt.); other British Possessions, 12,540 cwt. (12,958cwt.); total, 343,746cwt. (331,369cwt.).

Dyestuffs, Products of Coal Tar.—Russia, — (1,889cwt., valued £50,971.); France, 6,850cwt., £95,942. (2,478cwt., £50,531.); Switzerland, 25,879cwt., £275,847. (26,466cwt., £214,549.); Spain, 2,237cwt., £36,357. (115cwt., £3,837.); Italy, 3,790cwt., £73,875. (4,775cwt., £94,493.); Japan, 238cwt., £9,100. (50cwt., £648.); United States, 8,198cwt., £137,966. (9,120cwt., £144,851.); Brazil, 2,477cwt., £68,084. (1,285cwt., £33,190.); other foreign countries, 1,789cwt., £32,497. (909cwt., £18,013.); Egypt, 2,642cwt., £55,204. (1,624 cwt., £14,973.); Bombay (including Karachi), 18,319cwt., £268,334. (15,571cwt., £307,941.); Madras, 2,818cwt., £18,846. (856cwt., £19,637.); Bengal, Assam, Bihar and Orissa, 1,168cwt., £21,750. (849cwt., £23,676.); Burmah, 13cwt., £667. (3cwt., £124.); Australia, 3,131cwt., £95,556. (2,287cwt., £63,979.); New Zealand, 372cwt., £8,046. (258cwt., £7,009); Canada, 3,686cwt., £45,755. (5,481cwt., £80,500.); other British Possessions, 305cwt., £7,833. (174cwt., £3,177.); total, 83,912cwt., £1,251,659. (74,190cwt., £1,132,099.).

Dyestuffs, Other Sorts.—Russia, — (16,906cwt., £60,913.); Sweden, 1,040cwt., £4,062. (2,855cwt., £5,750.); Norway, 37cwt., £381. (1,769cwt., £3,555.); Netherlands, — (171cwt., £743.); France, 4,541cwt., £34,974. (3,054cwt., £17,440.); Portugal, 555cwt., £3,220. (1,585cwt., £4,264.); Spain, 136cwt., £2,461. (404cwt., £4,026.); Italy, 1,372cwt., £12,040. (2,144cwt., £13,924.); United States, 4,627cwt., £13,891. (5,404cwt., £24,719.); Brazil, 242cwt., £3,200. (253cwt., £2,246.); other foreign countries, 3,939cwt., £29,692. (7,228cwt.,

£36,518.); British India, 727cwt., £8,097. (3,246cwt., £25,498.); Australia, 1,810cwt., £19,970. (8,405cwt., £45,862.); Canada, 411cwt., £1,412. (1,376cwt., £12,043.); other British Possessions, 1,258cwt., £11,137 (7,793cwt., £22,247.); total, 20,695cwt., £144,537. (62,593cwt., £279,748.).

Glycerine, Crude.—Cape of Good Hope, 17,341cwt. (32,913cwt.); other British Possessions, 3cwt. (—); total, 17,344cwt. (32,913cwt.).

Glycerine, Distilled.—Italy, — (10,298cwt.); other foreign countries, — (103cwt.); Cape of Good Hope, 15cwt. (20cwt.); Natal, 22,206cwt. (27,311cwt.); Transvaal, 21,445cwt. (27,769cwt.); Canada, — (1cwt.); other British Possessions, 118cwt. (110cwt.); total, 43,784cwt. (65,612cwt.).

Hydrochloric Acid.—Foreign countries, 297cwt. (461cwt.); British Possessions, 1,011cwt. (2,651cwt.); total, 1,308cwt. (3,112cwt.).

(To be continued.)

STANDARDISATION OF MINERAL OIL TESTS.

IN the course of a very lengthy paper before the Institution of Petroleum Technologists on Tuesday, Mr. Arnold Philip, chief chemist to the Admiralty, at Portsmouth, dealt in great detail with the question of laboratory tests on mineral oils. The central fact which was brought out by the paper was the necessity for standardisation of mineral oil tests with a view to removing the constant disputes which take place between suppliers of oil and the large users owing to the different methods of testing which are adopted. The immediate question arising out of the paper is whether or not a Standardisation Committee should be appointed. The suggestion has been dormant for two years, but there is undoubtedly a great deal of support for putting it into effect now. Consequently, the general feeling of the meeting seemed to be rather against discussing the details of standardisation, but to leave that as the work for the committee, if, and when, appointed.

Sir Thomas Holland, who is home on leave from India, where he has done so much good work as Chief of the Indian Munitions Board, made a long and interesting speech on the subject. There were several difficulties to get over in connection with standardisation, he said. First of all, there was the British character; but if we postponed standardisation there would undoubtedly arise further vested interests which would make it more difficult. At the same time, it was not only the members of the Institution who would be affected by standardisation. It would be necessary to work with other bodies, especially the chemical societies, which had already done a considerable amount of work in this direction. There was also the question of international co-operation to be thought of. Nevertheless, we in this country should not postpone acting until we had got other countries acting in full co-operation, and it would not do to act precipitately without inviting the advice and assistance of other countries, especially America. Even before a committee was formed there were other things to be thought of. One was the question of money. It would not be possible to set up standards without work, and they would not get work done without being paid for. The Engineering Standards Association spent considerable sums every year, and a portion of the work of the

proposed committee would touch the work of the Engineering Standards Association, especially in connection with lubricating oils. It would therefore be necessary to consider the question of who was to meet the bill, and whether it should be done by private effort or whether it was fairly chargeable to Government funds. The first thing they should do was to form a preliminary committee whose work should be to gather together what had already been done in the direction of standardisation and indicate lines of further action. He felt that that would be better than at once forming a Standardisation Committee.

Dr. Dunstan expressed the hope that if and when a Standardisation Committee had been formed it would include within its purview some of the more recent fuel oils, such as cannell oils, low-temperature tar oils, and lignites, which undoubtedly had an important future in this country.

Professor J. S. S. Brame agreed that the question of money was the first and most important consideration. He agreed with Sir Thomas Holland that we must not be too insular in this matter of standardisation. There must be co-operation with other societies and with other countries. After all was said and done, we were not producing petroleum in very large quantities in this country at the present time, and England was not entitled to rank as a first-class oil producer. Whilst we should take our share in arriving at standardisation, he would point out that there were companies which had a big oil production in other parts of the world. It was most important to co-operate with America, who already had gone a considerable distance in the direction of standardisation. There had been some very excellent work carried out at the Bureau of Mines, Washington. It was no use chemists in this country, whether it was Mr. Arnold Philip in his laboratory at Portsmouth or a chemist in any other place, setting up their own arrangements, which worked very satisfactorily from their own point of view, without taking into consideration other facts, such as the work which had been done in the United States. He thought that they should consider how the Institution could inaugurate some scheme of standardisation, and also how they could get into touch with other countries. Flash-point and viscosity had already been dealt with by the International Congress of Applied Chemistry, and they should move warily and in co-operation with other people who had already been working on the question.

Dr. W. R. Ormandy expressed the opinion that there would be great difficulties to contend with in the future as the use of mixed fuels increased. Our tropical dependencies were coming forward with alcohol and alcohol-ether (natalite) fuels. In Australia a plant was being put down to make 2,000,000 gallons of this fuel per annum, whilst in India large plants were being installed. Therefore the question of the behaviour of these fuels would have to be studied, and methods worked out. We should also be faced with a new series of difficulties in regard to alcohol in its potable form, and that pointed to the necessity for the Institution taking action jointly with a view to standardise methods, which were required now and would be required more than ever in the future.

Mr. Philip, in a brief reply to the discussion, said he was prepared to scrap any method he had devised if, in the view of a Standardisation Committee, better methods existed.

DISCOLOURATION OF SULPHATE OF AMMONIA.

THE causes of the discolouration of sulphate of ammonia during the process of manufacture form the subject of an article in the current number of the *Times Engineering Supplement*.

In Germany, it is said, A. Thau has recently brought forward some more or less novel points, and states in particular that blue sulphate is far more common when the salt is produced by the ordinary distillation process than when it is obtained by "direct" means. The latter process, in fact, appears to overcome the formation of highly-coloured cyanides in the saturator. Prussian blue, which is the chief source of the trouble, is not decomposed by the action of acids, and the effect is greatly aggravated owing to the fact that in the matter of discolouration a very little goes a very long way. If, as is generally supposed, the Prussian blue is formed by interaction of volatile cyanides with the sulphide of iron invariably present in the sulphuric acid, then violent agitation (to avoid the formation of local neutral zones) should be sufficient to prevent the trouble. Thau has found, however, that even under such conditions, whereby local alkalinity is completely avoided, the blue salt is still obtained—particularly after just starting-up. He concludes, therefore, that "patchiness" in the saturator is not the primary cause, and alludes to the fact that dark blue condensates are frequently found in the connections between the still and the saturator. This would seem to indicate that the Prussian blue is formed before the saturator is reached, particularly as during the dismantling of plant, the surfaces of the still column and the delivery pipes are usually found to be coated with a very thin layer of the blue.

In advancing a new theory in connection with the subject Thau expresses the opinion that in the upper portions of the still and in the connections the iron is coated with ferrous sulphide which has been formed by the sulphuretted hydrogen distilled off from the ammoniacal liquor, and this reacts with the hydrocyanic acid obtained from the same source. Thus cyanide of iron is formed in the first place, and in the presence of oxygen and steam this is readily oxidised to ferric ferrocyanide.

In order that iron sulphide may be formed in the first instance as explained above, a certain concentration of sulphuretted hydrogen in the vapour is necessary, and if this concentration can be prevented or reduced there is every likelihood that the trouble will be stopped. The explanation probably depends upon the law of mass action; or an increase in the proportion of water vapour present may lead to condensation on the inner surfaces of the connecting pipes, which acts as a protection and prevents the sulphuretted hydrogen from attacking the metal. It seems likely, too, that whereas the objectionable reaction is assisted by lower temperatures, it is retarded by a higher temperature, for the use of a greater quantity of steam than is customary has been shown to be followed by relief from the trouble. Whether oxidation of the cyanide of iron takes place in the delivery pipes, in the saturator, or not until the sulphate or ammonia reaches the store, the ultimate effect is the same; but the whole matter is complicated by the fact that the blue colouring usually does not show itself until the salt has been lying for some little time in the store, this place being the most favourable for the process of oxidation. The amount of steam employed can best be

controlled by taking samples from the delivery pipe just before it enters the saturator, and it should be borne in mind that if attempts are made to avoid local alkalinity by reducing the steam the effect will be to assist the formation of Prussian blue.

In suggesting precautions which should be taken Thau states that when shutting down the stills the flow of liquor should first be stopped before the steam is turned off. The latter then effects a scavenging action, expelling the sulphuretted hydrogen from the whole system and thus precluding the formation of iron sulphide. In the same manner, the still should be well steamed before the plant is put to work again. Another means of prevention which has been tried is that of coating the interior of delivery pipes with lead, but the success is only partial, for even then the iron of the still-head is exposed to the vapours. In any case, however, the precaution should be taken to insert a siphon box at the point where the iron delivery pipe meets the saturator, the condensate from this being run back into the still. As regards the employment of higher temperatures it may be mentioned that pre-heating of the ammonia liquor, though a self-evident point, materially assists in maintaining the desired temperature in the still-head. It assists, moreover, in rendering the concentration of water vapour higher in the delivery pipe, thus reducing the formation of sulphide of iron. In conclusion, it should be borne in mind that the presence of hydrocyanic acid and sulphuretted hydrogen is not of very material importance so long as the action of these compounds on the iron portions of the plant is prevented.

SCOTTISH OIL PROSPECTS.

AT a meeting of the Mining Institute of Scotland, on Saturday last, a paper on "Scottish Oil Possibilities" was communicated by Mr. H. M. Cadell, F.R.S.E. Mr. R. McLaren, M.P., president of the Institute, occupied the chair.

The author said that the whole of the strata from the Broxburn shale down to the old red sandstone, a depth of some 4,000 feet, were already well known to geologists, and the supposed oil sand must be somewhere in the section. But on examining every likely bed, such as the Binny sandstone, Burdiehouse limestone, Hailes, Craigleith, and Granton sandstones, no signs of an oil sand nor indications of extensive reservoirs of oil or oil gas could be detected. The oil was known to occur along anticlines or arches in the strata, and a boring had been started some months ago, so far without success, to find oil near West Calder on an anticline in the shalefield there. Another boring was projected for oil on the Roman Camp Hill in Mid-Lothian, where a larger anticline was known to occur. But in both cases the strata were traversed by numerous faults, and consequently any oil that might be found would probably be small in quantity in each borehole. It was thus extremely unlikely that much, if any, liquid petroleum would ever be got either in the Lothians or anywhere else, and in thousands of bores that had already been made in Scotland no oil of any importance had ever been found. The author was regretfully forced to that conclusion by the mass of existing evidence, but he said he did not wish to end with an altogether pessimistic note, as there was still an untapped source of oil he would like to refer to.

UTILISATION OF PEAT.

The peat mosses were said to be larger than the coal-fields, and recent investigations had shown that the deep black peat in some large bogs was, when once the water was eliminated, richer in oil and ammonia than the best oil shales. The dry peat in some cases could be made to yield more than 26 gallons of oil and 100lb. of sulphate of ammonia per ton, and one large bog in Mid-Lothian had enough nitrogen to produce 180lb. on a practical scale, which was worth 22s. 6d. for that product alone, with the oil and other products of distillation in addition. The peat, if dry, was thus worth about three times the value of ordinary shale, that had up till now been workable at a small profit. The difficulty was eliminating the 80 to 90 per cent. of water in the peat before it could be distilled for oil and ammonia. But this was a new and a large source of oil and might appropriately be investigated, as it had great possibilities and would be very advantageous as an industry, especially in many of the poorer districts.

In the course of the discussion Dr. Flett, of the Geological Survey, reported that the West Calder bore was now down to a depth of 900 feet, but at the bore in the vicinity of Dalkeith there would be some little delay before drilling could be commenced. The situation of the Scottish bores had been most carefully selected, and he could state from personal knowledge that steps were being taken to procure perfectly definite opinions on this important, although highly disputatious subject. Within a comparatively short period the results would be to hand, and if the wells did not yield oil then, in view of the strong opinions of Scottish geologists, it was not at all unlikely that the question would be regarded as finally settled.

The Chairman said he did not know what the cost of these boring operations in the Lothians would be. If the bores, however, did not turn out satisfactorily, as appeared to be foreshadowed by Scottish experts, then the House of Commons and the public would assuredly have something to say.

Mr. Cadell, replying to the discussion, said he felt it was a great mistake on the part of the Government, especially in England, to lay down new bores before they had ascertained the definite results from any single bore that had as yet pierced the ground. It was, he feared, a serious waste of public money. No one would be more pleased than himself to see the Scottish bores successful, but the geological evidence was entirely against the presence of oil there.

OIL SHALE RESERVES.

According to estimates prepared by the Geological Survey, there are still very large reserves in the oil-shale fields of Scotland. In making the calculations, only beds of more than 3ft. in thickness have been reckoned, and no greater depth than 300 fathoms is included. The average yield of crude oil per ton is taken at 25 gallons. Rich shales produce 60 to 70 gallons, and shales yielding as little as 19 may pay, because of the quantity of sulphate of ammonia they also supply. The "proved" and "probable" fields are estimated as containing 601,886,000 tons. Deducting 120,000,000 tons for shales that have already been worked, there remains an available reserve of 481,886,000 tons, a supply for 133 years at the present rate of working.

There are also 883,791,000 tons of "possible" reserves—that is to say, areas where there are few or no bore-holes, but where geological considerations point

to the presence of shales of workable thickness and quality within 300 fathoms of the surface. Should these actualise, the reserves they contain would increase the duration at the present rate of working to 383 years. Subject to the cost of wages not becoming prohibitive and the prices of oil, paraffin wax, and sulphate of ammonia being maintained at reasonable figures, there is an assured future for this industry in Scotland.

NEWS FROM THE ANTIPODES.

(FROM OUR OWN CORRESPONDENT.)

SYDNEY, September 1.

Importation of Sheep Dip.—In reply to a question in the Senate, the Vice-President of the Executive Council, Senator Russell, said the quantity of sheep dip at present held up by the Customs authorities was 1,650 five-gallon drums, 1,324 one-gallon drums, and 900 cases. The Minister added that at the time the shipments were made the exporters were aware of the proclamation prohibiting the importation of sheep dip into the Commonwealth unless with the consent of the Minister of Customs. Being prohibited imports, the goods were liable to forfeiture, but as a special concession the Government had agreed to allow shipments made since the issue of the proclamation to be held under Customs control pending the introduction of the new tariff. Delivery could then be given subject to payment of duty.

Wallaroo-Mount Lyell Fertilisers.—For the twelve months ended June 30 the report of the Wallaroo-Mount Lyell Fertilisers shows a gross profit of £47,432., against £41,725. for the previous year, after providing for depreciation. Administration expenses amounted to £14,779., and after transferring £4,375 to appropriation account, the net return is £28,278. Adding £74. brought forward, the sum available is £28,352. A dividend at the rate of 8 per cent. absorbs £26,952., of which half was paid in April, and the balance of £1,400. is carried forward. The report states that great difficulties have been experienced in maintaining the supplies of raw material, and this condition is likely to continue for some time, owing to the shortage of shipping.

Price of White Lead.—The Sydney market price for Australian genuine ground white lead was recently advanced to £73. per ton, in lwt. packages, with the usual extras for smaller sizes. This represents a rise of £3. per ton.

Chemical Market.—Industrial chemicals were subject to moderate inquiry yesterday in the general merchandise markets. Quotations for the great majority of lines remained under indent cost, and merchants and manufacturers, therefore, filled their requirements from spot stocks. A parcel of powdered borax sold at £50. net per ton. Boracic acid has offered between houses at £85. net per ton. A quantity of liquid silicate of soda was placed at £21., less discount. Brunner-Mond's bicarbonate of soda was offering in 1½cwt. kegs at £15. net, but American was to be had at a lower rate. American 76-77 per cent. caustic soda had sellers at £23., and English, 70-72 per cent., at £22. 10s. per ton. Caustic soda, 98 per cent., was scarce, and commanding £50. Acids attracted rather more attention than of late, although actual sales were not numerous. Cream of tartar, in parcel lots, showed slight improvement, holders asking 2s. 9d. net per lb. for French, 95 per cent., and 2s. 7½d. net for American, 99 per cent. English or Italian tartaric acid was available in merchant parcels at 3s. net, and citric acid at 3s. 3d. net. Sellers of turpentine in quantities withdrew from the market. Those who had stocks preferred to keep them for their distributing trade. The nominal rate for parcels was about 13s. net per gallon, but small lots were offered at 10s. 6d. for ordinary trade business. Linseed oil was firmly controlled, the best prices for distributing lots being 9s. 6d. and 9s. 8d. per gallon respectively for raw and boiled. White lead was steady at £70 to £86 per ton basis, according to make.

Zinc and Zinc Dust Prices.—The price of Australian high-grade zinc-dust (88-92% metallic zinc) remains at £70. per ton, c.i.f. U.K. The price of Australian electrolytic zinc, containing 99.95% metallic zinc, is unchanged at £42. per ton, f.o.b. Australia for direct shipment to New Zealand, India, South Africa and the Far East.

ITEMS OF INTEREST.

WEST AUSTRALIAN COPPER.—*Reuter's* correspondent at Perth, West Australia, in a message dated October 18, states that the Inspector of Mines reports hopefully on the copper find discovered recently in a range between Peak Hill and Nullagine.

CHEMICAL WORKS' STUDENTS.—The Salters' Institute of Industrial Chemistry has awarded grants in aid to thirty young persons occupied in chemical factories in or near London to assist them in improving their knowledge of chemistry.

BUSINESS NOTICE.—We understand that the entire share capital of the firm of Kiloh and Co., Ltd., wholesale and retail chemists, Cork, has just been acquired by the Cork Chemical and Drug Co., Ltd., the purchase price amounting to a considerable sum.

ACID DRUM EXPLOSION.—While a drum used for storing acid was being dried on a fire in Devonport Dockyard on Tuesday it exploded, killing an apprentice named Clement. William Warren, chargeman of fitters, was injured badly, and others received minor injuries.

JOHN KNIGHT, LTD., AND LEVER'S.—A statement has been made by the chairman and managing director of Messrs. John Knight, Ltd., categorically denying certain rumours which have been circulated regarding the possibility of the absorption of the company by Messrs. Lever Brothers, Ltd.

PLANS PASSED.—Plans were recently submitted to the Aberdeen civic authorities by the proprietors of the Sandilands Chemical Works (Messrs. John Miller and Co.) for permission to erect a new superphosphate store in connection with their works. The plans were in order, and permission to proceed with the scheme was granted.

FIRE.—A serious fire occurred on October 16 at the oil mills in Burlington Street, Liverpool, owned by Messrs. Earle and King, an associated firm of Lever Brothers. The fire broke out on the upper floor, which, with its contents, was almost totally destroyed, but the outbreak was confined to that floor, and was extinguished in about two and a half hours. Damage amounting to several thousand pounds was done.

ROTHAMSTED EXPERIMENTAL STATION.—The new laboratories at the Rothamsted Experimental Station, Harpenden, were opened on Monday by Sir A. Griffith-Boscawen, M.P., Parliamentary Secretary to the Board of Agriculture. The buildings contain a complete library and laboratories devoted to physics, protozoology, entomology, and mycology, the latter two being used in the new institute of plant pathology. Professor H. E. Armstrong (Vice-Chairman of the Lawes Agriculture Trust), presided.

NEW SCOTTISH COMPANY.—It is announced that a new Scottish limited liability concern has been established, under the name of Messrs. John Scott and Watson, to acquire and amalgamate the existing businesses of the Kildust Company, 178, Berkeley Street, and of the Phoenix Chemical Works, 61, Pollok Street, Glasgow. This company is a private one, and among the first subscribers are Mr. John Scott and Mr. Robert P. Watson, both of whom are well-known personalities in the West of Scotland chemical trade.

BRITISH-GROWN SUGAR.—In a letter to the British Sugar Beet Growers' Society, Lord Lee of Fareham has expressed his desire to ensure a complete and trustworthy test of the commercial possibilities of the growth of sugar beet and the manufacture of sugar therefrom in England. The society proposes to carry out the project at Kelham, near Newark, the management to be in the hands of the public shareholders and certain matters of financial policy to be controlled by financial representatives of the Government. The best expert information is being secured, and when formalities have been completed the scheme will be published in detail.

BOILER EXPLOSION.—Two men were killed and two others severely burned as the result of a boiler explosion last week at the ammonia works belonging to Messrs. William Baird and Co. Limited, Muirkirk, Scotland. It appears that a number of men employed by Messrs. Dick, Kerr and Co. Limited engineers, Kilmarnock, with John Mair, foreman blacksmith, were testing a boiler, when the latter burst, killing Mair instantaneously. John Kelly (44), foreman, was so severely injured that he died in the ammonia house. John Willock (28), riveter, and Alexander M'Dill, apprentice riveter, were also severely burned on the head and body.

FIXATION OF ATMOSPHERIC NITROGEN.—The board of the British Cyanides Co., Ltd., announce that the experiments on the fixation of atmospheric nitrogen, upon which large sums were expended prior to the war, and which were necessarily suspended during the war, have now been resumed. These experiments will take many months to develop, but the special furnaces which have been erected have already satisfactorily overcome some of the chief difficulties which the company before the war were endeavouring to solve.

CHEMICAL WORKS FATALITY.—The inquest has been held at the Huddersfield Royal Infirmary on Isaac Brown, a labourer, who was killed by an explosion of a pan at the works of Messrs. L. B. Holliday and Company, dye makers, of Deighton, near Huddersfield. Evidence was given that the pan had a steam jacket, with neither water gauge or safety valve. Mr. E. W. Norris (the Coroner) said that probably the danger was not realised either by the workmen or the management. It was for the management to devise some means for preventing such an occurrence in the future. In the circumstances, however, he would return a verdict of "accidental death."

DYESTUFFS SCARCITY.—The Batley and Birstall (Yorks.) Chamber of Commerce Council have passed a resolution urging the Board of Trade to take steps to secure without further delay an adequate supply of such dyewares as are essential to the woollen and many other British industries. The resolution says: "The meeting understands that manufacturers in France have already secured very large quantities of these dyes from Germany, and the same is true of Italy and Belgium. This meeting fails to see why the industries of this country should be hampered by lack of dyes while the needs of the Continental competitors are being fully met. Local manufacturers and buyers have already supplied to the Board of Trade, through the Colour Users' Association, lists of the dyes required for their businesses, and unless the dyes can be promptly supplied, and at reasonable prices, the export trade of the district cannot fully be regained."

CHEMICAL WORKERS' WAGES: ARBITRATION COURT'S AWARD.—The award was issued on Saturday last of the arbitration on the claim made for workers in the drug and fine chemical industry for the reduction of the working week to 44 hours, payment for overtime at the rate of time and a half, and minimum rates of wages varying from 65s. to 60s. a week for males and 45s. to 37s. 6d. for females. The Court have decided that the claim for reduction of the working week, and the payment of the minimum rates is not established. Adult male employees whose rates of wages do not exceed 15s. above the minimum set out in the claim for their respective grades, are to receive an advance of 5s. a week, and those whose wages exceed 15s. above the minimum are to have such an advance as will give them rates not exceeding 20s. above the existing minimum for the respective grades. Having regard to certain negotiations the claim for women is referred back, the parties to be at liberty to apply to the Court for a decision in the event of no satisfactory settlement being arrived at. No change is ordered in the payment for overtime. Claims for payment of 20s. to departmental foremen, and 10s. to deputy foremen above the minimum of each class, are held not to have been established.

NON-FERROUS MINING.—The Committee appointed by the Board of Trade to consider the question of non-ferrous mining met on October 14, 15, and 16, under the chairmanship of Mr. H. D. Betterton, M.P., when evidence was given by Mr. C. A. Moreing, M.Inst.C.E. (of the firm of Bewick, Moreing and Co.), general manager of the Tohidy Minerals, Ltd., and East Pool and Agar, Ltd., and representing the Cornish Chamber of Mines and the Joint Industrial Council of the Tin Mining Industry in the United Kingdom. Mr. Moreing stated that, in his opinion, the mines on the Redruth and Camborne line of lodes should be amalgamated and worked on a large scale, a plan which held out the only hope of economic success in the future. He pointed out the real importance of the mining industry of Cornwall not only to those actually employed in the mines and the population dependent on them, but also to the country at large. This week the Committee heard further evidence from Cornwall. Mr. Josiah Paull, manager of the South Crofty mine, in the Camborne and Redruth Central Mining District, giving evidence before the Committee stated that unless the price of tin moved in the same ratio to the price of labour and material State aid in some form was necessary to save the tin-mining industry in Cornwall.

LEGAL INTELLIGENCE.

T.N.T. Factory Explosion and Fire Insurance: Court of Appeal Decision.

The case of the Hooley Hill Rubber and Chemical Company v. the Royal Insurance Company, Limited, and others came before the Court of Appeal, consisting of Lords Justices Bankes, Scrutton, and Duke, on Friday, October 17, upon the appeal of the plaintiff company from a judgment of Mr. Justice Bailhache in the Commercial Court. The case came before the learned judge upon a special case stated by Mr. Langdon, K.C., as arbitrator, and the question raised arose out of a fire insurance policy on the premises of the plaintiffs. Two points arose for decision: (1) Whether a clause in a fire policy which excepted damage caused by explosion applied so as to exempt the insurance company from liability where the explosion was only incidental to and in the course of the fire; (2) assuming that the first point was decided against the plaintiffs, whether the insurance company was estopped from putting that construction upon the policy when it had induced the plaintiffs to refrain from insuring against explosion loss by making a representation in writing that the exception did not include such a risk.

The plaintiff company, which manufactured T.N.T., carried on business at Ashton-under-Lyne on premises it had built for that purpose. The company was insured under policies issued by the Royal Insurance Company and other companies.

Condition 3 of the policy of the Royal Insurance Company provided as follows: "This policy does not cover . . . loss or damage occasioned by or in consequence of invasion, foreign enemy, rebellion, insurrection, riot, civil commotion, or any military or usurped power whatsoever, earthquake, volcano, or subterranean fire, loss or damage by explosion, except loss or damage caused by explosion of illuminating gas elsewhere than on premises in which gas is manufactured or stored." The other companies' policies contained a similar condition. Upon the Royal Insurance Company's policy the following memorandum was typewritten: "This policy does not cover loss or damage by explosion nor loss or damage by fire following an explosion where it be proved that such a fire was not caused directly or indirectly thereby or was not the result thereof."

On June 13, 1917, a fire broke out in the works of the plaintiffs. It burnt fiercely for 20 minutes, and did great damage. Later an explosion took place which shattered the premises. A quantity of T.N.T. in closed receptacles was exposed to the intense heat of the conflagration, and this caused the explosion. The loss suffered by the assured up to the time of the explosion was assessed by the arbitrator at £12,740. The loss suffered by the assured through the fire and the explosion together amounted to a sum far in excess of the aggregate amount of the sums insured under the policies which had been issued to the assured by the insurance companies. It was admitted by the insurance companies that they were liable to indemnify the assured for the loss suffered by them through the fire, but they contended that they were not liable under the policies for the loss which followed the explosion, on the ground that the conditions of the policies exempted them from that liability.

It was contended on behalf of the assured that they were entitled under the policies to be indemnified not only for the loss caused by the fire, but also for the loss caused by the explosion, on the ground that the explosion was an incident in the course of the fire, and that the proximate cause of the whole loss was the fire.

The arbitrator found, on the authority of *Stanley v. Western Insurance Company*, that the contention of the insurance companies was well founded, and that the contention of the assured could not prevail. Mr. Justice Bailhache upheld the finding of the arbitrator, and affirmed his award on both points, and from this decision the plaintiff company now appealed.

Mr. Douglas Hogg, K.C., for the appellants, said the appeal raised two points: first, as to the effect of an exception in a fire policy of an explosion risk, and, secondly, if, contrary to the appellant's contention, that point was decided against them, whether one of the respondent companies—viz., the Royal—was not estopped from setting up the effect which they sought to give to that exception.

The hearing was adjourned until Monday.

At the conclusion of the arguments, their lordships on Monday held that the decision which Mr. Justice Bailhache followed in the case of *Stanley v. Western Insurance Com-*

pany, which had been unchallenged for some 50 years, and presumably acted upon in insurance matters, was correct, and they dismissed the appeal upon the main point raised as to construction. It was, however, directed that a further question affecting the Royal Insurance Company as to whether that company was estopped from relying on the true meaning of the policies legally construed by reason of certain operations by the agent of the Royal in two letters during the negotiation of the policies should stand over for a week, and to be then argued unless the parties in the meantime could come to an agreement.

The China Clay Corporation: Receiver Appointed.

In the Chancery Division on Friday of last week, before Mr. Justice Sargant, Mr. Galbraith, K.C., moved, on behalf of Mr. H. Mallaby-Deeley, M.P., one of the trustees of a debenture trust deed securing the stock of the China Clay Corporation, Limited, for the appointment of a receiver and manager of the assets of the company. Counsel said the other trustee was Sir Charles Augustus Hanson, and he and the plaintiff were also directors, and Sir Charles was a defendant in the action.

The company was incorporated in 1910 with a capital of £400,000., of which £270,000. had been issued for the purpose of acquiring certain china clay lands in Devonshire, including leasehold properties, subject to a rent of £500. a year. In 1914 the company issued or raised £20,000. on the security of first mortgage debenture stock, and the trust deed was executed, the effect of which was that the company covenanted to pay 6 per cent. interest and to pay off the stock by yearly payments of £2,000. The company by the deed also specifically mortgaged the freehold and leasehold properties, and gave a floating charge on all its assets.

The plaintiff now held the whole of that £20,000. issue. No interest was ever paid on the first debenture stock, and in July, 1916, a supplemental trust deed was entered into, which recited that the debenture stockholders had agreed to the further issue of £20,000. to rank *pari passu* with the first issue, and it provided that the interest on the £40,000. accruing before June, 1916, and the termination of the war should be paid out of the profits only. In all, £34,460. stock was issued, and, in addition, £5,000. stock was issued to the directors of the company, of which Mr. Mallaby-Deeley held £833., to secure an overdraft.

The company had got into difficulties, £500. was due for rent, and in August, 1919, the company, owing to its financial difficulties, had practically to close its operations, though steps had been taken to keep the premises open, the company having sold 3,000 tons of clay, the sale of which in normal times would take 30 weeks to complete. In these circumstances the company passed a resolution that for the protection of the interests of the company Mr. Mallaby-Deeley should be asked to start proceedings for the security of the debenture holder, he being the holder of £20,838. stock.

Counsel for the company and for Sir Charles Hanson assented to the motion, and his Lordship appointed a receiver and manager of the assets of the company.

GAZETTE NEWS.

LIMITED COMPANIES.—Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions, Orders, and Official and Other Notices.

Bisbee Tin Smelting and Arsenic Company, Ltd.—Resolved September 19, confirmed October 6: That the company be wound up. R. B. Petre, 11, Ironmonger Lane, E.C., chartered accountant, liquidator. Meeting of creditors, W. B. Peet and Co.'s, 11, Ironmonger Lane, E.C., October 21.

Isle of Wight Cement Works, Ltd.—Resolved October 3: That the company be wound up. R. E. Crane, 8, Paternoster Row, E.C., incorporated accountant, liquidator. Meeting of creditors at liquidator's, October 22.

DISSOLUTIONS OF PARTNERSHIP.

(Note.—When two dates are given in the following announcements, the first is the date of the dissolution. The date in parentheses is that of the official advertisement.)

Viking Packing Company, The (Joseph Harding and Geo. Jenkins), 5, Richard Terrace, Cardiff, self-raising flour and soap-powder merchants. September 8. Debts by G. Jenkins. (October 10.)

BRITISH ASSOCIATION OF CHEMISTS.

"If we don't hang together we shall assuredly all hang separately."
—JOHN HANCOCK, when signing the Declaration of Independence.

Hon. Registrar: DR. FRANCIS W. KAY,
Chemical Department, The University,
Liverpool.

NOTICES.

Reprints of the Proceedings.

It was decided at the last Council meeting that the Proceedings of the Association should in future be issued once a month, and that reprints from the *Chemical Trade Journal* and *Chemical Engineer* should be distributed to members free of charge, so as to ensure that all members are kept informed of the doings of the Association. It has not yet been decided what steps shall be taken in the case of those members who have already paid 4s. to have the reprints sent them for one year, but they will certainly be compensated. The Proceedings were at first issued fortnightly, but during the summer months the sections had little to report, and the number of issues was curtailed. The Council meets monthly, and a copy of the proceedings will in future be issued as soon after the Council meeting as possible.

THE PROCEEDINGS OF THE ASSOCIATION.

The Council.

The 25th Council meeting, postponed from September 27 on account of the railway strike, was held at Derby on Saturday, October 11, Professor Hinchley being in the chair.

Income-tax Rebate.—The President reported that Mr. Millington (London) and Mr. Zeally had been appointed by the London Committee as a special sub-committee to deal with this question. They will report to the London Section Committee, which will then report to the Council. As previously reported, it is proposed to approach the Income-tax Commissioners with a view to obtaining rebate on the necessary professional expenses of chemists.

Guarantee Fund.—The President reported that liberal responses were coming in freely to the letter which was circulated to members appealing for support to the Guarantee Fund. The Association is incurring considerable expense in connection with the propaganda campaign, and although the financial position is sound, it will strengthen the hands of the officers of the Association to know that they have such a fund behind them.

Assistant Secretary.—Of a number of applicants who had replied to the Association's advertisement for an assistant secretary, three were interviewed by the Council, and of these Mr. Alan Stewart Mills was chosen, and was appointed for a trial period of six months. This appointment of an assistant secretary was a very necessary step, and will relieve the voluntary officers of a great deal of clerical work, for which they could ill spare the time.

Special Brigade R.E. Chemists.—Correspondence was considered dealing with the retention in the Army of chemists of the Special Brigade R.E. in subordinate non-technical work. It was decided that the president should prepare a summary of the facts, and place them before a member of Parliament for inquiry in the House of Commons.

Accounts.—The Hon. Treasurer's report, showing income, expenditure, and balance-sheet from December 1, 1918, to August 31, 1919—audited and found correct by Messrs. Sibbald Stones and Co., chartered accountants, of Derby,—was accepted. The finances of the Association were shown to be in a satisfactory condition. Dr. Hedley submitted a number of recommendations made by the auditors for controlling the financial affairs of the Association. It is absolutely necessary that local sections should submit monthly statements and monthly claims, if any, to the hon. treasurer.

Nominations Committee.—On the recommendation of the Nominations Committee, 74 candidates were elected as full members, nine as probationers, and two as students. Whilst twenty-four candidates, approved by the local assessors, were declared elected as full members, and seven as probationers, subject to the final approval of the Nominations Committee. One candidate, previously elected probationer, was, on account of a fuller and sufficient statement of his qualifications having been received, recommended to the Nominations Committee for election to full membership.

Whitley Councils Committee.—Mr. W. E. Kay reported the results of a conference of scientific and technical associations held in London on September 6, at which the B.A.C. was represented by the president, Mr. Millington, Mr. Holton, and himself. He stated that the conference accepted the whole of the proposals made by the B.A.C. representatives, and that at the close Professor Hinchley, on behalf of the Association, had intimated adherence to the Federation subject to the confirmation of the Council. It was resolved that the action of the representatives be approved, and that the president, Mr. Garland, and two of the three following members from the North—viz., Mr. Kay, Mr. Millington, and Mr. Holton—attend the Federation meeting to be held in London on October 18 as the B.A.C. delegates.

Draft Rules.—The rules, as amended, incorporating the suggestions made by the various sections, were submitted, and the committee were instructed to distribute copies to the local section committees for their final approval.

Munitions Chemists: Widnes Election.—The publication as propaganda of the questions submitted to the candidates in the Widnes by-election, and the answers received, was discussed; and on the motion of Dr. Kay, seconded by Dr. Hedley, it was decided first to submit the matter to the section committees for consideration, with a view to the preparation and adoption of a political programme as a permanent element in the B.A.C. organisation.

Leeds Section.—At the request of the Leeds Section for help in connection with a special meeting to be held there, Professor Hinchley, Dr. Hedley, and Dr. Foster undertook to attend and speak.

Salaries.—The attention of the Council having been drawn to an advertisement in the *Gas World* for a gas works chemist at a salary of £200., including war bonus, the President read a strongly worded letter (referred to elsewhere) protesting against the absurd inadequacy of the salary offered.

Reprints of the Proceedings.—On the motion of Mr. Kay, seconded by Dr. Forster, it was resolved that the editorial matter in the *Chemical Trade Journal* and *Chemical Engineer* appear only once a month, and that the reprints (together with other matter if desired) be issued periodically, without charge, to all members, probationers, and students.

Next Meeting.—The next meeting of the Council will immediately precede the annual general meeting, which will be held in Manchester on Saturday, November 15.

CHEMISTS AT £200. A YEAR.

The Council is indebted to Dr. E. W. Smith, chief chemist of the City of Birmingham Gas Department, for calling attention to the following advertisement, which appeared in the *Gas World* of September 6 last, under the heading, "Situations Vacant":—

"Works Chemist wanted for a 500-million works in the North of England. Applications preferred who have had College and works training, the latter extending over six or seven years. Duties shall include all usual laboratory and works tests, qualitative and quantitative analysis. Salary £200. per annum, including war bonus. Apply, stating age, experience, qualifications, etc., to Box 3130, *Gas World* Offices, 8, Bouverie Street, E.C. 4."

Dr. Smith himself wrote a strong protest to the anonymous advertiser, of which he was good enough to send us a copy; and the following letter was also sent, signed by the president, on behalf of the B.A.C.:—

Dear Sir,—Our attention has been drawn to your advertisement in the *Gas World* of September 6, 1919, in which you advertise for a fully qualified chemist at a salary of £200. per annum.

We wish to suggest most emphatically to you that such a salary is a disgraceful salary to offer a highly educated man with six or seven years' works experience; and it is quite impossible you will obtain a suitable man, unless you take advantage of his poverty through the circumstances of the time. The salaries paid to chemists under pre-war conditions indicated the backwardness of chemical industry in this country, but the salary you offer, if compared on a rational basis, is very much lower than the pre-war salary of the type of man you want.

The salary for the kind of man you require should be at least £350. per annum, and we can assure you that the payment of such a salary will mean, as far as you are concerned, a much greater benefit than £350. per year would indicate; and if you are wise in your own interests you will not think of any lower salary.

Finally, we may state that it is our intention to fight such people as yourselves not only in the personal interests of chemists, but in the interest of the country itself.—Yours faithfully,

For and on behalf of the Council,
J. W. HINCHLEY, Chairman.

Further comment on this case is needless. In taking up such cases as this the B.A.C. is fulfilling one of the functions for which it was formed, and members should not hesitate to call the attention of the Council to any such cases with which they may become acquainted.

FEDERATION AND WHITLEY COUNCILS.

The definite formation of the Federation of Scientific and Technical Professional Associations, as reported in the above proceedings, furnishes a convenient occasion for shortly summarising the part played by the B.A.C. towards bringing this about.

Early in the present year the Council of the B.A.C., alive to the possibilities of service to the industries of the country inherent to the Whitley scheme, but largely lying dormant and unappreciated, appointed a Committee to promote the representation on Whitley Councils of the chemist and the technician as a necessary complement to the employer and the manual worker, who so far had monopolised representation on these bodies.

This Whitley Committee in the first instance secured the services of Mr. Todd of the Ministry of Labour to address the Association on the subject, and 5,000 copies of this address were printed for general circulation.

The B.A.C. Whitley Committee however, recognised at the outset that little progress would be made if the combined forces of those who furnish the scientific and technical experience to industry were not brought into play, and it lies to their credit that they were the first to bring together the various scientific and technical organisations round a common table to discuss in concert the furtherance of the movement.

It is unnecessary to dwell upon the vicissitudes of these conferences, the difficulties that arose, and the cross purposes that were engendered; it is sufficient to say that the spirit of goodwill that animated them surmounted all obstacles; and, in justice to the B.A.C. Whitley Committee, to add that the principles elaborated by them have been substantially adopted by the Federation that has been formed, and have furnished the basis of its constitution. These may be broadly summarised as follows:—

(1) That the activities of the Federation shall initially be confined to Whitley Council and like work.

(2) That to facilitate acceptance by the Board of Trade the constituent Associations shall be registered trade unions.

(3) That representation shall be claimed, distinct from that of the employer and the manual worker, as a third party furnishing to the common pool the scientific brain and the technical skill without which the two other elements are of no avail.

(4) That the independence and initiative of the constituent associations shall be in no way prejudiced or impaired, subject to the provision that they keep the Federation informed of any procedure that relates to movements that are the accepted objects of federal action.

(5) That group committees shall be formed within the Federation (e.g. chemists, engineers, etc.), that shall unify each professional interest, which otherwise would be spread over a variety of the constituent societies, representation being *pro rata* to the professional interest concerned.

(6) That the Federation shall be democratically controlled, and that its activities shall be determined by the voice of the members of its constituent societies, expressed through their representatives on the Federal Council. Thus, for example the addition of other fields of activity to that of Whitley Council work would be so determined.

Fourteen professional associations were represented at the conference last held, and seven of them have already joined the new federation.

DERBYSHIRE OIL OUTPUT.—It is officially estimated that 8,000,000 gallons of oil has steadily flowed at the Hardstoft Well, near Sheffield, since the heart of the stratum was first penetrated by the American borers. The flow has now attained an average of over 2,000 gallons per twenty-four hours. Drilling for the present has been temporarily suspended but will be resumed in the near future.

NEW COMPANIES.

Globe Oilfields, Ltd.—Capital £50,000., 10s. shares. Registered office: Finsbury Pavement House, E.C.

Research Association of British Rubber and Tyre Manufacturers.—Registered October 9. Objects: To promote research and other scientific work in connection with the rubber and tyre manufacturing and allied industries, etc. Solicitors: J. B. and F. Purchase, 14, Regent Street, S.W.

Anglo-Trinidad Petroleum Company, Ltd.—Private company. Capital £100., £1. shares. Registered office: 13, Copthall Court, E.C.

Crystal Manufacturing Company, Ltd.—Private company. Capital £2,000., £1. shares. Object: To take over the business of a vinegar brewer carried on by G. Pickup at Pipwellgate, Gateshead, as the "Crystal Vinegar Company." Registered office: 7A, Pipwellgate, Gateshead.

H. J. Enthoven and Sons, Ltd.—Private company. Capital £120,000., £100. shares (340 A preference, 460 B preference, 200 C preference, and 200 ordinary). Merchants, metal refiners, etc. Registered office: 70, Lombard Street, E.C.

Lead Wool Company (1919), Ltd.—Private company. Capital £30,000., £1. shares. Object: To take over the business of the Lead Wool Company, Ltd. (in liquidation), including certain licences for the United Kingdom and British Colonies and patent rights relating to metallic packing. Registered office: Churchfields, Snodland, Kent.

Matthew Marshall, Ltd.—Private company. Capital £10,000., £1. shares. Object: To take over the business lately carried on as tallow manufacturers, oil and explosive merchants, and powder agents at Gateshead, Newcastle-on-Tyne, and elsewhere. Registered office: Emerson Chambers, Blakett Street, Newcastle-on-Tyne.

Mica Manufacturing Company, Ltd.—Private company. Capital £25,000., £1. shares. Manufacturers, importers, exporters of and dealers in mica, micanite and insulating materials, paints, varnishes, papers and paper cloths, electric, magnetic, galvanic, chemical, and other machinery. Office: 22½, Cazenove Road, N. 16.

Morrison Silica Brick Company, Ltd.—Private company. Capital £10,000., £50. shares. Registered office: Ynisderw Road, Pontardawe, Glam.

New Silver Nitrate Company, Ltd.—Private company. Capital £2,000., £1. shares. Object: To take over from B. A. Chapman, Joan H. Daniel, and H. A. H. Spinney the business of manufacturers of nitrate of silver carried on by them in London. Registered office: 61-2, Chancery Lane, W.C.

Victoria Chemical Works, Ltd.—Private company. Capital £5,000., £1. shares. Manufacturing chemists and druggists, oil and colourmen, etc. Registered office: 85-88, Minories, E.C. 1.

Noflame Paint, Ltd.—Private company. Capital £6,000., £1. shares. Oil, varnish, and colour men, pharmaceutical, manufacturing, and general chemists, druggists, and dry-salters, etc. Registered office: 1, Quality Court, Chancery Court, Chancery Lane, W.C. 2.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

(SPECIALLY CONTRIBUTED.)

The continuance of the iron moulders' strike has retarded the improvement in the hematite pig-iron trade which had been expected to take place after the settlement of the railway strike, and the result is that only half the normal output of the 380 by-product coke ovens in this district is required for the ironworks in West Cumberland and North Lancashire. There will be no material change for the better until at least three additional furnaces on ordinary iron are relighted. Of this, however, there is a reasonable probability within two or three weeks. It is quite on the cards that two more furnaces may be in operation at Workington and one at Barrow, and in that event the output of the ovens would have to be increased by one-third. The East Coast coke supplies have not undergone any diminution, as there is no reduction in the number of furnaces on low phosphorus brands of iron, for which the harder coke is used. To West Cumberland this week they are 7,500 tons, and to the Furness district, 12,300 tons. The make of benzole and sulphate of ammonia is not now sufficient to meet demands, but there is more pitch and creosote than can be readily absorbed, and acids, of course, are very dull.

FERTILISER NEWS.

(SPECIALLY CONTRIBUTED.)

Nitrate of Soda.—Good progress has been made with sales by the Producers' Association in Chili, a further quantity of 170,000 tons being reported as disposed of for November shipment at 9s. 4d. per quintal, f.o.b., for ordinary quality, making about one million tons in all since the beginning of operations in September. Curiously enough, since nitrate was obtainable at the fountain-head at the above figure, considerable resales are said to have been effected at 9s. 5d. to 9s. 5½d. for 95 per cent., and at twopence per quintal more for 96 per cent. quality, the premium on the latter having been judiciously reduced since the disappearance of the buying for "munitions"; we have repeatedly stated that the Allies, represented by the Nitrate of Soda Executive in London, were made to "pay through the nose" for so-called refined nitrate prices altogether out of proportion to the extra cost of production. Encouraged by success, the Producers' Association, primarily established for the purpose of "fixing" prices, and thereby preventing fluctuations detrimental to the trade, has again raised its limits to 9s. 7d. for delivery up to December 15, and 9s. 9d. beyond that date up to June 30, 1920. The seller is, of course, entitled to ask his own price—the anti-profiteering Act does not extend to Chili,—but in the present case the ostensible *raison d'être* of the Association is obviously stultified by the successive advances from 9s. to 9s. 9d. per quintal within a few weeks the while the cost of production has tended downwards. The European farmer does not yet take any interest in the Chilean fertiliser for next spring; but some doubt seems to exist with regard to the source of supply of the hundreds of steamers and sailing-vessels required to move a million and a half tons of nitrate of soda from the West Coast within the next five months.

North African Phosphates' Fine Prospects.—The Ministry of Industrial Reconstruction recently called together the managers of the African phosphate companies to ask them to intensify their production during the current year. The mines, according to the latest report, promised to increase the tonnage in 1919 by about 150,000 tons, of which two-thirds would be reserved for French use. It is quite understood that for next year the African production will be greater than that of the current year, and it is hoped that the quantity to be reserved for France will enable the producers of superphosphates to acquire all the phosphates that they have already contracted for. French agriculture can, therefore, count on something like normal deliveries of superphosphates, provided always that transport facilities equal to their requirements are available. Tonnage is now plentiful, and enough to carry all that has been hitherto reserved for France; and it is hoped that the mine owners will be left free from official interference, so that they may meet their engagements.

New Italian Fertiliser Company.—The *Fabbrica Concimi Bosio Viadana di Calvisano* has been formed for the production of chemical fertilisers and sulphuric acid. The capital is 250,000 lire.

Sulphate of Ammonia.—Business in this material moves easily all the time, and it appears that the production is going rapidly into consumption. Some fears are being expressed in certain quarters about the possible future demand, but this seems groundless. Sulphate of ammonia is in increasing favour in this country, and there is a likelihood of the home consumption expanding year by year for some time yet. Higher prices may, of course, check demand somewhat, but it is not to be supposed that higher prices will prevail for a considerably prolonged period. A readjustment must come. Export trade continues quiet in view of all the circumstances. From across the Atlantic news comes that there are large orders for sulphate of ammonia there. The difficulty experienced is in locating supplies with the large producers. There is also good inquiry noted for material for the balance of the year, and, according to all reports, American producers are well booked up over this period. Little material is available in double bags for export. Lots that appear in the resale market from time to time create considerable buying interest, and holders are not obliged to make concessions to bring business to a head.

Superphosphate and Basic Slag.—These products remain in request, especially the milder and cheaper forms of basic slag. At the same time, although orders are still coming in, deliveries are very much behind, and it will take manufacturers some time to work off orders now on hand. Potassic-

super (carriage paid, 4-ton lots), 4 and 26 per cent., in bags, is quoted at £9. 1s. to £9. 2s. 6d. per ton.

Potash.—The expected new trade in potash manures does not seem to be working up so well as was expected. The various descriptions are not at all settled in market value. It is reported from one good source that the Government offers do not meet trade requirements to the extent that is to be desired. Although supplies are reported to be only of small extent, there is said to be an improvement. For the week ended October 18, the imports of Alsatian potash amounted to 1,185 tons of 14 per cent. sylvinit (French kainit). Current quotations for Alsatian potash salts are as follows: Sylvinit, 14 per cent. (French kainit), £7. per ton; 20 per cent., £8. 7s. 6d. per ton; muriate of potash, 80 per cent., £19. 7s. 6d. per ton.

Other Fertilisers.—Bone meal remains in short supply, and, if anything, the price is inclined to harden. East Indian is much wanted, and over £16. has been quoted at Liverpool. Pure steamed material, 1 per cent. ammonia and 60 per cent. phosphates, in bags, is £13. 10s. to £14. per ton, ex works. It is again stated that imports of nitrate of lime will be resumed next season, when it is hoped that difficulties concerned with the moisture absorption will prove to have been overcome by the production of nitrate of lime in a granular and dust-free condition.

Italian Notes.—The *Unione Concimi* of Milan has held its general meeting for the sixteenth working year, terminating on June 30. The profits are reported to have been 3,401,093 lire, against 5,707,540 lire in the preceding working year. In the report the directors congratulate themselves on having been the first house in the country to offer fertilisers at 20 per cent. below the Government fixed price. However, with an eye to business, the directorate adds that the effect of this cheap fertiliser will be to more than double the consumption, and will ultimately tend to the advantage of the company. The report observes, further, that the question of raw material is, of course, the bottom one. Pyrites exist in abundance in Italy, and the company are supplied therewith by the largest producer, the *Montecatini*. But still there remains the grave question of phosphates, and this has been settled in favour of Italy; for France, which appeared at one time desirous of creating a monopoly therein for herself in respect to Tunisian phosphates for the purpose of treating them there, has contracted to let Italy have 600,000 tons a year.

The fertiliser market is unchanged, and remains calm. Demand is fairly active, and the supply so far satisfactory. In sulphate of ammonia there are no offers, there being little stock available. Small parcels are being quoted at 130-135 lire per quintal. The basic slag situation is unchanged. France has granted permission for the transport of some potash, and some parcels are arriving from England at high prices but of low grade.

SOUTH WALES NOTES.

(SPECIALLY CONTRIBUTED.)

There is much activity in the tinplate trade, and business still pours in from the Far Eastern markets. More mills are to be restarted in order to cope with the increased demand that has sprung up during the last four or five weeks. Manufacturers have some difficulty in getting good shipments owing to the continual strife among the dockmen at Swansea. It is no uncommon occurrence to have a sectional strike once or twice in a week, and these greatly interfere with the regular despatch that just now is so much needed.

The demand for all kinds of patent fuel is exceptionally strong and pressing. The labour disturbances at the docks impede exports, but nevertheless some good cargoes have gone during the week from Swansea, chiefly to Valencia, Rouen, St. Malo, St. Brieux, and Dieppe. One of 6,500 tons left for St. Nazaire. Manufacturers at Cardiff sent much of their makes to Calais, and those at Port Talbot despatched 2,949 tons to Santander, and smaller cargoes to Rouen. The Graigola Fuel Company, of Cardiff, has taken over 40 acres of land near the Port Talbot Docks for the purpose of erecting new fuel works which it is anticipated will have an output of 4,000 tons per day.

The copper works remain partially idle owing to the scarcity of ore. A parcel of 180 tons of copper matte arrived at Swansea from Avonmouth for the Mond Nickel Company, whose works at Clydach have become more active; and 41,573 bags of copper precipitate came into Port Talbot for the Rio Tinto Company's works there.

At all the works turning out fertilisers much activity prevails. There exists a heavy demand for basic slag.

EXPORTS OF CHEMICALS AND ALLIED PRODUCTS.

(Concluded from page 429.)

ARTICLES.	QUANTITIES.		VALUE.		ARTICLES.	QUANTITIES.		VALUE.	
	Month ended		Month ended			Month ended		Month ended	
	Sept. 30th.		Sept. 30th			Sept. 30th.		Sept. 30th.	
	1919.	1918.	1919.	1918.		1919.	1918.	1919.	1918.
OILS, Refined :					OIL-SEED CAKE, not				
Coco-nut cwt.	—	—	£	£	sweetened :			£	£
Cotton-seed tons	4	—	489	14	Cotton-seed Cake tons	4	11	85	192
Olive tuns	3	—	1,230	—	Linseed Cake .. "	7	1	183	20
Palm cwt.	2,888	—	12,238	—	Rape-seed Cake .. "	—	—	—	—
Palm Kernel .. "	160	3,280	880	9,183	Soya Bean Cake .. "	—	—	—	—
					Unenumerated.. "	—	—	—	—
Total Val. £	—	—	14,837	9,197	Total "	11	12	268	212
OILS, Unrefined :					PARAFFIN WAX .. cwt.				
Coco-nut cwt.	3,453	—	9,499	—		17,260	—	50,503	—
Olive tuns	—	—	—	—	SOAP :				
Palm cwt.	1,237	—	3,890	—	Soft Soap cwt.	7,210	1,287	19,927	3,546
Palm Kernel .. "	10	—	26	—	Household and Laundry Soap, in bars or Tablets :				
OIL, SEED :					To China "	2,652	321	8,099	1,100
To Netherlands tons	1,352	—	102,552	—	" Other Foreign Countries .. "	130,718	18,593	472,035	50,388
" Belgium "	1,287	—	131,806	—	" British South Africa "	67	27	211	96
" Brazil "	129	—	15,012	—	" British East Indies "	28,418	8,506	59,601	18,990
" Egypt (including Anglo-Egyptian Sudan) "	82	—	8,308	—	" Other British Possessions .. "	45,301	13,882	124,856	34,117
" British India .. "	19	—	2,700	—	Total "	207,156	41,329	664,802	104,691
" Straits Settlements .. "	24	—	2,910	—	Polishing and Scouring Soap cwt.	560	48	1,626	129
" Ceylon "	—	—	—	—	Soap Powder .. "	627	313	1,578	673
" Australia .. "	10	—	1,050	—	Toilet Soap "	11,164	5,101	119,056	45,668
" Canada "	160	—	18,715	—	Unenumerated .. "	734	120	4,035	519
" Other C'tries .. "	11,949	545	1,112,580	41,856	Total of Soap .. "	227,451	48,198	811,024	155,226
TOTAL :									
Castor-seed Oil .. "	397	249	41,942	23,325					
Cotton-seed Oil, Unrefined "	667	—	40,611	—					
Linseed Oil :									
Pure "	12,122	8	1,145,937	578					
Not Pure "	261	288	26,289	17,923					
Rape-seed Oil .. "	1,370	—	127,644	30					
Soya Bean Oil .. "	19	—	1,780	—					
Other Seed Oils .. "	176	—	11,430	—					
Total "	15,012	545	1,395,633	41,856					
CANDLES :									
To British South Africa cwt.	54	—	355	—					
" Other C'tries .. "	16,322	537	80,409	2,029					
Total "	16,376	537	80,764	2,029					
CEMENT for Building & Engineering purposes :									
To Netherlands tons	3,157	—	10,414	—					
" U.S.A. "	—	43	—	347					
" Brazil "	3,944	14	23,189	150					
" Argentine Republic .. "	1,239	704	7,169	3,012					
" British South Africa "	109	11	626	34					
" British East Indies "	6,903	4	38,165	204					
" Australia .. "	180	7	1,036	89					
" New Zealand .. "	—	9	—	191					
" Canada "	—	—	—	—					
" Other C'tries .. "	12,918	18,834	65,518	50,300					
Total "	28,450	19,626	146,417	54,327					
GLUE, Size, and Gelatine cwt.									
	9,475	867	42,723	10,190					

SOCIETY OF CHEMICAL INDUSTRY.

BIRMINGHAM AND MIDLAND SECTION.

AN excellent programme of lectures has been arranged for the winter season by the Birmingham and Midland Section of the Society of Chemical Industry. The session was opened on Thursday at the University of Birmingham, when Mr. E. C. Rossiter gave a paper on "Potash Production." On November 13 there will be a joint meeting with the members of the Birmingham Metallurgical Society, and at this a paper will be read by Mr. C. J. Brockbank, of Thorold, Ontario, on "Production of Artificial Abrasives in the Electric furnace." On December 11 Mr. J. O. Sullivan will speak on "The Influence of Temperature, Concentration, Duration of Mash and Slackness of Malt, on the Starch Products of the Extract of Malt." The subject of "Catalysis" will be discussed on February 12. Dr. Maxted (Walsall) will speak upon it from an industrial point of view; Mr. D. F. Twiss will refer to its application to vulcanisation; and Dr. Morrell will give his conclusions on catalysis applied to the oxidation of oils. The session will be wound up with a paper (on March 25) by Dr. A. Slator on "An Apparatus for Estimating CO₂," and with one on "Labour-saving Devices in Chemical Works" at a conference on April 22. The last-named meeting has been arranged by the Chemical Engineering Group.

DYE IMPORT LICENSING PETITION.—Readers who have forms of the petition to the Right Hon. D. Lloyd George, M.P., on the dyestuffs licensing question, which is being organised by the British Chemical Trade Association, are asked to return them forthwith to the offices of the Association, 80, Fenchurch Street, London, E.C. 3.

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THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

October 13th to 18th (inclusive).

Continuous Treatment of Hydrocarbons with Liquid Sulphur Dioxide. Allgemeine Ges. für Chemische Industrie. 25,317.
 Neutralising Oils or Fats. Bloxum, A. G. (Arbini). 25,528.
 Extraction of Fat or Oil from Raw Materials. Bollmann, H. 25,213.
 Transfusion of Combustible Liquids. Brewster, A. O. French. 25,499.
 Treatment of Wood, etc., for Obtaining Cellulose and Artificial Resin, Asphalt, Lac, etc. Claessen, C. 25,502.
 Distillation of Coal, etc. Davidson, T. M.; Low Temperature Carbonisation, Ltd.; and Armstrong, H. L. 25,103.
 Distillation of Carbonaceous Substances. Davidson, T. M.; Low Temperature Carbonisation, Ltd.; and Armstrong, H. L. 25,104.
 Acetic Acid. Dreyfus, H. 25,479.
 Treatment of Petroleum, etc. Dunstan, A. E. 25,336.
 Pyroxylin Compositions. Du Pont de Nemours and Co., E. I. 25,494.
 Substitute for Horn, Vulcanite, etc. Fitzgerald, F. W. V. 25,139.
 Non-inflammable Compounds Containing Cellulose-collodion, Celluloid, etc. Fitzgerald, F. W. V. 25,140.
 Combinations of Pyramidal Surfaces for Purification of Liquids, Vapours, and Gases. Gaillet, P. H. A. 25,486.
 Utilising Differences of Fluid and Vapour Gravities. Hoare, R. R. 25,589.
 Sulphuric Acid Valves. Hodge, J. 24,977.
 Distillation and By-product Recovery of Waste Grease. Lane, L.; and Williams, D. H. 25,116.
 Crates or Holders for Carboys, etc. Leigh, H. 24,966.
 Concentrating or Washing Ores, etc. Lesser, M. 25,529.
 Lead Pigments. Mackay, P. A. 25,544 and 25,545.
 Recovering Vanadium from Its Ores. Mackay, P. A. 25,546.
 Lubricating Greases. MacLaurin, R. 24,956.
 Oxidation of Zinc, Tin, etc., and Production of Oxides of Such Metals. Maconochie, H.; and Ros, R. de. 25,405.
 Colloid or Colloidal Substance. Moseley, J. F.; and Williams, M. L. 25,355.
 Effecting Crystallisation from Solution. Norsk Hydro-Elektrisk Kveistofaktieselskab. 25,018.
 Evaporating Processes. Stead, J. C. 25,169.
 Degasification of Coal. Young, N. 25,276.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 6d. in stamps to the Comptroller, Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane, W.C.

1916.

Artificial Asphalt-limestone Zimmer. 11,331.

1917.

Titanium Compounds. Wrigley, H.; Spence, H.; and Spence and Sons, P. 14,950. **133,336**

1918.

Calcium Carbide. Beckett, F. M. 7,239 and 7,240.

Metal Alloy Containing Manganese. Stabilimenti Biak—Ing. A. Pouchain. 10,209. **133,354** and **133,355**

Metal Alloy. Stabilimenti Biak—Ing. A. Pouchain. 10,210. **133,362**

Basic Lead Sulphate. Wilson, S. B.; and Purex, Ltd. 10,978. **133,363**

Aluminium Alloy. Stabilimenti Biak—Ing. A. Pouchain. 11,947. **133,367**

Glycerol. Eoff, J. R. 11,948. **133,373**

Clarifying or Recovering Lubricating Oils. Helmes, M. J. 16,170. **133,374**

High-percentage Carbazole. Soc. d'Eclairage, Chauffage, et Force Motrice. 16,291. **133,415**

Making Combustible Gases from Carbonaceous Material. Palmer, C. S. 16,304. **121,455**

Treating Ore Concentrates, Fines, Slimes, Dust, and the Like. Reece, O. 16,325. **119,874**

Synthetic Production of Hydrogen Peroxide. Moritz, R. 16,376. **120,044**

Esters of N-mono-arylsulpho-mono-alkyl (allyl, aralkyl)-amido-oxy-aryl compounds N-mono-alkyl- (allyl, aralkyl)- amido-oxy-aryl compounds, and aryl-sulpho-esters of amido-oxy-aryl compounds. Imray, O. (Soc. of Chemical Industry in Basle) 16,379. **120,045**

Centrifugal Separation. Maues, W. 16,523. **133,433**

Utilising Residues from Bituminous Shales, Cannel Coals, and the Like. Broxburn Oil Co.; and Findlater, R. H. 16,542. **133,448**

Bituminous Material. Wade, H. (Barrett Co.). 16,847. **133,452**

Apparatus for Mixing Paints. Wilkinson, F. 16,955. **133,466**

Potassium Fluoride from Silicate Rocks. Dutt, E. E.; and Dutt, P. C. 17,081. **133,471**

Mineral Selective and Frothing Agent. Marks, E. C. R. (Luckenbach Processes, Inc.). 18,028. **133,474**

Low Temperature Carbonisation. Yeadon, J. A.; and Whitaker, T. 257. **133,498**

Metal Alloy Containing Manganese Stabilimenti Biak—Ing. A. Pouchain. 6,986. **133,554**

257. **133,605**

COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

1919.

Hydrogenation. Dayton Metal Products Co. 11,439. **133,666**

Liquid Fuel. U.S. Industrial Alcohol Co. 24,852. **133,709**

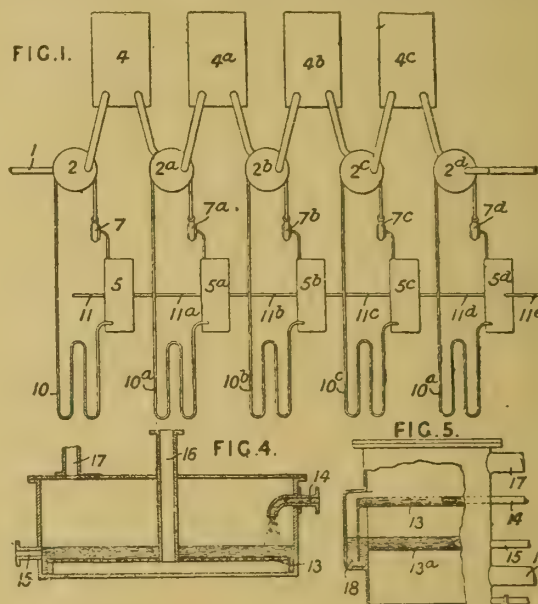
Resin-like Bodies. Melamid, M. 24,916 and 24,917. **133,712** and **133,713**

Sedimentation Apparatus. Dorr, C. O. 24,936. **133,716**

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Nitric Acid. K. B. Quinan, Somerset West, Cape Province, South Africa. British Patent, 131,029, of 1918.

The oxidation and absorption of gases containing nitric oxide is effected in apparatus having a number of permeable diaphragms upon which water is held in such a manner that the gas passes through the diaphragms but the liquid does not, suitably proportioned spaces being provided to allow of oxidation of the nitric oxide between successive contacts with the absorbent. Cooling devices may be provided for the absorbent and gas respectively at suitable points of their course. Fig. 1 shows an arrangement of plant comprising absorbers 2, 2^a - 2^d, oxidation chambers 4, 4^a, 4^b, 4^c, and the liquid tanks 5, 5^a - 5^d to receive the liquid from the absorbers through coolers 10, 10^a - 10^d, the liquid being returned to the absorbers by pumps 7, 7^a - 7^d. The course of the gas is



1, 2, 4, 2^a, 4^a, 2^b, 4^b, 2^c, 4^c, 2^d, while the liquid is supplied at 11 to the tank 5, and passes by overflow pipes 11^a - 11^d to the other tanks, and is withdrawn at 11^e. The construction of the absorbers is shown in Figs. 4 and 5, in which the gas enters at 16 and leaves at 17, while liquid enters at 14 and leaves at 15, so that the gas passes through the perforations in the plates 13 and (in Fig. 5) 13^a and through the layer of liquid upon these plates, the pressure of the gas, diameter of the perforations, and depth of liquid being so arranged that the liquid does not percolate through the plates. In the construction shown in Fig. 5, the liquid overflows from the plate 13 to a trap 18, from which it reaches the second plate 13^a. Means, such as blocks capable of being raised or lowered, may be provided to allow of closing down some of the perforations in the plates.

Ammonium Nitrate and Sodium Sulphate. C. W. Bailey, H. S. Denny, and A. T. Jefferis, H.M. Factory, Langwith, Nottinghamshire. British Patent, 131,017, of 1918.

Suitable proportions of ammonium sulphate and sodium nitrate interact in the presence of a bisulphate—for example, sodium bisulphate. Sodium sulphate separates from the hot solution and is removed. When the solution has cooled, without dilution, ammonium nitrate separates. Ammonium sulphate and sodium nitrate, in proper quantities, are added to the final solution, and the process is made continuous. Nitre-cake may be used as the source of the sodium bisulphate employed.

Acetaldehyde. J. Crosfield and Sons, Warrington; and T. P. Hilditch, Grappenhall, Cheshire. British Patent, 131,084, of 1918.

In the production of acetaldehyde by passing acetylene into acid solutions of mercuric salts, the mercury sludge formed in the process is revived by adding to the reaction liquid a small quantity of manganese dioxide, lead dioxide, red lead oxide, or cerium dioxide, and agitating the mixture by passage of gas or by mechanical agitation; the revivification is repeated until the solution ceases to be an effective absorbent. The reaction liquid should contain 0.5 to 1.5 per cent. of mercuric oxide, and the apparatus should be free from metallic parts; the lower portion of the apparatus should contain baffles to break up the gas current. An example is given of the use of manganese dioxide.

Chlorosulphonic Acid. Clayton Aniline Company, A. Schedler, and E. N. Marchant, Clayton, Manchester. British Patent, 131,024, of 1918.

Chlorosulphonic acid is prepared by passing hydrochloric acid gas obtained as a by-product in the chlorination of organic compounds—such as benzole, toluol, nitro-benzene, acetic acid, etc.—into sulphuric acid containing about 80 per cent SO_3 .

Ammonia and Hydrogen. E. B. Maxted, Walsall, Staffordshire. British Patent, 131,049, of 1918.

A mixture of nitrogen and hydrogen for the production of ammonia, or the hydrogen alone, is purified from carbon monoxide by preliminary passage over a base-metal catalyst, such as nickel or cobalt, at a temperature such as 350°C ., which is below that required for the production of ammonia, but sufficiently high for the production of methane. The gases are treated while under pressure, which may suitably be that required afterwards for the production of ammonia.

Phenol-formaldehyde Condensation Products. H. V. Potter and Damard Lacquer Company, Westminster. British Patent, 131,112, of 1918.

A purified condensation product of phenol (or cresols) with formaldehyde, free from uncombined phenol, is prepared by heating phenol (or cresols) with not more than an equal weight of formaldehyde solution (40 per cent.) in the presence of small quantities of an alkaline condensing-agent, such as ammonia, dissolving the viscous condensation product in aqueous caustic alkali and precipitating the pure condensation product by means of acid. The product, washed and dried, is a white amorphous non-resinous powder with a definite melting-point, and may be hardened by heating to an insoluble infusible product, or may be mixed with definite amounts of free phenol or resinous phenol-formaldehyde condensation products to give resins.

Lead Chloride. F. E. Elmore, Boxmoor, Hertfordshire. British Patent, 131,353, of 1918.

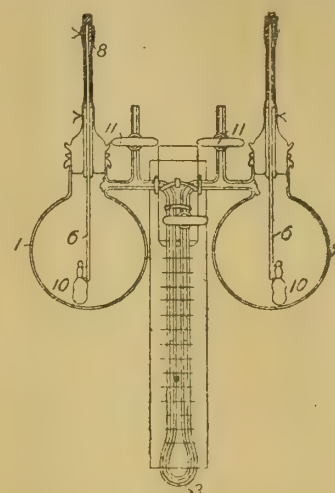
Lead zinc sulphide ores and concentrates are heated with sufficient strong hydrochloric acid to attack the lead but not the zinc, and the cooled residue is washed with cold water to remove acid and soluble impurities. Lead chloride is then recovered from the washed residue by hot water or brine, which is used alternately to dissolve the chloride and to deposit it in a cooling vat. The zinc sulphide of the ore remains unattacked. The lead chloride may be treated with sulphuric acid, which may be obtained from the sulphuretted hydrogen evolved in the ore treatment, and the hydrochloric acid obtained is then used again.

Dehydration of Tar. C. A. Klein, Brimsdown, Middlesex. British Patent, 131,087, of 1918.

This invention relates to the dehydration of tar, particularly that obtained from producer plants, and consists in bringing the watery tar into intimate contact with a convenient excess of water at a temperature above 40°C . The process may be carried out by forcing the heated tar through a perforated screen into a vessel containing water at a temperature above 40°C .; by causing a jet of steam to impinge on a jet of tar above the water vessel; by heating the tar in an excess of water by jets of live steam; or by violent mechanical agitation of the tar in the presence of an excess of water heated to a temperature above 40°C . The tar is finally allowed to settle, and is stated to contain less than 4 per cent. of water.

Estimating Vapours in Gases. H. S. Davis and M. D. Davis, Clifton, Nova Scotia. British Patent, 131,154, of 1918.

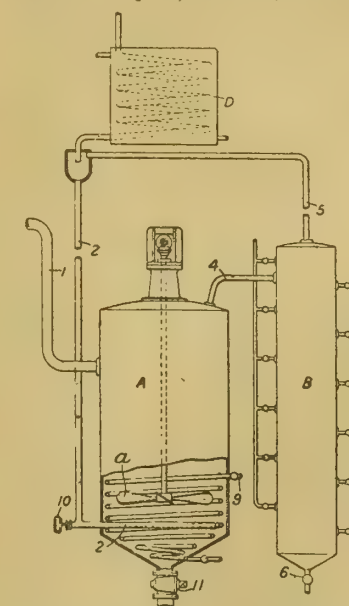
The amount of a vaporous constituent of a gas is measured by measuring the partial pressure due to the vapour in an apparatus comprising two similar flasks 1, 2, connected through a manometer 3, and having rods 6 passing through the stoppers, sealed by rubber tubes 8. Small sealed bulbs 10 containing the liquid or solid, corresponding with the vapour to be measured, are attached to the bottom of the rods, and are adapted to be broken against the bottom of the flasks by pressure on the rods. One of the flasks is filled with the gas to be analysed, and the other with air; the pressures are brought to atmospheric by momentarily opening cocks 11, and the bulbs 10 are broken. The pressure in one flask is increased by the full vapour pressure, while that in the other is increased by this amount less the pressure due to the



vapour already in the gas. The pressure difference shown on the manometer measures, therefore, the vapour pressure which existed in the gas. Solutions may be used in the bulbs 10. The sum of the vapour pressures due to more than one constituent of a gas may be measured by using a solution which evolves one of the vapours and dissolves the other vapours. The "light oil" vapours in coal gas may be measured by using benzene, or benzene and toluene, or benzene, toluene, and xylene in the bulbs 10. The flasks may be packed in melting ice, and solid benzene used in the bulbs.

Separating Tar Oils. R. Lessing, London. British Patent, 130,362, of 1918.

Tars and similar bodies are separated into oils and pitch by treatment with solvents which dissolve tar oils but not pitch, at a temperature above that at which the pitch is to be obtained melts. Preferably, the tar is first dehydrated, and the ammoniacal liquor, benzole, and naphtha are thus removed.



The solvent is a petroleum distillate, the bulk of which boils at a temperature above the melting point of the pitch—e.g., a petroleum spirit boiling at 100 – 120°C . The apparatus consists of a vessel A in which the tar and solvent, admitted by pipes 1, 2, are mixed by a stirrer a at a temperature of 100°C . maintained by a steam-coil 9. The solution of tar oils overflows by a pipe 4 to a packed tower or column still B heated by close steam. The solvent vapours are led to a condenser D, and the recovered solvent is led back to the vessel A. The tar oils and pitch are removed through outlets 6, 11. A plunger 10 is used to clear the solvent-admission pipe 2. The operation may be continuous or intermittent. To purify the tar oils the solution, on its way from the vessel A to the still B, is washed by a liquid, an alkaline liquid being used to remove phenols, etc., and an acid liquid to remove pyridine, etc.

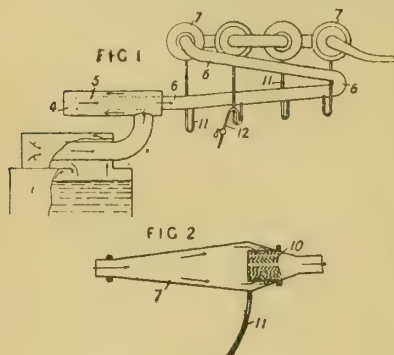
ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Preventing Incrustation. Aktieselskapet de' Norske Saltwerke, Bergen, Norway. British Patent, 131,279. Convention date, August 14, 1918.

In evaporators for liquids containing calcium salts, to prevent the formation of calcium sulphate on the heating surfaces, crystals of calcium sulphate are suspended in the liquid to take up the sulphate separated by evaporation. The liquid is agitated during evaporation to prevent the crystals from settling. The crystals may be formed by gradually pouring lime water into the boiling liquid.

Fractional Distillation. E. A. R. Chenard, Cognac, Charente, France. British Patent, 130,092. Convention date, August 5, 1918.

In fractional distillation, the vapours from a still 1 are passed upwards through a series of elements consisting of concentric tubes 4, 5 through which a reflux obtained by condensation flows downwards. The arrangement is such that an exchange of heat takes place between the vapours surrounding the tubes 5 and the liquid within the tubes 5 while the vapours and liquids are flowing in the same direction. The reflux is obtained by passing the vapours through a series of separators 7 each consisting of cones, Fig. 2, in which the



vapours expand, and which are provided with filtering-boxes 10 packed with inert material to separate the particles of liquid formed during the expansion. The resulting liquids flow by pipes 11 to the zig-zag pipe 6, by which the vapours are led from the elements 4, 5 to the separators 7. Certain impurities may be removed by means of a pipe 12 communicating with one of the pipes 11.

Nitric Acid. F. Gros and Bouchardy, Paris. British Patent, 131,336. Convention date, June 16, 1917.

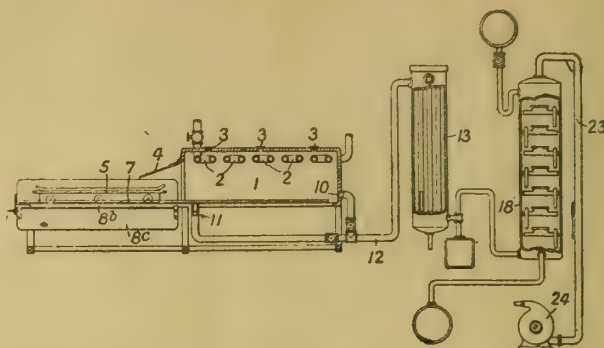
In the production of nitric acid of about 98-100 per cent. strength from liquid nitrogen peroxide, oxygen, and water or aqueous nitric acid, the nitrogen peroxide is employed in such excess as to maintain the liquid saturated throughout the operation—that is, the ratio of nitrogen peroxide to water is at least 15 : 1. The action of the oxygen is continued until the lower layer consists of nitric acid of 98-100 per cent. strength containing nitrogen peroxide and the upper of nitrogen peroxide containing a little nitric acid of the same strength. The oxygen may be employed under pressure—for instance, 20 atmospheres, —and a somewhat raised temperature not above 30° C. may be used. The mixture is agitated during the reaction. The operation may be effected intermittently or continuously. In the former case, the two layers which form may be separated, and the nitric acid layer may be distilled to recover the excess of nitrogen peroxide; while the other layer, which is mostly nitrogen peroxide, may be used again, or the whole mixture may be distilled together. In the latter case water, liquid nitrogen peroxide, and oxygen are introduced at B, C, and A respectively in the necessary proportions. The product flows out through S, and the excess of oxygen carrying nitrogen peroxide escapes at F. By heating the lower part E to 50-60° C. the peroxide is expelled from the acid, and is condensed by cooling the part G.



Recovering Solvents. E. I. du Pont de Nemours Powder Company, Wilmington, U.S.A. British Patent, 131,273. Convention date, August 8, 1918.

Volatile solvents are recovered from coated surfaces, such as split hides and aeroplane wings, by passing a current of air over the surface and passing the vapour-laden air through

an absorbent consisting of "dead oil"—i.e., a coal-tar distillate boiling at 240—350° C. This absorbent is particularly applicable for recovering vapours of ethyl, propyl, butyl, and amyl acetates. The recovered solvent is afterwards separated



from the absorbent by distillation, effected preferably by blowing air or steam through the heated liquid. The coated surfaces are run on a truck 5 into a drying-chamber 1 heated by a steam coil 2. Solvent-laden air is withdrawn through outlets 10, 11, and is led by a pipe 12 to a cooler 13, and thence to an absorbing-tower 18, in which it is passed repeatedly through a counter-current of an absorbent liquid. The vapour-free air is withdrawn through a pipe 23 by a pump 24, and may be returned to the drying-chamber by the openings 3, normally used for inspection purposes. The wheels of the truck 5 run between rails 7. The coating-table 8^b may have hinged sides 8^c, which are used to prevent heavy vapours from streaming down to the floor. As the coating proceeds, the truck is gradually pushed into the drying-chamber, air being meanwhile sucked into the chamber through the door 4. A dope used for coating aeroplane wings consists of nitrocellulose dissolved in a mixture of butyl acetate, benzole, and ethyl acetate.

PARLIAMENTARY NEWS.

Contract for German Potash.

In the House of Commons on Wednesday, Sir A. Geddes, replying to Mr. Chadwick, said: Contracts for material needed by the Government have been placed abroad by the Board of Trade, since the Armistice to date, only in respect of timber and potash. With regard to potash, one contract has been entered into with the German Government, representing an amount of £750,000. In each case the contracts were entered into in order to secure necessary supplies of the commodities in question for the United Kingdom. The potash contract also provided a means whereby the German Government might pay for a portion of their imports of food. With regard to contracts entered into by Departments other than the Board of Trade, I would refer my hon. friend to the Ministers responsible for the contracting Departments concerned.

Import Restrictions.

Sir A. Geddes, invited by Mr. Kiley to state the articles in respect of which import restrictions continue, and on what grounds they were imposed, said the general object of the restrictions was explained by the Prime Minister in his statement on trade policy just before the Recess.

Oil Royalties.

Mr. Holmes asked the Prime Minister whether the Government had come to a decision concerning the payment of royalties on the oil discovered in Derbyshire.

Mr. Bonar Law: Yes, sir; the Government have come to the decision that no royalty should be payable in the case of oil.

Railway Rates.

In reply to questions, Sir E. Geddes said that no general revision of railway goods rates had been, or could be, made until the Rates Advisory Committee to be set up under Section 21 of the Ministry of Transport Act had been appointed. He hoped the list of those appointments would be made in the next few days, and that the Committee would be asked as their first task to advise upon a scheme for the immediate increase of freight rates.

REPORTS OF COMPANIES.

A. and F. Pears, Ltd.

The meeting was held in London on Tuesday, the Right Hon. Lord Dewar (the chairman) presiding. The Chairman, in moving the adoption of the report, said: Our customary dividends and interest to debenture and preferred shareholders have been paid; the preferred ordinary shareholders receive 12 per cent. and the ordinary shareholders 20 per cent. We are placing another £5,000. to reserve, out of profits, and the fund will now amount to £120,000. Our profits are £12,000 more this year, after providing over £3,000 for the employees' benefit fund, pensions, war allowances, etc. On the credit side the cash at bankers is lower, but our trade debtors make up the difference, which has, of course, since come in. Investments are at the same figure as in last year's accounts, and they exceed the value quoted on the London Stock Exchange at the end of September, 1919. The nominal capital of the company has been increased by £150,000. in accordance with the resolution passed last October, but we only considered it necessary to issue £50,000., all of which was taken up by the ordinary shareholders. We have now been associated with Messrs. Lever Brothers for five years, and next month the majority of Pears' employees will enter the co-partnership scheme of that firm, and become part proprietors of that business without any contribution to its share capital.

Mr. John French seconded the motion, which was carried unanimously.

Mason and Barry, Ltd.

The directors regret to inform the shareholders that the position of the company shows no improvement from what it was at the time of the annual meeting last April. Although the price of copper is higher than at that date and the rate of exchange between Portugal and this country more in favour of the company, food and other conditions on the mine are worse and costs therefore continue to rise. Great difficulty in securing tonnage still continues, with the result that shipments of ore from the company's port of Pomaron up to September 30 only amounted to 23,790 tons, compared with 19,371 tons in 1918, 35,724 tons in 1917 and 151,424 tons in 1916, all up to same date.

Young's Paraffin Light and Mineral Oil Company, Ltd.

The directors announce that 27 per cent. of the B Debenture holders have not accepted the offer for the abandonment of their contingent rights, and the Anglo-Persian Oil Company have withdrawn their offer, but will reconsider the matter in the event of the minority seeing their way to agree within a reasonable time.

AMERICA AND GERMAN DYES.—*Reuter's* New York correspondent reports that American users of dyestuffs consider the domestic products unsuitable, and may apply to the War Trade Board for permission to import from Germany amounts sufficient to meet the requirements from November 15, 1919, to May 5, 1920.

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 4, Queen Anne's Gate Buildings, London, S.W. 1, whence, unless otherwise stated, further information may be obtained:—

Canada.

A firm of manufacturers' agents in Winnipeg desire to represent United Kingdom manufacturers of glues on a commission basis. (Reference No. 855.)

The following inquiry has been received at the office of the High Commissioner for Canada, 19, Victoria Street, London, S.W. 1. All replies should be sent direct to the foregoing address: A Montreal company, a director of which is at present in this country, seek agencies of United Kingdom manufacturers of aniline dyes and chemicals.

Belgium.

A firm at Tournai desire to secure an agency for United Kingdom manufacturers of dyes, chemical products, and caustic potash for soap makers. (Reference No. 862.)

Czecho-Slovakia.

An agent of good standing wishes to act as agent to United Kingdom firms exporting drugs, chemicals, oils, and dye-stuffs. (Reference No. 868.)

Italy.

A firm of agents in Rome desire to get into communication with United Kingdom manufacturers of soap with a view to undertaking agencies in these lines. (Reference No. 871.)

Spain.

H.M. Commercial Secretary, Madrid, reports that a Spanish agent in Barcelona desires to get into touch with United Kingdom firms who are prepared to deal, on a commission basis, in aniline dyes, chemical products, perfumes, paints, and varnishes. (Reference No. 874.)

Switzerland.

An experienced Swiss business man desires to represent, in Switzerland, well-established United Kingdom exporters of chemicals and metals. (Reference No. 876.)

CORRESPONDENCE.

***We do not hold ourselves responsible for the opinions expressed by our correspondents.*

Dyestuffs Licensing System: the British Chemical Trade Association's Protest.

To the Editor of "*The Chemical Trade Journal and Chemical Engineer.*"

Sir,—I should be glad if you will permit me, through the columns of your valued paper, to request that any forms of petition in regard to the above, which are still outstanding, should be returned to this office forthwith.—Yours, etc.,

THE BRITISH CHEMICAL TRADE ASSOCIATION.

O. F. C. BROMFIELD, Assist. Sec.

80, Fenchurch Street, London, E.C. 3, October 20, 1919.

[If our correspondents "Merchant" and "Another Dealer" will forward their names and addresses, publication of their letters will be considered. We do not recognise anonymous communications.—Ed., *C.T.J. and C.E.*]

MARKET REPORTS.

TAR AND AMMONIA PRODUCTS.

WEDNESDAY.

Benzole: London, 90%, 2s. to 2s. 1d.; North, 1s. 11d. to 2s.; 50%, 1s. 10d. to 1s. 11d.; North, 1s. 9d. to 1s. 10d.; naked; pure, 3s., naked, at works. Carbolic acid, crude, 60%. East and West Coast, nominally 1s. 7d. to 1s. 8d.; crystals, 39-40%, 3½d. to 9d., f.o.b. Crude tar, London, 45s. to 50s.; Midlands, 44s. to 46s.; North, 45s. per ton, ex works. Pitch, 77s. 6d. to 80s.; East Coast, 70s. to 75s., f.o.b.; West Coast, 62s. 6d. to 65s.; f.a.s. Solvent naphtha, naked, London, 90-190%, 2s. 5d.; North, 2s. 3d. to 2s. 4d.; 90-160%, naked, London, 2s. 5d.; North, 2s. 2d. to 2s. 3d. Crude naphtha, naked, 30%, 9d.; North, 8d. to 8½d. Refined naphthaline, £16. to £18.; salts, £6. to £7. Toluol, naked, London, 2s. 6d.; North, 2s. 5d. Creosote, naked, London, 6½d.; North, 5½d. to 5¾d.; heavy oil, 6½d. Anthracene, 40-45%, 7d. per unit. Cresylic acid, 95%, 2s. 5d. to 2s. 6d.; 97-99%, 2s. 7d. to 2s. 8d., ex works, London, and f.o.b. other ports. Sulphate of ammonia: home trade, October £20. 10s., November £20. 15s., basis 24½%. Nitrate of soda, £22. to £22. 10s.

FERTILISER MATERIALS.

LIVERPOOL, THURSDAY.

Nitrate of soda is very firm, the quotation on spot for 95-96% quality being £20. 2s. 6d. per ton, net cash, f.o.r. Liverpool, prompt delivery. East Indian bone meal for shipment is without alteration, the quotation for November-December shipment being £17. 10s. per ton, net cash, ex ship Liverpool, for 4½% ammonia and 62% phosphate; on spot, Liverpool, holders ask £16. per ton, net cash, for 4½% and 45% quality. Mineral Phosphates: There is no change to report in this market, and values at present are only nominal. Dried blood supplies are scarce, the value being about 30s. per unit of ammonia per ton.

LONDON METAL MARKET.

THURSDAY.

Copper: Standard brands, £104. 10s. to £104. 15s., cash; £104. to £104. 5s., three months; electrolytic, £116. to £121. Tin: Standard, £279. to £279. 5s., cash; £280. to £280. 5s., three months; Straits, £279. 5s.; English, £278. to £280. Lead: Soft foreign, £29. 15s.; English, £30. 10s.

Spelter, £45. 10s.; hard, £32. to £33.. Antimony, English regulus, 90%, £47. 10s. Aluminium £150. Nickel £205., delivered; packages extra. Quicksilver, £16. 15s. to £17. Bismuth, 12s. 6d. Platinum 442s. per oz. Wolfram 32s. 6d. per unit.

TURPENTINE MARKET REPORT.

Messrs. James Watt and Son, Ltd., of 101, Leadenhall Street, London, E.C. 3, report that the stocks of turpentine on October 18 were: American, 36,177 barrels, compared with 4,472 barrels at the corresponding date of 1918; French, 818 barrels (748 barrels); and Spanish, 421 barrels (611 barrels). Deliveries during the week ended October 18 were 2,196 barrels, against 459 barrels last year, and since January 1, 59,192 barrels, compared with 20,228 barrels in 1918. The price on Saturday last was 125s. per cwt., compared with 105s. at the corresponding date of last year. October-December delivery was quoted at 125s., and January-April (1920) 126s. 6d.

SWANSEA MARKET REPORT.

THURSDAY.

Tinplates are held very firmly, the quotations being between 39s. and 40s. per standard box. Copper, £107. prompt, and £106. 5s. three months. Tin firm, with fair business at £281. cash and £282. 5s. three months. Lead firm and dearer at £29. for foreign and £30. for English. Spelter advanced to £45. per ton. Silver, 64½d. per ounce. Aluminium, £150. per ton. Nickel, £205. per ton, including delivery London or equal. Antimony nominal, with English regulus, 90%, at £45. Quicksilver, £16. 10s. per bottle. Sulphate of copper remains very quiet at £40. per ton. Sulphate of ammonia, very steady at £20. 10s. per ton basis. Nitrate of soda, quietly steady at 21s. 9d. per cwt., in bags, net. Castor oil, 98s. per cwt. in barrels. Rape oil in better request at 111s. per cwt. in barrels. Palm oil very firm and slightly dearer: Lagos, £84. 15s.; Benin, £83.; and hard, £81. Petroleum selling well at 1s. 6½d. to 1s. 7½d. per gallon in casks for American refined. Turpentine steady at £6. 6s. 6d. per cwt. Pitch rather scarce at 62s. 6d. per ton ex ship. Arsenic shows improvement, and prices are round £60. per ton for white powdered in bags f.o.b. Oxalic acid rather quiet at 1s. 2d. per lb. f.o.b. Copperas in fair request at £3. 10s. to £4. per ton delivered.

MANCHESTER CHEMICAL MARKET.

THURSDAY.

Trade generally, both in home and export branches, continues very satisfactory, and values all round show an improving tendency. Resale lots of caustic soda, 70%, are firm at £24. 10s.; and there is an active demand for 58% alkali at £10. per ton, f.o.b. Refined bicarbonate of soda quiet at £8. 5s., in bags. Bleaching powder, softwoods, £17. on rails, casks returnable. Chlorate of soda in good request at 6d. per lb. Potash dull at 1s. per lb. Spot supplies of bichromate of soda are scarce, and price is higher at 10d. for resale lots. Roasted saltcake firm at 70s. per ton, carriage paid. Sulphate of copper in only small request, and export price nominal at £40., f.o.b. Recovered rock sulphur, £16. 10s. on rails. Phosphate of soda, steady at £28. per ton, in bags. Commercial hyposulphite of soda, unchanged at £16. 10s., in bags. Sulphite of soda, £11. per ton. Supply of white arsenic is still short, and price firm for best brand at £60. per ton. Yellow prussiate of potash quiet at 1s. 9d. per lb. Soda higher at 11½d. per lb., with strong inquiry. Carbonate of potash, £100. per ton; basis 85%. Lead salts are moving off steadily: White acetate at £83. and brown £68. per ton. Nitrate dull at £56. per ton. Acetic acid is well maintained at recent rates. Acetate of soda in better request, and price steady at £49. per ton. English brown acetate of lime firm at £12. per ton.; grey £17. per ton. Miscible wood naphtha, 10s. 6d. per gallon. Nitrate of soda unchanged at £60.; basis 100%. Green copperas is selling more freely. Oxalic acid steady at 1s. 1½d. per lb., delivered.

LIVERPOOL CHEMICAL MARKET.

THURSDAY.

The inquiry for chemicals has been well maintained, and a fairly active demand on export account is now being made. Bleaching powder has been in very fair request. It is £17. per ton for the home trade, free on rail or conveyance in buyers' packages, and £15. to £18. per ton for export. Chloride of calcium has been steadily called for, and is £8. to £11. per ton, in casks, f.o.r. Caustic soda has had a brisk inquiry, especially on export account. It is £24. per ton for 76%, £22. per ton for 70 to 72%, and £19. per ton for 60

to 62%. Nitrate of soda has been more in demand, and is £21. to £22. per ton. Saltcake has been in rather active inquiry, and is £6. 10s. per ton, in casks, f.o.b. Soda crystals have been sold with some freedom, and are £5. 10s. per ton, in 2cwt. bags, f.o.r. at works. Bicarbonate of soda has been in good request, and is £8. 5s. to £10. per ton, according to terms of delivery. Borax continues to be freely inquired for, and spot stocks are still very light. Ordinary is £50. per ton, and powdered £51. to £52. per ton, in bags. Ammonia alkali has been in brisk demand, and is £6. 10s. to £6. 15s. per ton, f.o.r. at works. Hyposulphite has been quiet, and is £16. per ton for ordinary, and £21. per ton for pea crystals, in 1cwt. bags. Sulphite of sodium has been quieter, and is £10. per ton for ordinary, and £16. to £18. per ton for pea crystals, in 1cwt. kegs. Bichromate of soda has been more in request, and is 9d. per lb. Phosphate of soda has been in moderate demand, and is £25. per ton. Sulphide of sodium has been in fair request, and is £20. per ton in casks, and £22. per ton in drums. Chlorate of potash has been in somewhat freer inquiry, and the price is easier. It is 1s. per lb. Permanganate of potash has been quiet. The price is somewhat lower, and may be given as from 3s. to 3s. 3d. per lb. Sulphate of potash has been inactive, and is £30. per ton. Carbonate of potash has been in very fair demand, and is from £95. to £100. per ton for 80 to 85%. Caustic potash has been in good request, and is £120. per ton. Nitrate of potash has sold more freely, and is £55. to £60. per ton for refined, and £40. per ton for ordinary. Canadian potashes have been inactive. First quality Montreal are £200. to £220. per ton, and second quality £190. to £210. per ton. Bichromate of potash has sold a little more freely, and is 1s. 6d. to 1s. 7d. per lb. Yellow prussiate of potash has been in moderate demand, and is 1s. 9d. to 1s. 10d. per lb. Salammoniac has been more in request, and is £95. per ton for first quality lump, £85. per ton for second quality, and £5. per ton extra for crushed. Sulphate of ammonia has been but little in request, and is £20. 10s. per ton for October, £20. 15s. for November, £21. for December, £21. 7s. 6d. for January, 1920, £21. 15s. for February, and £22. per ton for March to May, 1920. Carbonate of ammonia has been in quietly steady demand, and is 6½d. per lb. Muriate has had a limited sale, and is £48. to £50. per ton. Magnesia has been in very fair request. Carbonate is £2. 5s. per cwt., and sulphate £11. to £16. per ton, according to grade. Alum continues to meet with a good inquiry, and stocks available for early delivery are still very small. Prices are: For home-trade uses, £18. 10s. per ton; for export, £18. 10s. to £19. 10s. per ton. Aluminoferric has been but little called for, and is £8. 10s. to £12. per ton, according to quality. Sulphate of alumina has again been quiet, and is £12. to £17. per ton, according to grade. Sulphur has been well inquired for. English flowers are £32. per ton, roll is £28. per ton, and rock £22. per ton, in bags, f.o.r. Sicilian grades are: Flowers, £28. per ton; roll, £22. 10s. per ton; and rock, £17. 15s. per ton. Cream of tartar has been steadily called for, and has been scarce. The price has hardened, and may be given as £12. to £12. 10s. per cwt. Tartaric acid has been in very fair request, and is 3s. 1d. to 3s. 2d. per lb. Boracic acid has been quieter. Crystals are £80. per ton, and powdered £82. per ton, in bags, and from £2. to £3. per ton extra in casks. Oxalic acid has been rather more inquired for, and is slightly easier in price. It is 1s. 1d. to 1s. 2d. per lb. Citric acid has sold rather more freely, and is 4s. 3d. to 4s. 4d. per lb. White acetate of lead has been in moderate demand, and is £85. per ton. Arsenic has been in quietly steady request, and the price has eased. White powdered is £58. to £60. per ton. Sulphate of copper has been but little called for, and prices are somewhat lower; from £40. to £41. per ton for home trade lots, and from £41. to £42. per ton for export, less 5% in casks, f.o.b. at Liverpool, are being quoted.

TYNE CHEMICAL REPORT.

TUESDAY.

Market is firm, and there is a brisk demand for chemicals, especially for the house market. There is also an improved inquiry for export, and more business passing. Locally, soda crystals are in strong request at £5. 10s. per ton in 2cwt. bags. Sulphur scarce at £22. to £23. per ton.

The following prices are per ton, net: Bleaching powder, softs, £17.; caustic soda, 76 7/7%, £24.; do., 70%, £22.; do., 60%, £20.; recovered sulphur, 2cwt. bags, £22.; hyposulphite of soda, 5/7cwt. casks, £19.; 1cwt. kegs, £25.; sulphite of soda, 5/7cwt. casks, £12., do., 1cwt. kegs, £20.; silicate of soda, 75Tw., £9. 12s. 6d., do. 100Tw., £10., do., 140Tw. £10. 10s.; soda crystals, 2cwt. bags, £5. 10s.; sulphate of soda (salt

cake) in bulk, £4.; pure white sulphate of alumina, £19. 10s.; blanc fixe, £22.; sulphide of sodium, crystals, £18.; do., refined concentrated solid, 60/62%, £25.; hydrate of barium, crystals, £56.

COALS.—Market is very firm, with a strong demand for prompt loading. The supply of tonnage is rather better, and any surplus coal is being readily taken up. Quotations nominally: Best Northumbrian steam, 95s. to 100s. per ton, seconds, 90s. to 95s.; Northumberland small coals, 75s. to 80s., seconds, 70s. to 75s.; best Durham gas coals, 80s. to 85s., seconds, 65s. to 75s.; Durham Bunkers, 70s. to 80s., seconds, 60s. to 65s.; foundry coke, 100s.; gas coke, 95s. to 100s.

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Wednesday.

During the past week there was a continued good demand for most classes of heavy chemicals, and prices on the whole were maintained at a steady level—with however, a slight tendency in some cases to lower values. Saltpetre, for instance, is now quoted at £3. as against £3. 2s. previously; but on the other hand tartaric acid has jumped from 3s. 3d. to 3s. 6d. per pound, and caustic soda from £24. to £25. per ton. Current quotations are:—Arsenic, £62. per ton, net, Glasgow; bicarbonate of soda, £9. 15s. and £10. 10s. per ton for 6-8 casks and 1cwt. kegs, net, Liverpool; boracic acid crystals, English refined, £72. for 2cwt. bags; and borax

crystals, £39. for 2cwt. bags, carriage paid; caustic soda, white, 70-72%, £25. per ton, net, Glasgow; chlorate of potash, 1s. 1d. per lb., net, Glasgow; chlorate of soda, 8d. per lb., net, Glasgow; citric acid, 4s. 4d. per lb., 5%, Glasgow; cream of tartar, 98%, £11 10s. per cwt., net, Glasgow; paraffin wax, U.K. deliveries, 125°, 6½d. to 6¾d.; 121-3°, 5½d. to 5¾d.; 118-20°, 5d.; 110-12°, 4d. to 4½d.; and 98-102°, 4d. to 4½d.; salammuniac, £80. and £75. per ton, net, any port, for first and second lump respectively; salammuniac crystals, £85. per ton, net, Glasgow; saltpetre, £3., net, Glasgow; tartaric acid, 3s. 6d. per lb., 5%, Glasgow.

Among the sea oils, prices do not show very much fluctuation over previously quoted values, but where any change is noted this is in a lowering direction. Among whale oils, for instance, the pale variety is now on offer at 90s. as against 95s. previously, but both brown and black remain stationary at the old figures of 76s. and 74s. respectively. Again, Menhaden is also lower in value at 80s. as against 82s. previously, but there are no changes with regard to Newfoundland cod, at 80s., and pale seal at 96s. Demand is good and usually more than equal to the supply.

Matters in the local coal trade continue to be pretty much on the old footing. From the industrial standpoint the demand for fuel is well maintained, while requirements for household purposes are getting heavier as the colder season sets in. The output generally is being maintained at a good level and stocks are not allowed to accumulate long at the pithead.

IMPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LIST OF CONTRACTIONS USED IN THE IMPORT AND EXPORT LIST.

Blus.	Balloons.	Cbys.	Carboys.	Gals., Gl.	Qnty.	Quantity (otherwise undeclared).	qr.	Quarters.
Bls.	Bales.	Css. or Cs.	Cases.	or Glus. Gallons.			lb.	Pounds.
Brls.	Barrels.	Cks.	Casks.	Hf. pps. Half pipes.				
Bgs.	Bags.	Chts.	Chests.	Hhds. Hogsheads.	Rlts.	Runlets.		
Btls.	Bottles.	Cylds.	Cylinders.	Kgs. Kegs.	Sks.	Sacks.		
Bdls.	Bundles.	Dms. Drs.	Drums.	Ozs. Ounces.	Sbs.	Slabs.		
Bskts.	Baskets.	Djns.	Demijohns.	Pks. Packages.	Tes.	Tierces.		
Bxs.	Boxes.	Frkns.	Firkins.	Pns. Puns. Punchcons.	t. c.	Tons. Cwts.		

Note. There is no information available as to the net weights of the various items, nor do we recognise in them any standard.

BRISTOL.

Publication of Official Returns Suspended.

GLASGOW.

Week ending October 18.

BORATE—
New Orleans, 728 sks.

DYESTUFFS—
Cutch
Rangoon, 1,050 bxs.

FISH OIL—
Baltimore, 1,175 brls.

PARAFFIN WAX—
New York, 539 brls.

ROSIN—
New Orleans, 125 brls.

SOAP—
New York, 200 brls.

WAX—
New York, 87 bgs.; Rangoon, 560 bgs.

GOOLE.

Week ending October 18.

GLUE—
Antwerp, 205 bgs.

TAR—
Gothenburg, 8 brls.

GRANGEMOUTH.

Week ending October 18.

NIL.

GRIMSBY.

Week ending October 18.

DYESTUFFS—
Aniline Dyes
Dieppe, 10 cs.

HULL.

Week ending October 18.

ACETIC ACID—
New York, 571 brls.

BORAX—
New York, 1,000 cks.

DYESTUFFS (otherwise undescribed)
Antwerp, 81 cks.

FERRO SILICON—
Frederikstad, 250 cs.

LITHOPONE—
New York, 522 brls.

POTASSIUM CARBONATE—
New York, 15 cs.

ROSIN—
New York, 504 brls.

STEARINE—
Rotterdam, 13 brls.

WHITE LEAD—
New York, 368 cks.

LEITH.

Week ending October 18.

NIL.

LIVERPOOL.

Week ending October 18.

ACETIC ACID—
Montreal, 1,096 brls.

ARSENIC—
Seattle, 377 cs.

BARIUM SULPHATE—
Antwerp, 101 bgs.

BORATE OF LIME—
Buenos Ayres, 1,829 bgs.

BORAX—
New York, 3,316 sks.

CARBONATE (otherwise undescribed)
Bahia, 1 pkg.

CARNAUBA WAX—
Antwerp, 1,871 bgs.; Ceara, 652 bgs.; Maranham, 157 bgs.

CREAM OF TARTAR—
Bordeaux, 13 cks.

DENTRINE—
New York, 500 bgs.

DYESTUFFS—
Annatto
Bordeaux, 2 cks.

Fustic Extract
New York, 150 brls.
Tanning Extract
Gothenburg, 1 ck.

EXTRACT OF CAMPHOR
Bordeaux, 40 cs.

FATTY ACIDS
Amsterdam, 753 cks.

GLUE (DRY)
Boston, 144 bgs.

HEMATOL—
Havre, 80 cks.

MAGNESITE—
Montreal, 480 bgs.; Rotterdam, 80 bgs.

MAGNESIUM CHLORIDE
Rotterdam, 76 cks.

MANGANESE ORE—
Tokio, 255 bgs.

MINERAL WHITE
Bordeaux, 500 bgs.

OCURE—
Bordeaux, 15 cks.

OLEO STEARINE—
Boston, 247 tes.; La Plata, 15 cks., 1,121 tes.

OLEO TALLOW—
La Plata, 4,115 tes.

PARAFFIN SCALE—
New York, a qty.

PARAFFIN WAX—
New York, 100 brls.; Philadelphia, 800 brls.

PARALDEHYDE—
Montreal, 15 cs.

PHOSPHATE—
Tunis, 3,000 t.

POTASSIUM BROMIDE
Gothenburg, 5 cs.

ROSIN—
Bordeaux, 8 brls., 1,844 cks.; Savannah, 9,900 brls.

SALT—
Bathurst, 40 bgs.

SOAP—
New York, 1,000 brls.

SODIUM CHLORATE—
Bordeaux, 500 cks.

SODIUM NITRATE—
W.C. South America, 10,238 bgs.

STEARINE—
La Plata, 2,033 tes.

TALLOW—
Buenos Ayres, 340 cs., 2,002 cks.; La Plata, 231 cks., 3,536 tes.; Portland, 420 tes.; San Francisco, 1,178 brls.

TAR (WOOD)—
Gothenburg, 81 brls.

TARTAR
Bordeaux, 121 bgs.

WAX—
New York, 1,381 brls.; Philadelphia, 200 brls.

WHITE LEAD
Montreal, 98 cks.

LONDON.

Week ending October 18.

ACETIC ACID—
Switzerland, 161 pkgs.; U.S.A., 54 pkgs.

ANTIMONY
Spain, 10 t.

ARSENIC—
Greece, 320 t.; Straits, 8 t. 9 c.

BEES WAX—
British India, 60 cs.; Ceylon, 10 cs.; Egypt, 24 bgs.; Holland, 25 cs.; Pt. E. Africa, 144 bgs.; Morocco, 36 bgs.; U.S.A., 460 cs.

CALCIUM MOLYBDATE—
U.S.A., £8.
CARBON BLACK—
U.S.A., 10 cs.
CARNAUBA WAX—
U.S.A., 304 bgs.
CREAM OF TARTAR—
Italy, 88 pkgs.; Spain, 45 pkgs.
DYESTUFFS
Aniline Dye
Switzerland, 359 pkgs.
Argol
Italy, 78 pkgs.; Spain, 51 pkgs.
Myrobalans
British India, 5,274 pkgs.
Saffron
Spain, 1 pkg.
Tanner's Bark
Natal, 141 t. 13 c.
Turmeric
B India, 65 pkgs.; Holland, 18 pks.
FISH OIL—
Japan, 5,220 cs.
FORMALDEHYDE—
U.S.A., £4,550.
GELATINE—
France, £4,251.
GLUE—
France, £1,254.; Holland, £893.
MAGNESITE—
Holland, £232.
METHYLIC ALCOHOL—
Canada, 10,540 galls.; U.S.A.,
4,246 galls.
PARAFFIN SCALE—
U.S.A., 13 c. 14 t.

PARAFFIN WAX—
U.S.A., 252 t. 17 c., 4,900 brls.
PARALDEHYDE—
Canada, £147.
PHENAZONE—
Holland, £100.
PHENOLPHTHALIEN—
Canada, £200.
PITCH—
Norway, 1,483 cks.
PLUMBAGO—
Japan, 270 brls.
POTASH—
U.S.A., 10 pkgs.
POTASSIUM BROMIDE—
Switzerland, £150.; U.S.A., £263.
ROSIN—
Canada, 503 brls.; France, 150
brls., 97 cks.; Norway, 34 brls.;
Sweden, 27 brls.; U.S.A., 5,850
brls.
SALTPETRE—
British India, 50 t.
SOAP—
Canada, £2,579.; U.S.A., £23,585.
SPERMACEETI WAX—
U.S.A., 100 pkgs.
STEARIC ACID—
U.S.A., £3,250.
STEARINE—
Argentine Rep., 648 bgs.; Bel-
gium, 14 bgs.; Holland, 40 bgs.
TALLOW—
China, 209 t., 1,080 cs.; N.Z.,
204 t. 4 c., 54 cks.

TALLOW—
Natal, 11 c., 6 cks.
TANNIC ACID—
Switzerland, £40.
TAR—
Sweden, 51 brls.; U.S.A., 500
brls.
TARTARIC ACID—
Italy, 40 pkgs.
THEOBROMINE SALICYLATE—
Holland, £600.
VEGETABLE WAX—
Japan, 40 cs.
WAX—
Japan, 100 cs.
WHITE LEAD—
U.S.A., 313 brls.
WOOD OIL—
China, 150 brls.; Hong Kong,
541 brls.
ZINC OXIDE—
Holland, 850 brls.; Spain, 30 brls.

PHOSPHORUS—
Montreal, 500 cs.
POTASSIUM BROMIDE—
New York, 15 cs.
SOAP—
New York, 998 brls.
SODIUM NITRATE—
Skien and Drammen, 119 cks.
SODIUM PHOSPHATE—
New York, 25 brls.
TANNIC ACID—
Montreal, 20 pkgs.
ZINC OXIDE—
Antwerp, 40 brls.

MIDDLESBROUGH.

Week ending October 18.

NIL.

NEWCASTLE-ON-TYNE

Week ending October 18.

KIESELGUHR—
Bergen, 101 bgs.

N. & S. SHIELDS.

Week ending October 18.

NIL.

SWANSEA.

Week ending October 18.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

BRISTOL.

Publication of Official Returns
Suspended.

GLASGOW.

Week ending October 18.

AMMONIUM SULPHATE—
Rouen, 16 bgs.
CAUSTIC SODA—
Rangoon, 55 drms.
CHEMICALS (otherwise undescribed)
Adelaide, 4 pkgs.; Alroa Bay,
3 pkgs.; Beira, 1,530 pkgs.;
Boston, 35 pkgs.; Buenos Ayres,
9,230 pkgs.; Calcutta, 2 pkgs.;
Coquimbo, 30 pkgs.; Delagoa
Bay, 1,448 pkgs.; Cape Town,
35 pkgs.; Kilindini, 17 pkgs.;
Monte Video, 200 pkgs.; Mon-
treal, 200 pkgs. and £1,950;
Natal, 892 pkgs.; Nantes, 1,260
pkgs.; New York, 114 pkgs.;
Rangoon, 249 pkgs.; Rouen,
8 pkgs.; Shanghai, 150 pkgs.;
Sydney, 99 pkgs.; Valparaiso,
2 pkgs.; Valencia, 200 pkgs.;
Vera Cruz, 2,100 pkgs.
COAL PRODUCTS (otherwise undes.)
Delagoa Bay, £15.; Havre, £542.;
La Pallice, 1 c.; Natal, 511 c.;
Rouen, 151 c.
COAL PRODUCTS—
Creosote Oil
Monte Video, £1,121.
Cresylic Acid
Philadelphia, £1,200.
Pitch
Calcutta, 28 t. 10 c.
Tar
Calcutta, 4,000 galls.; Cape
Town, 5,121 galls.; Colombo,
370 galls.; Rangoon, 49,213
galls.
DEXTRINE—
Montreal, £246.
DISINFECTANTS (otherwise undes.)
Cape Town, £196.; Montreal,
£683.; Oporto, £70.
DYESTUFFS (otherwise undescribed)
Havre, £64.

DYESTUFFS—
Aniline Dye
Rangoon, £1,726.
Logwood Extract
Melbourne, £376.
Quebracho Extract
Adelaide, £413.; Melbourne, £324
Sydney, £242.
GLUE, SIZE, AND GELATINE—
Calcutta, £13.; Delagoa Bay,
£8.; Montreal, £331.; Rangoon,
£20.; Shanghai, £950.
MANGANESE CHLORIDE—
Philadelphia, £300.
PITCH—
Calcutta, 12 t. 1 c.
PITCH (STOCKHOLM)—
Rangoon, 1 t. 5 c.
SALT—
Natal, 3 c.; Sydney, 240 lbs.
SHEEP DIP—
Buenos Ayres, £416.; Cape
Town, £1,425.; East London,
£27.; Montreal, £237.; Mossel
Bay, £900.; Punta Arenas,
£8,856.; Santa Cruz, £1,138.;
Valparaiso, £2,425.
SOAP—
Colombo, 10 bxs.; Calcutta,
110 bxs.; Montreal, 150 drms.;
Rangoon, 132 bxs.; Shanghai,
65 bxs.
SODIUM BICARBONATE—
Rouen, £50.
SODIUM BICHROMATE—
Sydney, £1,056.
SULPHURIC ACID—
Colombo, £56.
TAR (STOCKHOLM)—
Cape Town, 1 t. 3 c.; Calcutta,
3 t. 11 c.; Rangoon, 16 c.

GOOLE.

Week ending October 18.

NIL.

GRANGEMOUTH.

Week ending October 18.

COAL PRODUCTS—
Creosote Oil
Christiania, 8 t. 16 c.

COAL PRODUCTS—
Naphthalene
Christiania, 850 galls.
Pitch
Havre, 620 t.
PARAFFIN WAX—
Christiania, 10 t.; Nantes, 2 t. 2 c.
SODA ASH—
Rotterdam, 13 t.

GRIMSBY.

Week ending October 18.

NIL.

HULL.

Week ending October 18.

CAUSTIC SODA—
Esbjerg, 2 drms.
CHEMICALS (otherwise undescribed)
Antwerp, 1 cs., 1 ck.; Esbjerg,
45 cks., 50 bgs.; New York,
240 cks., 30 drms.
DISINFECTANTS (otherwise undes.)
Amsterdam, 18 cs.
GLUE—
Esbjerg, 107 brls.
MINERAL WHITE—
Esbjerg, 46 bgs.
SOAP—
Antwerp, 3,607 cs.; Esbjerg
715 cs., 182 brls.; Wiborg, 197 cs.
SODA—
Antwerp, 3 cks., 7 brls.
WOOD PRESERVATIVE—
Esbjerg, 517 drms.

LEITH.

Week ending October 18.

AMMONIUM BICHROMATE—
Gothenburg, 1 c., £7.
BORAX—
Gothenburg, 10 t., £397.
BORIC ACID—
Gothenburg, 7 t. 10 c., £560.
COAL PRODUCTS (otherwise undes.)
Gothenburg, £313.

COAL PRODUCTS—
Pitch
Gothenburg, 66 t. 12 c., £310.
DYESTUFFS—
Aniline Dye
Gothenburg, 1 c., £40.
POTASSIUM BICHROMATE—
Gothenburg, 3 t., £493.

LIVERPOOL.

Week ending October 16.

ACETIC ACID—
Calcutta, 3 c., £14.; Las Palmas,
3 c., £15.; Sapele, 2 c., £13.
ALUM—
Axim, 1 c., £1.; Buenos Ayres,
4 c., £6.; Demerara, 4 c., £5.;
Duala, 1 c., £1.; Galatz, 10 t.,
£176.; Lagos, 1 c., £1.; Quittah,
1 c., £8.
ALUMINA SULPHATE—
Melbourne, 10 t. 1 c., £110.
ALUMINA SULPHITE—
Lisbon, 5 t., £110.
AMMONIA—
Algoa Bay, 10 c., £40.; Lagos,
11 c., £19.; Shanghai, 1 c., £5.
AMMONIUM BIFLUORIDE—
Calcutta, 2 c., £27.
AMMONIUM CARBONATE—
Algoa Bay, 1 c., £13.; Buenos
Ayres, 3 t., £82.; Porto Alegre,
19 c., £63.; Rangoon, 3 t., £285.;
Rio de Janeiro, 1 t. 19 c., £163.;
Sydney, 1 t., £73.
AMMONIUM CHLORIDE—
Melbourne, 2 t., £183.; New-
castle, 5 o., £15.
AMMONIUM MURIATE—
Antwerp, 5 t., £251.; Melbourne,
1 t. 4 c., £60.; Montreal, 9 t. 6 c.,
£486.; New York, 2 t. 5 c., £177.;
Santos, 9 t. 16 c., £574.; Toronto,
2 t. 2 c., £96.; Winnebago,
4 t. 19 c., £223.
AMMONIUM NITRATE—
Cape Town, 47 t. 4 c., £1,229.
AMMONIUM PHOSPHATE—
Melbourne, 5 c., £23.
ANTIMONY—
Sabang, 1 pkg.

ARSENIC—

Calcutta, 3 t., £333.

BARIUM CARBONATE—

Bordeaux, 80 t., £1,105.

BLEACHING POWDER—Buenos Ayres, 25 t. 15 c., £319.;
Monte Video, 9 t. 17 c., £126.;
Rangoon, 10 c., £9.**BORAX—**Antwerp, 5 t., £205.; Bahia,
2 c., £5.; Demerara, 2 c., £5.;
Dunkirk, 5 t., £220.**CALCIUM CARBIDE—**Accra, 5 c., £12.; Lagos, 11 c.,
£21.**CALCIUM CARBONATE—**Grand Canary, 12 c., £16.;
Secondee, 10 c., £20.**CALCIUM CHLORIDE—**Accra, 3 c., £2.; Calcutta,
2 t. 8 c., £15.; Medellin, 37 t. 2 c.,
£255.; Pt. Said, 8 t. 19 c., £67.;
Rangoon, 20 t. 3 c., £141.**CAUSTIC SODA—**Alexandria, 282 drms.; Catania,
102 pkgs.; Colombo, 27 drms.;
Durban, 159 drms.; Funchal,
20 pkgs.; Galatz, 198 drms.;
Melbourne, 42 drms.; Pacas-
mayo, 50 drms.; Padang, 50
pkgs.; Perth, 20 drms.; Pt.
Swettenham, 120 drms.; Rotter-
dam, 61 drms.; Sao Paulo,
200 pkgs.; Singapore, 34 drms.;
Yokohama, 200 drms.**CHEMICALS (otherwise undescribed)**Antwerp, 10 t., £438.; Secondee,
15 c., £75.; Singapore, 5 c., £11.**CHINA CLAY—**

Calcutta, 100 cks.

CHLORIDE OF LIME—Algoa Bay, 1 t. 10 c., £27.;
Cape Town, 1 t., £18.; Ibiuay,
4 c., £5.; Sapele, 2 c., £3.**COAL PRODUCTS (otherwise undescribed)**Alexandria, 25 t., £106.; Beira,
18 c., £31.; Boston, 5 t. 5 c.,
£3,086.; Monte Video, 19 t. 8 c.,
£388.; Montreal, 5 t. 19 c.,
£2,004.; S. Leone, 5 t. 10 c., £53.**COAL PRODUCTS—****Carbolic Acid**
Adelaide, 3 c., £14.; Kobe,
16 t. 1 c., £1,121.; Monte Video,
9 t. 6 c., £40.; San Jose (C.R.),
1 t. 16 c., £50.; Sydney, 18 c.,
£71.**Creolina**
Pelotas, 9 c., £56.**Cresote**Tientsin, 171 t. 13 c., £2,120.
Cresylic Acid
Boston, 2 t. 16 c., £60.; Sydney,
2 t. 7 c., £69.**Naphthalene**Assinie, 1 c., £2.; Calcutta, 5 t.,
£190.; Kano, 8 t. 14 c., £165.;
Lagos, 4 t. 13 c., £94.; Rio de
Janeiro, 4 t. 19 c., £788.**Pitch**

Bathurst, 3 c., £3.

TarAccra, 210 galls., 4 t. 4 c., £82.;
Addah, 17 t. 19 c., £252.; Cape
Coast, 16 c., £7.; Duala, 8 c., £3.;
Lagos, 8 t. 4 c., £67.; Lome,
13 t., £198.; Malmo, 51 t. 10 c.,
£583.; Opobo, 10 c., £8.; Obussi,
10 c., £3.; Quittah, 1 t. 14 c.,
£107.; Secondee, 3 t., £26.;
Saltpond, 7 c., £4.; St. Thome,
4 c., £88.; Warri, 8 c., £3.;
Winnebuh, 17 c., £11.; Victoria,
7 c., £3.**COPPER MANGANESE—**

Paris, 4 pkgs.

COPPER SULPHATE—Algiers, 10 t., £375.; Alexandria,
10 t. 5 c., £91.; Aalsund, 10 c.,
£20.; Bombay, 48 t. 7 c., £375.;
Boston, 16 t. 6 c., £131.; Buenos
Ayres, 8 c., £20.; Calcutta,
13 t. 5 c., £274.; Chittagong,
1 t. 6 c., £53.; Karachi, 8 t. 6 c.,
£70.; Lagos, 2 c., £5.; Monte
Video, 25 t., £1,002.; Las Palmas,
5 t. 2 c., £46.; Rio de Janeiro,
1 t., £9.; St. Thome, 15 t., 6 c.,
£613.; Saltpond, 2 qtrs., £2.**COPPERAS—**

Bombay, 16 t. 6 c., £131.

DISINFECTANTS (otherwise undescribed)Accra, 3 c., £10.; Algoa Bay,
7 t. 16 c., £430.; Buenos Ayres,
2 t. 5 c., £292.; Calcutta,
4 t. 14 c., £175.; Calabar, 6 galls.,
£26.; Cape Town, 4 t. 10 c.,
£227.; Chemulpo, 9 t. 3 c.,
£456.; Delagoa Bay, 1 c., £37.;
East London, 4 t. 9 c., £187.;
Fernando Po, 5 c., £8.; Lagos,
5 t. 12 c., £612.; Montreal, 2 c.,
£17.; Oratava, 1 c., £4.; Quil-
mane, 2 c., £3.; Santos, 5 c.,
£10.; Shanghai, 9 c., £22.;
Warri, 1 c., £3.**DYESTUFFS (otherwise undescribed)**

Sydney, 3 t. 2 c., £1,853.

DYESTUFFS—**Aniline Dyes**Alexandria, 18 c., £241.; Amster-
dam, 1 c., £14.; Boston, 16 t.
13 c., £7,280.; Buenos Ayres,
1 c., £8.; Calcutta, 8 c., £373.;
Galatz, 1 c., £8.; Hayre, 59 t. 9 c.,
£7,730.; Lisbon, 1 c., £15.;
Samarang, 9 c., £316.; Smyrna,
17 c., £112.**FERRO MANGANESE—**Antwerp, 10 t.; Baltimore,
1,085 t.**GLUE—**Amsterdam, 10 pkgs.; Dakar,
30 pkgs.; San Jose, 2 pkgs.;
Sav-la-Mar, 4 pkgs.**GLUE, SIZE, AND GELATINE—**Bangkok, 16 pkgs.; East London,
10 pkgs.; Galatz, 11 pkgs.;
Madras, 35 pkgs.; Gibraltar,
20 pkgs.; Kobe, 100 pkgs.;
Montreal, 20 pkgs.; Melbourne,
6 pkgs.; Shanghai, 220 pkgs.;
Singapore, 120 pkgs.; Vancouver,
16 pkgs.**HEMATINE CRYSTALS—**

Santos, 3 t. 12 c., £677.

LEAD ACETATE—

Montreal, 11 c., £82.

MAGNESIUM CHLORIDE—Bombay, 56 t. 1 c., £1,044.;
Calcutta, 9 t. 8 c., £107.; Grand
Bassam, 4 c., £4.; Pondicherry,
10 t. 5 c., £230.; Santos, 1 t.,
£19.**MAGNESIUM SULPHATE—**Attuaboe, 3 c., £7.; Kingston,
10 c., £12.; Secondee, 4 c., £5.**MURIATIC ACID—**Antwerp, 1 t. 19 c., £75.;
Bombay, 2 c., £16.**NICKEL SULPHATE—**Kobe, 3 t., £180.; Sydney, 1 t.,
£55.**NITRIC ACID—**

Bombay, 3 c., £26.

PITCH—Aviles, 280 t., £1,500.; Grand
Bassam, 4 c., £2.; Lagos, 1 t. 5 c.,
£8.; Saltpond, 1 t., £5.; Sierra
Leone, 6 c., £3.; St. Thome,
4 c., £66.**PLUMBAGO—**

Santos, 5 pkgs.

POTASSIUM IODIDE—

Pt. Harcourt, 3 c., £285.

SALICYLIC ACID—

Quebec, 10 c., £300.

SALT—Pt. Harcourt, 123 t.; Quebec,
680 t.; Rio Grande do Sul, 29 t.;
Grand Bassam, 66 t.; Secondee,
89 t.; Para, 386 t.; Sth. Georgia,
1 t., £4.; Secondee, 10 t.**SALTPETRE—**Accra, 3 c., £6.; Attuaboe, 2 c.,
£10.; Axim, 4 c., £19.; Medellin,
2 c., £7.; Montreal, 3 c., £25.;
Quittah, 1 c., £4.; Sierra Leone,
3 c., £9.**SHEEP DIP—**Ascension, 1 t. 14 c., £65.;
Algoa Bay, 12 t. 6 c., £799.;
Beira, 6 c., £19.; Buenos Ayres,
276 t. 6 c., £12,438.; Delagoa
Bay, 11 t. 12 c., £736.; Cape
Town, 5 t. 11 c., £342.; East
London, 5 t. 16 c., £378.; Monte
Video, 8 t. 19 c., £750.**SOAP—**Accra, 500 bxs.; Alexandria,
1,670 cs., 167 bxs.; Algiers,
935 cs., 975 bxs.; Amboina,
125 bxs.; Amsterdam, 3 cs.;
Athens, 1,000 bxs., 110 cs.;
Axim, 50 bxs.; Bangkok, 30 bxs.;
Barcelona, 16 bxs.; Barbados,
3,106 cs.; Bilbao, 20 bxs.;
Bathurst, 21 cs.; Bombay, 2
bxs.; Beira, 36 cs.; Bordeaux,
100 cs.; Braila, 1,410 cs.;
Bucharest, 500 cs.; Cape Coast,
300 cs.; Casablanca, 456 bxs.;
Constantinople, 2,125 cs.; Dakar,
214 cs.; Dominica, 41 cs.;
Dunkirk, 6,950 cs.; Esmeraldas,
112 bxs.; Eten, 50 cs.; Fama-
gusta, 630 bxs.; Galatz, 2,353
cs.; Genoa, 340 bxs., 699 cs.;
Gibraltar, 24 cs.; Gijon, 40 cs.;
Havre, 1,500 cs.; Hsin Ho
Wharf, 35 cs.; Larache, 200
bxs.; Larnaca, 221 bxs.; Limas-
sol, 24 bxs.; Lome, 50 bxs.;
Manta, 112 bxs.; Martinique,
50 cs.; Menado, 200 bxs.;
Padang, 15 pkgs.; Para, 4 bxs.;
Payta, 1 pkg.; Penang, 3 bxs.;
Petta, 75 pkgs.; Pt. Louis,
121 pkgs.; Pt. Sudan, 1,347 bxs.;
Puerto Barrios, 1 pkg.; Rabat,
200 pkgs.; Reval, 420 pkgs.;
Rotterdam, 5 bxs.; St. Kitts,
50 pkgs.; St. Louis, 136 pkgs.;
St. Lucia, 165 pkgs.; San Salva-
dor, 20 pkgs.; Secondee, 23
bxs.; Sierra Leone, 50 bxs.;
Suakim, 150 pkgs.**SODA ASH—**Adelaide, 32 pkgs.; Catania,
20 pkgs.; Cochín, 4,000 bgs.;
Galatz, 90 pkgs.; Geelong, 43
pkgs.; Kobe, 2,891 pkgs.; Mel-
bourne, 314 pkgs.; Pernambuco,
34 pkgs.; Shanghai, 2,688 pkgs.;
Sydney, 378 pkgs.**SODA CRYSTALS—**Galatz, 100 pkgs.; Pt. Swetten-
ham, 20 pkgs.; Soerabaya, 5
pkgs.; Valparaiso, 14 pkgs.**SODIUM BICARBONATE—**Adelaide, 303 pkgs.; Copen-
hagen, 140 pkgs.; Colombo,
880 pkgs.; Dantzig, 400 pkgs.;
Kobe, 1,076 pkgs.; Melbourne,
680 pkgs.; Moji, 215 pkgs.; Pt.
Swettenham, 120 pkgs.; Mon-
treal, 2,000 pkgs.; Singapore,
83 pkgs.; Sydney, 190 pkgs.;
Valparaiso, 100 pkgs.; Yoko-
hama, 1,000 pkgs.**SODIUM CARBONATE—**

Syra, 31 pkgs.

SODIUM NITRATE—

Syra, 10 pkgs.

SODIUM SILICATE—Fremantle, 116 pkgs.; Kobe,
144 pkgs.; Para, 57 pkgs.;
Shanghai, 124 pkgs.; Pernam-
buc, 32 pkgs.; Soerabaya, 4
pkgs.**SODIUM SULPHIDE—**

Saigon, 17 pkgs.

SULPHUR—Lagos, 1 t. 15 c., £60.; Newcastle,
1 c., £3.; Sherbro, 2 c., £3.**SULPHURIC ACID—**Bombay, 12 c., £54.; Buenos
Ayres, 7 c., £16.; Fretown, 2 c.,
£7.; St. John's, N.F., 2 c., £5.**TAR—**Conakry, 8 c., £22.; Loanda,
12 c., £11.**TARTARIC ACID—**Calcutta, 4 c., £90.; Lisbon, 5 c.,
£93.**WAX—**

Bilbao, 8 bgs.; Singapore, 4 pkgs.

WOOD PRESERVATIVE—Akuse, 4 c., £10.; Accra, 10 c.,
£14.; Fernando Po, 5 c., £8.;
Lagos, 4 c., £7.; Secondee,
4 c., £9.**ZINC CHLORIDE—**Bombay, 7 t. 10 c., £326.;
Karachi, 1 t., £47.; Pondicherry,
5 t. 5 c., £230.**ZINC SULPHATE—**Montreal, 4 c., £6.; Sydney, 1 t.,
£36.; Winnipeg, 2 c., £3.**LONDON.**

Week ending October 15.

ACETIC ACID—Gehoa, 57 cks., £854.; Helsing-
fors (F.), 28 brls., £360.; Mel-
bourne, 5 cs., £13.; Punta Arenas,
5 cs., £28.; Salonica, 1 ck., £33.**ACETO SALICYLIC ACID—**Batavia, 1 cs., £100.; Beyrou-
t, 1 cs. (pt.), £6.; Marseilles, 1 cs.
(pt.), £5.; Melbourne, 1 cs. (pt.),
£34.; Pt. Elizabeth, 2 cs., £40.;
Perth (F.), 1 cs., £25.; Rotter-
dam, 2 cs., £60.; Shanghai, 1 cs.,
£62.; Sydney, 1 cs. (pt.), £17.**ACETONE—**Barcelona, 6 drms., £165.; Rot-
terdam, 2 drms., £47.**ALUM—**Christchurch, 10 c., £20.; Dur-
ban, 1 c., £8.; East London,
4 c., £7.; Fremantle, 10 c., £11.;
Galatz, 1 ck., £8.; Paris, 5 t.,
£100.; Piraeus, 1 ck., £8.; Rotter-
dam, 10 c., £75.; Singapore,
3 c., £11.; Soerabaya, 5 c., £10.**AMMONIA—**Alexandria, 1 dr., £35.; Buenos
Ayres, 10 cs., £36.; Bombay,
4 cs., £22.; Calcutta, 28 cs., £77.;
Calais, 70 drms., £730. Cape
Town, 5 cs., £22.; Delagoa Bay,
10 cs., £19.; Durban, 11 cs.,
£31.; Hong Kong, 8 cs., £15.;
Kilindini, 10 cs., £20.; Lisbon,
2 drms., £7.; Lorenzo Marques,
5 cs., £9.; Madras, 11 cs. (pt.),
£6.; Pt. Elizabeth, 7 cs., £23.;
Punta Arenas, 5 cs., £8.;
Salonica, 9 cs., £45.**AMMONIUM ACETATE—**Bombay, 3 cs., £12.; Calcutta,
2 cs., £21.**AMMONIUM BENZOATE—**

Sydney, 1 cs. (pt.), £9.

AMMONIUM BROMIDE—

Sydney, 1 cs. (pt.), £8.

AMMONIUM CARBONATE—Alexandria, 2 c., £8.; Amoy,
2 c., £19.; Bahia Blanca, 5 c.,
£19.; Batavia, 12 c., £60.;
Buenos Ayres, 2 t. 14 c., £156.;
Calcutta, 1 t. 19 c., £198.; Con-
stantinople, 17 c., £80.; Cyprus,
2 c., £8.; Hong Kong, 9 c., £45.;
Hobart, 2 c., £8.; Galatz, 1 t.,
£57.; Guayaquil, 4 c., £30.;
Iquique, 1 c., £6.; Madras, 6 c.,
£30.; Penang, 13 c., £69.;
Shanghai, 1 t. 4 c., £126.;
Trinidad, 2 c., £7.**AMMONIUM CHLORIDE—**

Calcutta, 1 cs., £11.

AMMONIUM MURIATE—Rosario, 1 t. 10 c., £71.; Tal-
cahuano, 1 c., £8.; Valparaiso,
1 t. 16 c., £216.**AMMONIUM NITRATE—**

Adelaide, 1 cs., £10.

AMMONIUM PHOSPHATE—

Piraeus (F.), 21 cks., £350.

ANTIMONY REGULUS—

Antwerp, 1 t. 10 c.

AMMONIUM SULPHATE—

Dunkirk, 100 t., £2,300.

AMMONIUM SULPHO CYANIDE—

Shanghai, 3 cs. (pt.), £10.

AMYL ACETATE—Antwerp, 4 drms., £355.; Sama-
rang, 2 cs. (pt.), £23.**ANTIMONY BLACK—**

Rotterdam, 1 cs., £10.

ANTIMONY SALTS—

Italy, 18 cks., £225.

ANTIMONY SULPHIDE—Bombay, 14 cks., £351.; Chris-
tiania, 5 cks., £98.; Oporto,
12 kgs., £86.; Paris, 3 cks., £57.;
Rotterdam, 2 pkgs., £7.; Yoko-
hama, 28 cks., £688.**ARSENIC—**Calcutta, 3 t., £165.; E. London,
16 t., £564.; Lisbon, 8 c., £16.**ARSENIOUS ACID—**

Iquique, 1 cs. (pt.), £6.

BARIUM CHLORIDE—

Barcelona, 23 cks., £125.

BARIUM NITRATE

Bombay, 7 cks., £55.

BASIC SLAG

Belawan, 180 t., £720.; Landersneau, 125 t., £438.

BENZALDEHYDE

Amsterdam, 2 cs., £18.; Melbourne, 1 cs., £32.

BENZOIC ACID

Canton, 17 cs. (pt.), £8.; Christiania, 1 brl., £30.

BISMUTH

Melbourne, 1 cs. (pt.), £15.; Toronto, 2 cs., £160.

BISMUTH CARBONATE

Durban, 1 cs. (pt.), £22.; Melbourne, 2 cs., £92.; Shanghai, 1 cs., £25.; Sydney, 3 cs., £221.

BISMUTH SALICYLATE

Mauritius, 1 cs. (pt.), £20.; Sydney, 1 cs. (pt.), £10.

BISMUTH SALTS

Marseilles, 1 cs. (pt.), £25.

BISMUTH SUBGALLATE

Sydney, 1 cs. (pt.), £11.

BISMUTH SUBNITRATE

Buenos Ayres, 1 cs., £76.; Bombay, 1 cs. (pt.), £41.; Constantinople, 2 cs. (pt.), £74.; Dantzig, 1 cs., £147.; Lisbon, 1 cs. (pt.), £100.; Mauritius, 1 cs. (pt.), £10.; Melbourne, 1 cs., £19.; Pt. Swettenham, 1 cs. (pt.), £7.; Shanghai, 1 cs., £104.; Sydney, 1 cs. (pt.), £48.; Talcahuano, 1 cs. (pt.), £10.; Valparaiso, 1 cs. (pt.), £20.

BORAX

Antwerp, 15 t. 3 c., £763.; Bermuda, 5 c., £23.; Buenos Ayres, 20 t. 9 c., £797.; Calcutta, 6 t., £234.; Durban, 3 c., £7.; Christiania, 1 t., £40.; Constantinople, 1 t., £57.; Paris, 5 t. 10 c., £225.; Rotterdam, 12 t., £600.; Sydney, 5 c., £11.

BORIC ACID

Alexandria, 1 t. 5 c., £92.; Belgrade, 1 t., £70.; Buenos Ayres, 5 t. 1 c., £547.; Constantinople, 1 t., £98.; Iquique, 4 c., £29.; Jamaica, 2 c., £9.; Limon, (F.), 2 c., £9.; Montreal, 4 c., £16.; Piraeus, 5 c., £19.; Pekin, 3 c., £12.; Punta Arenas, 1 c., £7.; Rotterdam, 3 t. 19 c., £289.; Shanghai, 10 c., £39.

CALCIUM CARBIDE

Amsterdam, 14 t. 15 c., £360.; Cyprus, 10 c., £27.; Malta, 10 cs., £12.; Punta Arenas (F.), 1 t. 10 c., £36.

CALCIUM CHLORIDE

Auckland, 4 c., £30.; Caen, 5 c., £14.; Colombo, 10 c., £7.; Havre, 1 t. 11 c., £77.; Paris, 1 t. 10 c., £94.

CALCIUM HYPOPHOSPHITE

Paris, 4 cs., £102.

CARBIDE

Kilindini, 2 c., £8.; Mossel Bay, 4 c., £18.; Pt. Elizabeth, 2 t., £18.; Suez, 6 c., £8.

CARBON BISULPHIDE

Copenhagen, 50 drms., £100.; Durban, 4 cs., £19.

CARNAUBA WAX

Christiania, 10 c.; Genoa, 1 t.; Leghorn, 1 t.

CAUSTIC POTASH

Canton, 16 pkgs. (pt.), £9.; Melbourne, 1 cs. (pt.), £7.; Valparaiso, 1 ck., £98.

CAUSTIC SODA

Gibraltar, 6 c., £11.; Larache, 10 c., £20.; Port Said, 10 c., £21.; Rotterdam, 1 t., £9.

CERESINE WAX

Antwerp, 16 c.; Yokohama, 3 t. 10 c.

CHEMICALS (otherwise undescribed)

Antwerp, 4 cs., £168.; Auckland, 1 cs., £10.; Antigua, 1 cs., £7.; Bombay, 11 cs. (pt.), £86.; Brisbane, 3 cs., £55.; Cape Town, 4 cs., £67.; Copenhagen, 7 pkgs., £101.; Christiania, 5 cs., £46.;

CHEMICALS (otherwise undescribed)

Grenada, 4 cs., £139.; Durban, 9 cs., £167.; Christchurch, 1 cs., £14.; East London, 3 cs., £31.; Lyttleton, 1 ck., £13.; Melbourne, 3 cs., £45.; New York, 3 cs., £320.; Pt. Swettenham, 2 cs. (pt.), £23.; Penang, 8 pkgs. (pt.), £19.; Shanghai, 4 pkgs., £99.; Singapore, 3 cs., £70.; Sydney, 5 pkgs., £94.; Wei-hai-Wei, 1 cs., £10.; Wellington, 7 cs., £66.

CHLORIDE OF LIME

Delagoa Bay, 10 c., £20.

CHLOROSULPHURIC ACID

Switzerland, 23 drms., £440.

CHRYSAROBIN

New York, 1 cs., £130.

CHRYSOPIANIC ACID

Canton, 17 cs. (pt.), £24.

CITRIC ACID

Barcelona, 1 t. 19 c., £937.; Belawan, 4 cs., £10.; Bombay, 4 c., £104.; Calcutta (F.), 3 c., £68.; Christiania (F.), 2 c., £34.; East London, 1 cs. (pt.), £5.; Fremantle, 1 c., £26.; Kobe, 2 t. 10 c., £115.; New York, (F.), 5 t. 5 c., £2467.; Piraeus (F.), 5 c., £126.; Pt. Elizabeth, 5 c., £129.; St. Vincent, W.I. Is., 1 c., £26.; Talcahuano, 1 cs. (pt.), £6.; Trinidad (F.), 1 c., £18.

COBALT RESINATE

Brussels, 2 cks., £48.

COPPERAS

Sydney, 1 cs., £8.

COPPER ACETATE

Sydney, 1 cs., £14.

COPPER CHLORIDE

Amsterdam, 10 cks., £209.

COPPER SULPHATE

Durban, 3 c., £8.; Rio de Janeiro, 1 t., £47.; Rotterdam, 1 t., £40.

COPPER SULPHOCYANIDE

Malmo, 10 drms., £52.

CREAM OF TARTAR

Adelaide (F.), 1 t. 6 c., £299.; Bangkok (F.), 2 cs., £8.; Bombay (F.), 2 c., £34.; Brisbane (F.), 3 t., £690.; Calcutta (F.), 4 c., £70.; Constantinople, 2 c., £35.; Durban (F.), 3 c., £30.; East London, 2 c., £36.; Hong Kong, (F.), 4 c., £65.; Iquique, 1 c., £19.; Kilindini (F.), 1 c., £12.; Karachi (F.), 2 c., £32.; Singapore (F.), 1 c., £12.; Talcahuano, 2 c., £39.; Trinidad (F.), 2 c., £27.

DIETHYLBARBITURIC ACID

Lisbon, 2 cs. (pt.), £5.

DISINFECTANTS

Aden, 2 c., £6.; Antigua, 2 c., £8.; Bangkok, 2 t. 5 c., £90.; Beyrout, 1 c., £11.; Bombay, 1 t. 15 c., £86.; Canton, 4 t., £132.; Cape Town 3 t. 12 c., £126.; Calcutta, 1 t. 16 c., £94.; Colombo, 6 t. 3 c., £179.; Durban, 12 c., £98.; East London, 4 c., £12.; Foochow, 4 c., £6.; Jamaica, 1 t. 10 c., £59.; Lobiti Bay, 2 c., £10.; Malta, 10 c., £49.; Melbourne, 4 c., £11.; Montreal, 3 t. 12 c., £206.; Piraeus, 8 c., £42.; Pt. Elizabeth, 11 c., £45.; Penang, 6 c., £19.; Port Sudan, 2 t. 15 c., £105.; Perth, 4 c., £11.; Rangoon, 9 t. 7 c., £156.; St. Johns N.F., 3 t. 13 c., £252.; Shanghai, 3 t. 14 c., £130.; Sydney, 4 t. 19 c., £229.; Swatow, 4 c., £12.; Tientsin, 1 t., £36.; Trinidad, 17 c., £30.

ETHER

Cyprus, 1 cs., £7.; Piraeus, 10 cs., 51 cs. (pt.), £660.; Samarang, 2 cs. (pt.), £28.

ETHER (ACETIC)

Calcutta, 2 cs., £32.; Canton, 1 cs., £12.; Pekin, 1 cs., £8.

ETHER (METHYLIC)

Bombay, 1 cs. (pt.), £4.

ETHER (SULPHURIC)

Bombay, 3 cs. (pt.), £26.; Lisbon, 7 cs., £55.; Rangoon, 1 cs., £5.

ETHYL CHLORIDE

Bombay, 1 cs. (pt.), £12.

FATTY ACIDS

Dunkirk, £2,280.

FLUORIC ACID

Madras, 1 cs. (pt.), £6.

FORMALDEHYDE

Alexandria, 1 ck., £24.; Christiania (F.), 9 cks., £200.; Iquique, 2 cs., £11.; Melbourne (F.), 3 cs., £66.; Piraeus (F.), 2 cs. (pt.), £7.

FULLER'S EARTH

Montreal, 2 c.; New York, 1 t.

GALLIC ACID

Bombay, 1 cs. (pt.), £20.; Kobe (F.), 4 brls., £168.; Rotterdam, 1 brl., £60.

GELATINE

Chemulpo, 3 c.

GLUE

Wellington, 10 e.

GLUE PITCH

Boston, 1 t. 17 c.

GLUE, SIZE, AND GELATINE

Amsterdam, 2 t.; Antwerp, 1 c.; Bangkok, 10 c.; Barcelona, 8 c.; Bilbao, 3 t.; Bombay, 2 c.; Christchurch, 1 c.; Cape Town, 1 t. 16 c.; Copenhagen, 1 t. 17 c.; Dunedin, 2 t.; Durban, £34.; East London, 2 c.; Fremantle, 8 c.; Gothenburg, 1 t.; Helsingfors, 5 t.; Hong Kong, 2 t. 5 c.; Karachi, 2 c.; Madras, 1 c.; Pt. Elizabeth, 1 c.; Rangoon, 12 c.; Rotterdam, 1 t. 15 c.; Singapore, 1 t. 2 c.; Sydney, 2 t. 4 c.

GLYCERINE

Alexandria, 1 c., £7.; Bombay, 4 c., £41.; Bordeaux, 5 t., £658.; Calcutta, 2 c., £20.; Canton, 2 c., £14.; Constantinople, 1 c., £11.; Galatz, 5 t., £625.; Havre, 1 t., £120.; Mossel Bay, — c., £6.; Pekin, 3 c., £22.; Paris, 4 t. 17 c., £680.; Piraeus, 2 c., £22.; Pt. Elizabeth, 1 c., £8.; Rotterdam, 10 c., £60.; Rouen, 8 t. 1 c., £770.; Salonica, 6 c., £40.; Samarang, 1 c., £7.; Shanghai, 10 c., £56.; Valparaiso, 2 c., £19.; Zanzibar, 1 c., £6.

GLYCEROPHOSPHATE OF LIME

Lisbon, 1 cs. (pt.), £9.

GUANO

New York, 1 t., £22.

HYDROCHLORIC ACID

Alexandria, 1 t., £50.; Belawan, 3 c., £10.; Bombay, 2 c., £6.; Cape Town, 1 c., £7.; Colombo, 12 c., £59.; Trinidad, 2 t., £80.

HYDROFLUORIC ACID

Pt. Elizabeth, 4 c., £56.

HYDROGEN PEROXIDE

Alexandria, 2 crbys., 8 cs., £25.; Cyprus, 3 cs., £8.; Madras, 11 cs. (pt.), £12.; Mossel Bay, 1 cs., £7.; Pt. Elizabeth, 2 cs., £8.

HYDROQUINONE

Bombay, 1 cs. (pt.), £17.

IODINE

Alexandria, 1 cs., £101.; Genoa (F.), 10 cks., £5,916.

IODINE (RESUBLIMED)

Buenos Ayres, 1 cs. (pt.), £45.; Shanghai, 1 cs. 2 cs. (pt.), £85.

IRON & AMMONIUM CITRATE

Bilbao, 2 cs., £57.; Montreal, 3 cs., £125.; Moss, 3 cs., £124.; Rotterdam, 2 cs., £60.

IRON SULPHIDE

Durban, 1 ck., £6.

LACTIC ACID

Brussels, 7 cks., £130.; Melbourne, 1 cs., 5 cks., £97.; Piraeus, 20 cks., £520.; Talcahuano, 1 cs. (pt.), £6.

LEAD ACETATE

Bombay, 60 kgs., £207.; Lisbon, 4 kgs., £18.; Gothenburg, 18 kgs., £428.

LEAD ARSENATE

Auckland, 24 drms., 2 cks., £30.; Delagoa Bay, 2 cks., £15.

MAGNESIA (CALCINED)

Alexandria, 1 cs. (pt.), 5 cs., £42.; Bombay, 3 cs., £18.; Constantinople, 3 cks., £9.; Lisbon, 4 cks., 1 cs., £82.; Marseilles, 1 cs. (pt.), £7.; Rouen, 40 cs., £176.

MAGNESIUM CARBONATE

Boulogne, 40 bgs., £108.; Bombay, 6 cs., £30.; Foochow, 1 cs., £5.; Melbourne, 40 cks., £130.; Piraeus, 1 ck., £5.; Shanghai, 150 bgs., £375.; Sydney, 2 cs., £11.

MAGNESIUM CITRATE

Bermuda, 1 cs., £5.; Limon, 3 cs., £36.; Pt. Elizabeth, 1 cs., £6.

MAGNESIUM SULPHATE

Alexandria, 7 c., £13.; Bermuda, 3 c., £7.; Cyprus, 6 c., £15.; East London, 9 c., £14.; Guayaquil, 8 c., £20.; Karachi, 2 c., £7.; Kilindini, 4 c., £7.; Malacca, 10 c., £11.; Mauritius, 6 c., £10.; Seville, 16 c., £44.; Shanghai, 1 t., £34.

MANGANESE ACETATE

Boulogne, 1 ck., £90.

MANGANESE BORATE

Genoa, 10 c., £36.; Rouen, 3 c., £8.; Stockholm, 3 cks., £60.

MANGANESE HYDRATE

Genoa, 1 ck., £15.

MANGANESE RESINATE

Stockholm, 6 cks., £72.

MERCURY BICHLORIDE

Bombay, 1 cs., £25.; Rangoon, 4 cs., £157.

MERCURY OXIDE

Beyrout, 1 cs. (pt.), £11.; Switzerland, 1 cs. (pt.), £7.

MERCURY PERCHLORIDE

Beyrout, 1 cs. (pt.), £33.; Toronto, 1 cs., £40.

METHYL ALCOHOL

Bombay, 1 cs. (pt.), 2 cs., £21.; Buenos Ayres, 1 cs., £7.

METHYL SALICYLATE

Belgrade (F.), 1 cs., £9.; Lisbon, (F.), 1 cs., £11.

MURIATIC ACID

Buenos Ayres, 3 cs., £9.; Rosario, 4 cs., £12.

NICKEL SALTS

Pt. Chalmers, 1 ck., £6.

NICKEL SULPHATE

Paris, 3 cks., £17.; Rotterdam, 45 cks., £560.; Yokohama, 50 cs., £150.

OXALIC ACID

Calcutta, 2 cks., £21.; Cape Town, 1 kg., £8.; Paris, 21 cks., £706.; Piraeus, 3 cks., £51.

PHOSPHORIC ACID

Durban, 1 cs., £7.; Montreal, 21 cs., £105.; Paris, 149 crbys., £1,447.; Yokohama, 2 cs., £91.

PLUMBAGO

Malaga, 1 t.

POTASSIUM ACETATE

Bombay, 1 cs. (pt.), £5.; Cape Town, 1 cs., £5.

POTASSIUM BICARBONATE

Italy (F.), 1 c., £19.

POTASSIUM BROMIDE

Bombay, 1 cs. (pt.), 2 cs., £45.; Canton, 17 cs. (pt.), £9.; Piraeus, (F.), 1 cs. (pt.), £5.; Shanghai, (F.), 1 cs. (pt.), £8.; Valparaiso, 1 cs. (pt.), £3.

POTASSIUM CARBONATE

Alexandria, 1 cs., £18.; Genoa (F.), 5 t., £860.; Talcahuano, 1 cs. (pt.), £6.

POTASSIUM CHLORATE

Calcutta, 1 c., £10.; Iquique, 2 c., £24.

POTASSIUM CITRATE

Bombay, 3 cs., £180.; Canton, 17 cs. (pt.), £15.; Pt. Swettenham, 1 cs. (pt.), £8.; Shanghai, 1 cs., £14.; Sydney, 2 cs., £57.; Toronto, 1 cs. (pt.), £14.

POTASSIUM CYANIDE

Bombay, 1 cs., 1 cs. (pt.), £227.; Buenos Ayres, 14 cs., £186.;

POTASSIUM CYANIDE—

Christchurch, 1 cs., £10.; Singapore, 9 cs., £182.

POTASSIUM FERROCYANIDE—

Bilbao, 1 kg., £33.

POTASSIUM IODIDE—

Alexandria, 1 cs., £85.; Buenos Ayres, 1 cs. (pt.), £40.; Durban, 1 cs. (pt.), £10.; Melbourne, 1 cs., £46.; Pt. Swettenham, 1 cs. (pt.), £39.; Shanghai, 2 cs. (pt.), £55.

POTASSIUM METABISULPHITE—

Algiers, 10 cks., £210.; Italy, 4 cks., £43.; Paris, 4 cks., £205.

POTASSIUM PERMANGANATE—

Bombay, 1 t., £364.; Constantinople, 1 cs. (pt.), £40.; Lisbon, 1 cs. (pt.), £15.; Perth, 1 cs., £20.; Valparaiso, 2 cs. (pt.), £56.

POTASSIUM PRUSSATE—

Durban, 1 brl., £15.; Pt. Swettenham, 2 c., £28.

POTASSIUM SILICATE—

Bilbao, 1 t. 10 c., £104.

POTASSIUM SULPHATE—

Alexandria, 2 cs., £22.; Valparaiso, 1 cs. (pt.), £8.

PYRAMIDON—

Kobe (F.), 2 cs., £577.

PYRO ACID—

Amoy, 1 cs., £8.; Batavia, 1 cs. (pt.), £9.; Bangkok, 1 cs. (pt.), £6.; Shanghai (F.), 2 cs. (pt.), £14.

QUININE—

Bombay, 1,000 ozs.; Calcutta, 1,089 ozs.

RESORCIN—

Valparaiso, 1 cs. (pt.), £27.

ROSIN—

Batoum, 8 c.

SALACETOS—

Paris, 5 brls., £103.; Sydney, 5 cs., £46.

SALAMMONIAC—

Bombay, 4 t. 13 c., £327.; Delagoa Bay, 1 c., £5.; Galatz, 1 t., £72.; Kilindini, 2 c., £8.; Toronto, 5 c., £19.

SALICYLIC ACID—

Canton, 17 cs. (pt.), £9.; Hong Kong, 2 cs., £6.; Shanghai, 2 cs., £11.

SALT—

Alexandria, 6 c.; Bombay, 2 t., 14 c.; Colombo, 13 c.; Karachi, 11 c.; Madras, 1 t.; Trinidad, 13 t.

SALTPETRE—

Alexandria, 2 t., £110.; Amsterdam, 2 t., £104.; Barcelona, 7 t., 9 c., £395.; Christiania, 2 t., £130.; Durban, 1 t. 3 c., £81.; Iquique, 2 c., £11.; Malta, 2 c., £7.; New York (F.), 118 t., 5 c., £3,550.; Oporto, 5 t. 11 c., £301.; Pacasmayo, 4 c., £13.; Valencia, 2 t. 11 c., £101.

SHEEP DIP—

Beira, 1 c., £8.; Buenos Ayres, 72 t. 6 c., £3,717.; Dunedin, 6 t. 5 c., £219.

SILVER NITRATE—

Piraeus (F.), 3 cs. (pt.), £14.; Rio de Janeiro, 1 cs. (pt.), £6.

SILVER NUCLEINATE—

Calcutta, 1 cs., £96.

SILVER PROTEINATE—

Belgrade (F.), 2 cs., £43.; Calcutta, 1 cs., £50.; Constantinople, 50 cs., £108.; Shanghai, 1 cs. (pt.), £8.

SILVER SALTS—

Pt. Chalmers, 1 cs. (pt.), £23.

SOAP—

Abo, 2 c.; Adelaide, 3 c.; Alexandria, 3 t. 5 c.; Aden, 9 c.; Amsterdam, 6 c.; Antwerp, 232 t. 15 c.; Auckland, 1 c.; Bangkok, 5 c.; Barcelona, 8 c.; Beira, 1 t. 1 c.; Bergen, 11 t. 7 c.; Beyrout, 2 t. 13 c.; Bilbao, 1 c.; Bombay, 3 t. 19 c.; Brisbane, 3 c.; Calais, 7 c.; Cape Town, 1 t. 1 c.;

SOAP—

Channel Islands, 4 c.; Christiania, 11 t. 11 c.; Cologne, 94 t. 15 c.; Colombo, 1 t. 7 c.; Constantinople, 11 c.; Copenhagen, 2 t. 5 c.; Drammen, 1 c.; Dunedin, 2 c.; Durban, 2 c.; Esbjerg, 5 c.; Galatz, 38 t. 11 c.; Gijon, 5 c.; Helsingfors, 50 t. 2 c.; Hobart, 1 c.; Hong Kong, 1 c.; Karachi, 2 c.; Kilindini, 5 c.; Lobito Bay, 10 c.; Lisbon, 2 c.; Malta, 3 c.; Marselles, 4 c.; Mauritius, 2 c.; Mombasa, 1 c.; Montreal, 16 c.; Morocco, 2 t. 10 c.; New Chang, 2 c.; New York, 2 t. 12 c.; Penang, 12 c.; Perth, 4 c.; Rangoon, 8 c.; Rotterdam, 26 t. 1 c.; Salonic, 1 t. 16 c.; St. Helena, 1 c.; St. John's, N.F., 2 t. 4 c.; St. John, N.B., 1 t. 17 c.; Seville, 2 c.; Shanghai, 8 c.; Singapore, 8 c.; Smyrna, 1 t. 19 c.; Tripoli, 1 t. 11 c.; Wellington, 3 c.; Yokohama, 10 c.

SODA—

Singapore, 4 t. 18 c., £38.

SODA ASH—

Cologne, 61 t. 15 c., £477.; Gothenburg, 26 t., £202.

SODA CRYSTALS—

Gibraltar, 1 t., £9.; Nassau, 7 c., £7.

SODIUM ACETATE—

Bombay, 1 kg., £7.

SODIUM AND TITANIUM**OXALATE**—

Christchurch, 1 ck., £25.

SODIUM ARSENITE—

Durban, 1 t. 18 c., £112.

SODIUM BENZOATE—

Alexandria, 1 cs. (pt.), £26.; Beyrout, 1 cs. (pt.), £6.; Buenos Ayres (F.), 1 cs. (pt.), £17.; Calcutta, 4 cs., £59.; Constantinople, 2 kgs., £55.; Mauritius, 1 cs. (pt.), £7.; Piraeus (F.), 5 cs. (pt.), £6.; Valparaiso, 1 cs. (pt.), £8.

SODIUM BICARBONATE

Bermuda, 1 t., £12.; Calcutta, 4 c., £14.; Canton, 5 c., £6.; Cologne, 27 t., £220.; Durban, 10 c., £16.; Iquique, 6 c., £6.; Pt. Elizabeth, 16 c., £26.; Rotterdam, 1 t., £13.; Shanghai, 10 c., £10.; Sydney, 4 c., £9.; Toronto, 4 c., £9.; Wellington, 5 c., £7.

SODIUM BICHRIMATE

Christiania (F.), 4 t., £317.

SODIUM BISULPHITE—

Antwerp, 10 t. 1 c., £286.; Pt. Swettenham, 2 t. 10 c., £79.; Singapore, 1 t., £24.

SODIUM BROMIDE—

Bombay, 1 cs., £14.; Constantinople, 1 cs. (pt.), £6.; Melbourne, 2 c., £36.; Sydney, 1 cs. (pt.), £7.

SODIUM CADODIATE—

New York (F.), 2 cs., £350.

SODIUM CARBONATE—

Batavia, 1 c., £5.; Buenos Ayres, 2 c., £5.; Salonic, 2 cs., £14.; Shanghai, 3 c., £13.; Singapore, 7 c., £14.

SODIUM CHLORIDE—

Alexandria, 3 t., £5.

SODIUM CYANIDE—

East London, 2 cs., £22.; Shanghai, 1 ck., 2 cs., £16.

SODIUM HYPO—

Amsterdam, 2 cks., £45.; Batavia, 10 c., £11.; Constantinople, 2 t. 15 c., £77.; Jaffa, 1 t., £27.

SODIUM HYPHOSPHITE—

Paris, 2 cs., £45.

SODIUM METHYLARSENATE—

Lisbon, 1 cs. (pt.), £6.

SODIUM PERBORATE—

Christiania (F.), 2 c., £31.

SODIUM PHOSPHATE—

Calcutta, 1 ck., £6.

SODIUM PRUSSATE—

Kobe, 34 t. 5 c., £2,626.; New York, 34 t. 19 c., £2,797.

SODIUM SALICYLATE—

Bombay, 2 cs., 1 cs. (pt.), £38.; Buenos Ayres (F.), 1 cs. (pt.), £7.; Constantinople, 1 cs. (pt.), £60.; Durban, 1 cs. (pt.), £8.; Melbourne, 2 cks., £66.; Piraeus, 1 ck., £10.; Sydney, 1 cs., 2 cks., £69.

SODIUM SILICATE—

Christiania, 9 t. 17 c., £138.; East London, 5 c., £9.; Larache, 13 c., £10.; Shanghai, 7 t. 3 c., £78.

SODIUM SULPHATE—

Penang, 18 c., £16.

SODIUM SULPHATE (GLAUBER SALTS)—

Alexandria, 1 t., £10.

SODIUM SULPHITE—

Batavia, 2 cks., £11.; Calais, 11 c., £305.; Copenhagen, 3 c., £8.; Christiania, 2 t., £44.; Pt. Swettenham, 1 t. 5 c., £30.; Salonic, 2 cs., £14.; Singapore, 7 c., £14.; Sydney, 5 c., £6.; Shanghai, 4 c., £18.

SODIUM TARTRATE—

Marseilles, 1 c., £6.

STEARINE—

Bordeaux, 10 t.

STRONTIUM NITRATE—

Bombay, 16 cks., £158.

SULPHATE OF LEAD—

Bombay, 8 cks., £152.

SULPHUR—

Alleppey, 3 c., £9.; Alexandria, 2 c., £5.; Cologne, 10 c., £15.; Cape Town, 18 c., £23.; Delagoa, 1 c., £9.; Punta Arenas (F.), 2 c., £6.; Rio Galleo, 15 t., £435.; Rotterdam, 1 c., £14.; Sydney, 2 c., £8.

SULPHUR (FLOWERS)—

Beira (F.), 4 c., £9.; Cape Town, 4 t. 9 c., £119.; Durban, 2 c., £6.; Lisbon, 3 c., £5.

SULPHURIC ACID—

Alexandria, 2 t., £92.; Brussels, 1 t. 4 c., £46.; Buenos Ayres, 15 c., £21.; Channel Islands, 1 t. 6 c., £15.; Demerara, 7 t. 10 c., £112.; Trinidad, 5 t., £80.

TALLOW—

Genoa, 14 t. 11 c.

TANNIC ACID

Buenos Ayres, 2 cs., £110.; Durban (F.), 1 cs. (pt.), £12.; Hobart (F.), 1 cs. (pt.), £6.; Iquique, 1 cs. (pt.), £31.; Vera Cruz, 1 cs. (pt.), £13.

TARTARIC ACID—

Bombay, 2 c., £38.; Calcutta (F.), 4 c., £85.; Canterbury, 1 c., £30.; Chinde, 1 cs. (pt.), £6.; Cape Town, 5 c., £91.; Cape Town (F.), 1 c., £18.; Christiania, 15 c., £296.; Christiania (F.), 11 c., £200.; Constantinople, 1 c., £28.; Colombo (F.), 1 c., £12.; Durban (F.), 3 c., £56.; Durban, 2 c., £43.; Fremantle, 3 c., £56.; East London, 2 c., £40.; Iquique, 1 c., £24.; Karachi, 1 cs. (pt.), £6.; Karachi (F.), 5 c., £112.; Kobe, 10 c., £187.; Madras (F.), 1 c., £22.; New York (F.), 1 t., £318.; Pt. Elizabeth, 5 c., £94.; Pt. Elizabeth (F.), 1 c., £18.; Pt. Sudan, 5 c., £82.; Singapore, (F.), 10 c., £159.; Talcahuano, 1 c., £28.

THEOBROMINE AND SODIUM**SALICYLATE**—

Belgrade, 1 cs., £22.

WHITE LEAD—

Alexandria, £282.; Antwerp, £274.; Auckland, £5.; Buenos Ayres, £593.; Calais, £1,235.; Christiania, £100.; Christchurch, £60.; Dantzig, £46.; Dunedin, £14.; Kilindini, £113.; Lisbon, £337.; Malta, £15.; Oamaru, £30.; Oporto, £73.; Paris, £185.; Piraeus, £381.; Singapore, £171.; Treport, £525.

ZINC SULPHATE—

Bombay, 34 cks., £48.

MANCHESTER.

Week ending October 14.

ALUM—

Antwerp, 150 pkgs.

CAUSTIC SODA—

Genoa, 102 drms.

COAL PRODUCTS (otherwise undes.)

Genoa, £13.; Piraeus, £145.; Volo, £129.

DYESTUFFS—

Logwood Extract

Genoa, 36 cs.

PITCH—

Antwerp, 689 t.

SOAP—

Antwerp, 650 cs., 67 pkgs.

SODA ASH—

Genoa, 500 bgs.

SODA CRYSTALS—

Piraeus, 50 bgs.

SODIUM BICARBONATE—

Antwerp, 482 bgs.

SODIUM BICHRIMATE—

Antwerp, 2 cks.

MIDDLESBROUGH.

Week ending October 18.

OLEINE—

Rotterdam, 12 t., £1,200.

SALT—

Antwerp, 310 t., £963.; Helsingborg, 222 t., £778.; Karlsruhe, 100 t., £350.

NEWCASTLE-ON-TYNE

Week ending October 18.

ANTIMONY—

Gothenburg, 4 t.; Rotterdam, 5 t.

BARIUM NITRATE

Genoa, 14 c.

BLEACHING POWDER—

Gothenburg, 43 t.; Rouen, 70 t.

CAUSTIC SODA

Gothenburg, 55 t.; Genoa, 60 t.

FERRO MANGANESE

Bilbao, 300 t.; Gothenburg, 60 t. 10 c.

GELATINE—

Esbjerg, 13 c.

LEAD SULPHATE—

Antwerp, 13 t.

MAGNESIUM CARBONATE—

Genoa, 15 t.

PITCH—

Gothenburg, 2 t. 16 c.

RED LEAD

Antwerp, 5 t. 8 c.; Gothenburg, 36 t. 3 c.; Genoa, 3 t. 2 c.; Rotterdam, 4 t., 18 c.

SOAP—

Antwerp, 9 t.; Bergen, 1 c.

SODA ASH—

Gothenburg, 434 t.

SODA CRYSTALS—

Rotterdam, 25 t.

SODIUM BICARBONATE—

Gothenburg, 10 t.

SODIUM SILICATE—

Gothenburg, 16 t. 5 c.

SODIUM SULPHATE

Gothenburg, 300 t.

SULPHUR—

Gothenburg, 10 t.

WHITE LEAD—

Antwerp, 17 t. 6 c.

N. & S. SHIELDS.

Week ending October 18.

NIL.

SWANSEA.

Week ending October 18.

NICKEL SULPHATE—

Antwerp, 10 cks., £120.; Rotterdam, 6 kgs., £300.

PRICES CURRENT.

THURSDAY, Oct. 23, 1919

PREPARED BY MESSRS. HIGGINBOTTOM AND CO., 21, SPRING GARDENS, MANCHESTER.

The values stated are F.O.R. at makers' works, or at usual ports of shipment in U.K., unless otherwise specified
The prices in different localities may vary.

Acids:—				£	s.	d.
*Acetic 40% and 60%	per cwt.	29/- & 44/-				
* " Glacial	per ton	85 0 0				
Arsenic, S.G. 2,000°	per ton	70 0 0				
Boric, Crystals	"	72 0 0				
*Fluoric	per lb.	0 0 7				
*Muriatic (Tower Salts), 28 Tw.	per carboy	0 6 6				
*Nitric, 80° Tw.	per ton	32 0 0				
Oxalic	per lb.	0 1 1½				
Phosphoric, 1,750°	"	0 1 9				
*Sulphuric (fuming, 70%)	per ton	—				
" (Pyrites, 168°)	"	7 18 9				
" (" 140°)	"	4 10 0				
" (free from arsenic, 144°)	"	5 7 4				
Tannic (commercial)	per lb.	0 2 6				
Tartaric (crystals)	"	0 3 2				
*Acetone	per ton	80 0 0				
*Alum, loose lump (delivered)	"	17 0 0				
Alumina Sulphate (pure)	"	17 0 0				
Aluminoferic (in slabs)	"	8 10 0				
Aluminium (Ingot Metal, 98/99%)	per ton	150 0 0				
*Ammonia, Anhydrous	per lb.	0 1 10				
* " 880	per ton	33 0 0				
* " 920	"	20 0 0				
" Carbonate	per lb.	0 0 6½				
" Muriate (grey)	per ton	47 10 9				
" (salammoniac) 1st & 2nd, per cwt.	80/- & 75/-					
" Nitrate	per ton	60 0 0				
" Phosphate	"	110 0 0				
" Sulphate (grey), London, net	"	—				
" " Hull	"	—				
" " Manchester	"	—				
*Aniline Oil (pure)	per lb.	0 1 2				
Aniline Salt	"	0 1 2				
Antimony	per ton	45 0 0				
" (tartar emetic), 43/44%	per lb.	0 3 4				
" (golden sulphide)	"	0 1 3				
Arsenic, white powdered	per ton	60 0 0				
Barium Chloride (in casks)	"	23 0 0				
" Carbonate (native), 92/94%	"	11 10 0				
" Sulphate (native levigated)	"	£7 to £14				
Baryta Chlorate	per lb.	0 1 3				
*Bisulphide of Carbon	per ton	55 0 0				
*Bleaching Powder, 35%	"	17 0 0				
* " Liquor, 7%	"	6 0 0				
Casein (commercial)	"	90 0 0				
Chromium Acetate (crystals)	per lb.	0 1 0				
Calcium Chloride	per ton	8 0 0				
China Clay (at Runcorn), in bulk	"	70/- to 90/-				
Coal-tar Products and Dyes:—						
Alizarine (artificial), 20%	per lb.	0 2 0				
Magenta	"	18/- to 35/-				
Anthracene, 40/50% A, f.o.b., L'don, per unit,	"	0 0 7				
Benzol, 90's (naked)	per gal.	0 2 0½				
" 50/90's	"	0 1 10½				
Carbolic Acid (crude, 60°)	"	0 1 7½				
" (crystallised, 40°)	per lb.	0 0 9¼				
" Acid (pale liquid, 97/98%)	per gal.	0 2 9				
*Creosote (ordinary), naked	"	0 0 6½				
*Crude Naphtha, 30% at 120°C.	"	0 0 9				
*Grease Oils, 18° Tw. (naked)	per ton	6 10 0				
Pitch, f.o.b., Liverpool or Garston	"	3 2 9				
*Solvent Naphtha, 90% at 160°	per gal.	0 2 5				
Copper	per ton	104 10 0				
" Sulphate	"	40 0 0				
Pross Salts	"	39 0 0				
*Glycerine (crude), 80%	"	72 0 0				
" (industrial, S.G. 1,260)	"	110 0 0				
*Iodine	per oz.	0 1 0				
*Iron Nitrate, 80° Tw.	per ton	12 0 0				
" Sulphate (copperas), delivered	"	4 5 0				
" Sulphide	"	9 0 0				
Lead (Foreign Pig)	"	29 15 0				
" Litharge Flake	"	45 0 0				
" Acetate (white)	"	83 0 0				
" (brown)	"	68 0 0				
Lead, Carbonate (White lead), pure	per ton	50 0 0				
" Nitrate	"	56 0 0				
Lime, Acetate (brown)	"	12 0 0				
" (grey), 80%	"	17 0 0				
Magnesium Chloride	"	15 10 0				
" Carbonate (light)	per cwt.	2 7 6				
" Calcined Magnesite	per ton	21 10 0				
" Sulphate (Epsom Salts) (coml.)	"	12 0 0				
" (druggists)	"	16 0 0				
Manganese, Sulphate	"	75 0 0				
" Borate	"	95 0 0				
*Methylated Spirit, 64° (industrial)	per gal.	0 5 7				
*Naphtha (Wood), Solvent	"	0 10 0				
" Miscible, 60° p.	"	0 10 6				
Oils:—						
*Cottonseed	per ton	95 0 0				
*Linseed	"	90 0 0				
Stearine, 115-120° M.P.	"	95 0 0				
Potassium, Bichromate	per lb.	0 1 6				
" Carbonate, 85%	per ton	100 0 0				
" Chlorate	per lb.	0 1 0				
" Hydrate (Caus. Pot.) 88/90%	per ton	105 0 0				
" 75/80%	"	95 0 0				
" Potash Hydrate Liquid, 50° B.	"	75 0 0				
" Nitrate (refined)	"	55 0 0				
" Permanganate (commercial)	per lb.	0 3 3				
" Prussiate (yellow)	"	0 1 9				
" (red)	"	0 5 6				
" Sulphate, 90% (ex ship)	per ton	25 0 0				
" Muriate, 80%	"	25 0 0				
Silver (metal)	per oz.	0 5 3½				
Sodium (metal)	per lb.	0 1 3				
" Acetate	per ton	5 0 0				
" Arseniate, 45%	"	60 0 0				
" Borate (Borax), Crystals	"	39 0 0				
" Bicarbonate (2 cwt. bags)	"	8 5 0				
" Bichromate	per lb.	0 0 11				
" Carb. (Caustic Soda-ash), 48%	per ton	12 10 0				
" (Al'ali), 58% (bags)	f.o.r. wks.	6 10 0				
" (Soda Crystals), (bags) car. pd.	"	5 10 6				
" Chlorate	per lb.	0 0 6				
" Cyanide (100% basis) for export	"	0 0 11				
" Hydrate (76% C. Soda) (f.o.r.)	per ton	24 0 0				
" (74% C. Soda)	"	13 5 0				
" (70% C. Soda)	"	22 0 0				
" (60% C. Soda)	"	21 0 0				
" (pure liquid, 90° Tw.)	"	10 2 6				
" 77/78% Powdered (99%) Hydrate	"	24 10 0				
" Hyposulphite (commercial)	"	16 10 0				
" Manganate, 25%	"	65 0 0				
" Nitrate, 96%, refd., f.o.r., L'pool	"	21 0 0				
" Nitrite, 100%	"	60 0 0				
" Phosphate	"	27 0 0				
" Prussiate	per lb.	0 0 11				
" Silicate (glass) Alkaline	per ton	12 5 0				
" (liquid, 100° Tw.)	"	9 10 0				
" Sulphate (Salteake), delivered	"	3 10 0				
" (Glauber's Salt)	"	4 0 0				
" Sulphide (conc.), 60/65% casks	"	22 0 0				
" Sulphite	"	10 0 0				
Sulphocyanide, Ammonium, 95%	per lb.	0 2 0				
" Barium, 95%	"	0 1 4				
" Potassium	"	0 2 4				
" Calcium, 70%	per lb.	0 1 4				
Sulphur, (Flowers)	Sicilian per ton	21 0 0				
" (Roll Brimstone)	"	21 0 0				
" Brimstone (best thirds)	"	14 10 0				
" (ex ship)	"	100 0 0				
Tallow	"	0 2 0				
Tin Crystals	per lb.	278 0 0				
" English Ingots	per ton	0 1 6				
Titanium, Potass. Oxalate	per lb.	4 10 0				
Titanous Chloride	per cwt.	45 10 0				
Zinc (Spelter)	per ton	70 0 0				
" Powder, 88/92%	"	24 0 0				
* " Chloride (solution, 102° Tw.)	"	22 0 0				
" Sulphate, Crystal	"	22 0 0				

* Packages extra or returnable; otherwise, prices usually include packages.

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LONDON, SATURDAY, NOVEMBER 1, 1919.

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CURRENT TOPICS.

GERMAN CHEMICAL INDUSTRY CONDITIONS.

FURTHER reports relating to the German chemical industry would appear to indicate that from the point of view of chemical manufacturers in that country prospects for the near future are anything but hopeful. The first report, emanating from the Verein zur Wahrung der Interessen der Chemischen Industrie, and presented at a recent general meeting of that body in Berlin, states that the chemical industry experiences a shortage of raw materials, particularly coal, while at the same time the coal delivered has greatly deteriorated; the ash content has risen from 12 to 15 per cent. formerly to as high as 35 per cent. at the present time. In addition there are great difficulties in the transport conditions on the railways and difficulties with the workmen. The final result has been, according to the report, that a number of the works in the west have been either partly or completely brought to a standstill, as, for instance, the works of Leopold Cassella and Co., Griesheim-Elektron, the Zellstoff Fabrik Waldhof, the Verein Chemischer Fabriken Mannheim, the Hoechst Farbwerke, and the Sodafabrik Wiehl, whilst the chemical works at Leverkusen are living from hand to mouth. As compared with this state of affairs the report remarks that an "immense hunger" for all kinds of chemical products prevails throughout the world, so that there would be an abundance of business if the German industry were able to work at full output. But even in this event it is said the Peace Treaty is against the development of the industry, as it takes away 50 per cent. of the existing stocks and 25 per cent. of the annual production until 1925. The position in regard to the markets in the late enemy countries is summed up as follows:—England, except by special permits, has prohibited the import of dyes and chemicals for a period of ten years; France has also issued import vetoes, and has imposed a duty of 6 francs per kilo. when permits are granted; and the United States has levied an *ad valorem* duty of 45 per cent. The report, in conclusion, expresses the opinion that the industry can only recover from the present depression by the greatest exertion of all forces, assiduity, and by proficiency. Equally gloomy are the conclusions of Mr. Irving A. Keene, chairman of the Advisory Committee on Drugs, Chemicals, and Dye-stuffs of the American Chamber of Commerce in London.

Mr. Keene has recently returned from a visit to Germany, and his impressions are published in the October *Bulletin* of the Chamber. Factories and workshops in the Rhineland towns which Mr. Keene visited are working for private German account, but are under the control of the occupying military authorities. Practically none of them could offer goods for export. Up to 50 per cent. of their output as in January, 1919, must be sold to the German Government for delivery to the Allies as indemnity, and little or nothing is left for export. All production, he says, is suffering from a serious lack of raw materials. Bayer and Co., for instance, had nothing to offer excepting a few vat colours, and could not sell anything without instructions from the Government. Colours other than vat colours were very scarce, and supplies of medicinal chemicals extremely low. At Frankfort, also, such big firms as Meister Lucius and Bruning and Cassella had practically nothing to offer. The former's place had been bombed, and they were able only to fill their orders and supply their fixed percentage to the Government for the Allies. At Darmstadt, E. Merck and Co. and the Griesheim Elektron had fine large plants but few materials for sale. The great demand is for raw materials, coal, and credit. Employers complain of a lack of energy on the part of the workmen. The proportion of productivity per man was quoted from as low as $33\frac{1}{3}$ per cent. to as high as 75 per cent. of the pre-war normal. Mr. Keene predicts, however, that this condition is a temporary one only. "Far from being in a position to dump dyestuffs and other chemicals on American, British, and other markets," asserts the writer, "Germany is actually short, and when she has delivered to the Allies the quantities required by the Peace Treaty there will be little left for export. The dire shortage of coal and raw materials precludes the possibility of her becoming anything more than a weak competitor for at least a year." Assuming that the above reports accurately represent the situation as it now exists in the German chemical industry, chemical manufacturers in this country would be well advised not to jump to the conclusion that matters are worse than they really are. By so doing the very grave danger would arise of a relaxation of the efforts that are being made to meet the competition of Germany in the future. In striking contrast to Mr. Keene's remarks anent the labour situation in Germany is the following quotation from the report of the Industrial Commission to Germany on the Wallpaper Industry: "A very outstanding feature was the alert and businesslike manner in which the staffs in all departments went about their work, and the grim determination of the employees, conscious of having lost the war, yet striving to win success in the industrial sphere by the quality and quantity of production." We quote the passage, not as a refutation of the conclusions of Mr. Keene, but simply for the purpose of drawing attention to the fact that the available information concerning industrial conditions in Germany, far from throwing a clear light upon matters tends to make them more obscure.

ALUMINIUM FROM LABRADORITE.

MR. L. HAWKES, writing in *Nature* (October 23), says that the metal aluminium can be obtained by electrolytic means from its oxide, and nearly all the suggested methods of manufacture depend upon this as a final stage, the main difficulty being the preparation of a sufficiently pure oxide, free from iron and silica. The ore commonly used is bauxite, after a rather costly preliminary purification by the Baeyer process. At the outbreak of war the Central Powers utilised their available bauxite, including the small deposits of poor quality in Germany; but the necessity for finding a more widespread source was felt, and a process was discovered and successfully put into operation by Dr. Buchner, of Heidelberg, for treating kaolin and kaolin-rich clays.

There is no bauxite in Norway, and it was first proposed to work the clays after the Buchner and other suggested methods. This, however, has for the most part proved impracticable owing to the unfavourable character of the clays, which are relatively unweathered glacial deposits, not only poor in alumina, 16-20 per cent., but with part of it bound in alkali feldspar, and therefore unavailable. In 1917, Prof. V. M. Goldschmidt, of the Mineralogical Institute, Christiania, conceived the idea of using labrador-stone as a source of aluminium. Labrador-stone is a white rock extensively developed in south-western Norway, and especially in the inner Sogne-fjord district. The main constituent of this rock is a plagioclase feldspar of the labrador group, the more felspathic varieties containing only a very small amount of iron-bearing pyroxenes, and with an alumina content of 30 per cent. Prof. Goldschmidt has found that the feldspar is surprisingly soluble in dilute acids, so that it can be dissolved out, leaving a residue of insoluble ferro-magnesian minerals and silica. The calcium and sodium oxides of the feldspar, 13 per cent. and 5 per cent. in amount respectively, go into solution with the alumina, and, using sulphuric acid, there is thus a considerable loss in the form of a useless by-product. This method is rejected for the manufacture of alumina, although it is used in the preparation of sufficient quantities of aluminium sulphate to satisfy Norwegian needs. By using nitric acid as a solvent, not only is a waste of acid avoided, but the precipitation with ammonia can be dispensed with—a valuable consideration in Norway, where ammonia cannot be obtained cheaply in quantity.

The main features of the process, which has been worked out by Prof. H. Goldschmidt, are as follows: The labrador-stone is extracted with dilute nitric acid, the 30 per cent. acid, first raw product of the electrical air-industry, serving for this purpose. The silica and greater proportion of the iron minerals remain insoluble, aluminium, calcium, and sodium going into solution together with a little iron. After removal of this iron the solution is evaporated down and the residue heated to a certain temperature at which the aluminium salt alone is decomposed, the nitric acid driven off being collected as a valuable concentrate. By washing with water the nitrates of calcium and sodium are removed, the alumina remaining.

This process seems to be full of promise for Norway—a country with such abundant water-power, a flourishing nitric acid industry, and an unlimited quantity of a raw material which few other countries possess; and hopes are entertained that a product will be obtained which will not only suffice for local needs, but also win a footing in the world's rapidly expanding aluminium market.

CHEMICAL ASPECTS OF THE POTASH INDUSTRY.

AT the opening meeting of the session of the Birmingham and Midland Section of the Society of Chemical Industry, held at the University of Birmingham on Thursday, October 23, an interesting paper by Mr. E. C. Rossiter, F.I.C., and Mr. Cyril S. Dingley, A.I.C., was read by the former on "Some Chemical Aspects of the Potash Industry in Great Britain." Dr. R. S. Morrell presided, in the absence of Mr. L. P. Wilson (the chairman of the Section), over a representative attendance.

It was announced that Dr. E. W. Smith, chief chemist at the Birmingham Gas Works, found himself unable, owing to pressure of engagements, to accept the position of chairman; and Mr. Wilson had consented to act in that position, and Dr. H. W. Brownson and Dr. Morrell had been elected vice-chairmen. Mr. J. C. Sheldon had been appointed representative and corresponding member of the Section on the Chemical Engineering Group.

The hon. secretary (Mr. F. R. O'Shaughnessy) stated that it was the intention of the Section to co-operate closely and sympathetically with the Group, which was very keen about developing its work. It had arranged for a conference to be held on April 22 on "Labour-Saving Devices in Chemical Works," and a number of interesting papers would be read. The contributions would include papers by American chemical engineers.

Mr. Rossiter, in the course of the paper, commented upon the importance of a home supply of potash, as being second only to that of the supply of combined nitrogen, both as regarded agriculture and industry. In the case of combined nitrogen the supply can, he pointed out, be obtained from synthetic processes, from by-product recovery, and from natural deposits. In the case of potash the last two sources only are possible. Potash occurred as a by-product in considerable quantities in the blast-furnaces, the cement industry, and the wool-washing industry. In 1917 there were some 240 blast-furnaces in blast in England and Wales, and the preliminary examination of each furnace for possible potash production took about seven days. They had, however, after three years' work, arrived at a stage when certain conclusions could be drawn as to the probable extent of potash production from this source.

BLAST-FURNACE DUSTS.

Unless certain modifications are made in the routine of blast-furnace management—namely, the simple addition of salt to the furnace charge combined with an adequate means of cleaning the furnace gases,—it is improbable that sufficient potash can be obtained to make a potash industry worth while. The greater portion of the potash charged into the furnace is carried into the slag; and the collection of the dust from the stoves and boilers will provide only a small portion of the potash requirements of the country, and then only of a very variable and inferior quality. An examination of materials used in the manufacture of pig-iron has shown that the chief source of the potash is the iron ore. Lime-stones and coals do not, as a rule, contain much more than 0.1 per cent. of potash stated as KCl, or about 3.5 lb. per ton of pig-iron made, but occasionally as much as 13-14 lb. per ton of pig is found in these constituents of the furnace charge.

Hundreds of analyses have been made to determine the potash contents of various flue-dusts from blast-

furnaces. Such dusts, provided they contain sufficient potash, and have been burnt in stoves or under boilers, can be used without further preparation in agriculture, and are therefore valuable as a source of potash. There is wide variation in the potash content, even when obtained from the same works. The heavy dust from the heavy dust-catcher and the flues near the furnace contains little potash; it varies from a trace to 2.05 per cent. of potash stated as KCl. On the other hand, the dust from stoves and boiler settings is usually valuable; the soluble potash varies from 3 per cent. K_2SO_4 with 4 per cent. KCl in the same sample to 30.5 per cent. K_2SO_4 . The potash insoluble in water varies from 3.6 to 11.4 per cent. stated as KCl, and soluble impurities such as sodium and calcium sulphates and chlorides also vary greatly. The following analysis may be taken as a fair sample of the dust obtained from the stoves of an ordinary blast furnace where no cleaning plant is installed: K_2SO_4 , 10.01 per cent. KCl, 1.60; NaCl, 1.14; $CaCl_2$, 1.18. Total soluble in water, 13.93 per cent.; SiO_2 , 26.49; Fe_2O_3 and Al_2O_3 , 37.46; CaO, 9.69; MgO, 1.98; PbO, 0.69; ZnO, 2.30; K_2O , 4.83; Na_2O , 0.55; CO_2 , 1.98 per cent.

The dust from stoves and boilers provides a very low potash content. The potash charged into the blast-furnace comes out either in the slag or in the gas. In the slag it probably occurs combined with silicates, and in the gas as a very fine fume, which, after cooling, may contain the potassium as carbonate, bicarbonate, formate, cyanide, thiocyanate, sulphate, and chloride, with small quantities of bromides and iodides. It usually contains a very constant quantity of chloride with varying quantities of carbonate and a smaller quantity of cyanides. It varies considerably for each works. This fume is so fine that a sample of the gas, if drawn into a hot aspirator, shows no signs of settling after remaining for several hours.

In those works which do not clean their gas most of the potash carried in the gas eventually escapes up the chimney after the gas is burnt at the boilers and stoves, and is evident in the white fume issuing. A small proportion is deposited with the heavy dust collected in the dust-catcher and the first portion of the gas main, and a larger proportion (but less than 10 per cent.) is deposited in the stoves and boiler flues, where, after the gas has been burnt, it is present as a mixture of sulphate and chloride.

For the manufacture of potassium salts only that portion of the potash which is carried by the gas is available, unless the small quantities of stove dust are collected for this purpose, and therefore when considering the distribution of potash it is of the first importance to determine the quantities of potash present in the gas and in the slag at every blast-furnace. The greater the quantity of potash present in the ores the greater is the proportion remaining in the slag. Unless a large proportion of the potash remaining in the slag can be transferred to the gas, a sufficient quantity of potash to make a potash industry worth while will not be available. The experiments show that by the simple addition of salt to the furnace charge a larger proportion of the potash is transferred from the slag to the gas. In regard to the ferro-manganese furnaces the whole of the potash is volatilised into the gas under normal working con-

ditions, and a large proportion is obtained as carbonate. The hæmatite furnace, using only foreign ores containing a small percentage of potash has, on the average, given an increase of 9lb. KCl for 13lb. of salt, and when the salt was more advantageously adjusted, an increase of 8.1lb. KCl for 9.2lb. of salt. When the salt is properly adjusted there is every prospect that 1lb. of KCl will be obtained for every pound of salt used. The basic iron furnace using 55-70 per cent. Cleveland ore mixed with foreign ores has, on the average, given an increase of 14.6lb. KCl per 37lb. of salt, or 1lb. KCl for each 2½lb. of salt used.

The Cleveland iron furnace using 94 per cent. Cleveland ore has, on the average, given an increase of 18.5lb. KCl per 37lb. of salt, or 1lb. KCl for each 2lb. of salt used. In both these furnaces the result is very similar. A substantial increase in the potash volatilised into the gas is obtained, but the potash in the slag cannot on the average be reduced to less than 1.0 per cent. KCl; that is, the greater portion of the potash remains in the slag. A larger quantity of salt will reduce the potash in the slag, although up to the present we have never obtained a satisfactory reduction; but with this larger quantity of salt the proportion of sodium chloride volatilised into the gas is so high that the separation of the sodium and potassium salts at the potash works is rendered more costly.

The authors believe this retardation of the action of salt in furnaces using Cleveland ores to be due to the low ratio of lime and magnesia to silica in the slags from these furnaces. Before salt is added the fume carried by the gas is neutral, and contains chlorides of calcium, iron, and aluminium, so that there is already present more than sufficient hydrochloric acid to combine with the potassium which is volatilised, but the low working temperature of the furnace may also retard the volatilisation of the potash.

The effect of adding salt on the dust collected in the cleaning plant is very marked; the salt addition has replaced a comparatively poor dust containing 15 per cent. of potash salt by one containing 26 per cent. KCl.

The authors are of opinion, from the results obtained by the addition of salt to those few furnaces to which it has been added up to the present, that in the case of furnaces using North Lincolnshire ores about 80 per cent. of the potash will be volatilised into the gas, and be therefore recoverable by the use of adequate gas-cleaning plant; the hæmatite furnaces will also yield about 80 per cent. of the potash, and the furnaces using Cleveland ores about 33 per cent. of the potash contained in the furnace charge. The analyses of ores shows Northamptonshire to have the highest average potash content, and on the information gained it appears that a potash industry obtaining raw material from the blast-furnaces of England and Wales will be able to provide potassium salt equivalent to 63,000 tons of potassium chloride per annum.

In this estimate no account of the potash now going to waste in the manufacture of ferro-manganese has been taken into account; neither has any allowance been made for the substitution of home ores for foreign ores. All factors considered, the authors are of opinion that a conservative estimate of the potash which can be recovered from the blast-furnaces of England and Wales may be taken at 80,000 tons per annum as KCl, equivalent to some 50,000 tons of potash expressed as K₂O, or more than double our pre-war requirements of potash.

DISCUSSION.

Dr. Morrell, in expressing the appreciation of the Section to the authors, said he believed the results obtained would be of great value to the community at large. He inquired whether the addition of the charge of salt interfered with the durability of the linings of the furnace, and Mr. Dingley replied that experience up to the present justified an answer in the negative.

Dr. Slater Price asked if, with war conditions over, potash produced by the process would be able to compete in cost with the supply that would be available from abroad.

Mr. Rossiter said there was no further expense, beyond apparatus, except that for salt added. Moreover, it was accepted generally by blast-furnace managers that it paid to clean the gas without considering the question of the cost of collecting the dust.

Mr. H. Silvester said with some knowledge of blast-furnace examination he was able to appreciate the enormous amount of detailed work that had been done. However this process of potash production might be regarded, the contribution of the authors to the literature of the subject would always be turned to with interest. It was essential that furnace-gas should be clean if it were to be used in gas engines. Furnace owners would welcome any information as to a cheap gas-cleaning apparatus.

Mr. F. C. A. H. Lantsberry said with the expansion of the pig-iron industry it was to be hoped that more and more furnace-gas would be used in gas engines, but it must be absolutely clean.

Dr. H. W. Brownsdon said the contribution was a noteworthy instance as to the value of by-products. It appeared to him that the time would come when the potash must be recovered from this source.

Mr. Rossiter suggested that it would pay to instal the necessary plant, because, apart from the production of potash, it would mean clean gas not only for gas engines, but for stoves and boilers. The question was one as to whether the country was going to stand still and continue to witness the enormous waste of power and fuel that now took place in our blast-furnaces. When the supply of potassium carbonate was stringent they produced it direct from the flue-dust. A very substantial amount of potash from the blast-furnaces was made each week at Oldbury.

CALCULATING LIQUID CONTENT OF TANKS.

THE storage of large quantities of liquids at chemical works in cylindrical tanks, usually in a horizontal position, while the liquids are frequently being added to or in part withdrawn, makes a ready method of measuring the contents at any time desirable. Tables to facilitate these calculations are given in hand-books, but they have the common defect of being applicable only to vessels of the diameters therein given; for other diameters the tables are useless. The author offers a formula which supplies the want. In this formula the value of the contents is a function of the radius and the height of the liquid. It is thus stated:—

$$V = \frac{V_0}{\pi} \left\{ \arccos \left(1 - \frac{h}{r} \right) - \left(1 - \frac{h}{r} \right) \sqrt{\frac{h}{r} \left(2 - \frac{h}{r} \right)} \right\}$$

where V_0 is the volume when the tank is full—i.e., the total capacity. It will be seen from the equation that the quotient $\frac{V}{V_0}$ is dependent only on the relation $\frac{h}{r}$. Hence it is applicable to any given diameter. This relation can be shown graphically, and the author gives a diagram which can be used in practice to save work in calculation.—*Chem. Zeit.*, April 3, 1919.

MANCHESTER LITERARY AND PHILOSOPHICAL SOCIETY.—A general meeting of the society will be held on Tuesday next, November 4, at 5 p.m., when, an application having been received and approved by the Council for the formation of a chemical section of the society, the following resolution will be submitted to the meeting on behalf of the Council:—That the chairman and secretary of the chemical section of the society be added to the council as ex-officio members thereof."

DEVELOPMENT OF THE GERMAN CHEMICAL INDUSTRY.

FURTHER CONSOLIDATION OF INTERESTS AND CAPITAL INCREASES OF SEVERAL MILLIONS STERLING.

A GIGANTIC augmentation of share capital is now proposed to be carried into effect in the immediate future by the big companies engaged in the German heavy chemical industry—so enormous indeed that it throws entirely into the shade all previous expansions in capital made by any single industry at any former period. The scheme, as is claimed, shows the firm intention of the German companies also to maintain in the future the position which they acquired in the markets of the world as a result of work extending over many years.

It will be remembered that in 1916, as was reported in this journal at the time, the community of interests in the German aniline dye industry, which until then comprised only the Elberfeld Farbenfabriken of Leverkusen, the Badische Anilin und Sodafabrik of Ludwigshafen, and the A. G. für Anilin Fabrikation of Berlin-Treptow, was extended by the inclusion of the Farbwerke vorm. Meister Lucius and Brüning, of Höchst; Leopold Cassella and Co., of Frankfort-on-the-Main; Kalle and Co., of Biebrich; the Chemische Fabriken vorm. Weiler-ter-Meer of Uerdingen; and the Chemische Fabrik Griesheim-Elektron, of Frankfort-on-the-Main. The extended community excepted from its scope certain branches which were reserved exclusively for the firms at Ludwigshafen, Leverkusen, and Berlin, in so far as concerns the financing of the branches and the participation in the profits and losses resulting from them—that is to say, to the three firms forming the original community. This was specially the case with the nitrogen department. This branch has assumed considerable dimensions in the past few years, and has outgrown the capital resources of the companies concerned. So much so that it is estimated that the capital already invested in the works at Oppau and at Merseburg, and the considerable sum which is still required represent an amount of several hundred millions of marks. Under these circumstances it has been found necessary to widen the basis of the undertaking, and at the same time raise fresh capital.

It is computed that on the entire completion of the installations at Oppau and Merseburg, the plant will be able to produce 300,000 tons per annum of nitrate in the form of ammonia, ammonia sulphate, nitrate, etc., which would be supplied to German agriculture, and also be placed at the disposal of the chemical industry, and thus be able substantially to cover the inland requirements. It has now been agreed, however, to abandon particularly the reservation mentioned so as to bring about a simplification of the entire branch of working, and also enable all the firms to co-operate in the financing, and consequently in the financial results.

The scheme contemplates the doubling of their ordinary share capital by the three large firms at Leverkusen, Ludwigshafen, and Höchst by the issue of new shares; and the five other firms will also increase their capital in proportion to their percentage in the profits of the community. In addition each of the works will make an issue of preference shares to the extent of 40 per cent. of the amount of the increase in the ordinary capital. In this connection the directors of the Farbenfabriken vorm. Fried. Bayer and Co., of Leverkusen, announce that they

have decided, at an extraordinary meeting to be held on November 15, to recommend an increase in the ordinary capital by 90,000,000 marks, and in the preference capital by 72,000,000 marks. The ordinary shares, which will be entitled to participate in the results from January 1, 1920, will be taken over by a banking syndicate, and then will be offered to the shareholders. The preference shares are to be issued as "vinculum" registered shares, and to bear a preference interest at the rate of $3\frac{1}{2}$ per cent., and they will be taken over by the other firms in the community at the nominal value and be paid in cash to the extent of 25 per cent. The funds resulting to the companies by the issue of ordinary shares will serve to strengthen the working capital and to complete the Badische company's works at Oppau and Merseburg. On the other hand the Bayer Company states that the object of preference shares, which will not yield new capital to the community, is to serve the purpose of drawing closer together the bonds which connect the community, and thereby strengthen their competitive capability in the markets of the world.

The other two big companies which also have an ordinary share capital of 90,000,000 marks, are on the point of issuing similar statements. As far as concerns the remainder, the Chemische Fabrik Griesheim-Elektron has already convened a meeting for the same day, when a proposal will be submitted to raise the ordinary capital by 20,000,000 marks, and the preference by 18,000,000 marks, so that the total capital will be brought up to 63,000,000 marks. In the case of the Chemische Fabriken vorm. Weiler-ter-Meer the augmentation in the capital is to be 6,240,000 marks in ordinary and 6,656,000 in preference shares; and the other firms concerned are about to issue their proposals for raising further capital.

It is expected that all the new ordinary shares will be issued at the price of 107 per cent. It is intended to raise the capital, on account of the large amounts involved, in instalments in November or December, 1919, and in July and October, 1920.

SYNTHETIC NITRATES.

WHILE there is constant speculation going on in regard to the position and proportions of the synthetic nitrate industry in Germany, it is surprising how little attention is paid to the Norwegian developments in this direction. Thanks to the filip given to the enterprise by the war, it is understood that the Norwegian supplies of synthetic nitrate, manufactured by the electric-arc process, now reach an annual output of 150,000 to 200,000 tons. It is further known that plans are well advanced for harnessing more power and considerably augmenting the 300,000 to 350,000 H.P. which are at present used *in toto* at the works situated at Notodden and Rjukan.

The suggestion which is sometimes made that the artificial substances are not so valuable as the "real" ones is grossly misleading to the uninitiated. The products in question are really characterised by a high degree of purity. The Norwegian nitrate of soda, for example, is ordinarily of 96-98 per cent. purity, thus comparing favourably with the Chilean product, while it can be manufactured of approximately 99 per cent. purity. Nitrate of soda also complies with more or less similar standards. Nitrate of ammonia exceeds 99 per cent. in purity, testing about 34.8 per cent. nitrogen, while nitrate of lime is practically 98 per cent. pure, containing 13 per cent. nitrogen.

It may be of further interest to note that nitrate of lime, which has been exhaustively tested in this and other countries, has proved on the average of all the tests at least equal in efficiency, nitrogen for nitrogen, to the Chilean nitrate of soda. The proportion of lime which it leaves in the soil after the removal of the nitrate by the crop gives it an obvious additional value on soils poor in lime, and on heavy soils where the maintenance of a satisfactory tilth is an important factor.

Nitrate of ammonia by virtue of its high nitrogen content offers considerable attractions for export purposes, where freight is now the vital consideration. The field tests in this country conclusively show that its nitrogen is equally as efficient as that of the other high-grade nitrogenous fertilisers. The presence of practically one-half of its total nitrogen as ammonia is an important feature of nitrate of ammonia, rendering it a more gradually available source of nitrogen than a wholly nitrate product, and thus better adapted for certain crops and soils.

THE STRUCTURE OF COLLOIDS.

SOME time ago we described, says *Engineering*, how Debye and Scherrer had successfully applied Röntgen-ray examination to the study of the structure of crystalline and amorphous substances, in particular of graphite and amorphous carbon. That this X-ray examination was not limited to the investigation of the structure of crystals had indeed been demonstrated by M. von Laue and his collaborators in their first original researches.

In the *Nachrichten der Gesellschaft für Wissenschaften*, Göttingen, of last year (available so far in abstract only), P. Scherrer has extended the method to the examination of the structure of colloids, both organic and inorganic. The colloidal particle may or may not have a crystalline structure. In the former case the X-ray examination should yield interference bands arranged in a manner characteristic of the space lattice; the positions of the bands would not depend upon the size of the particles, but the breadth of the bands would depend upon the size. In the latter case, in the absence of a crystalline structure, there would be no distinct bands, only one or several maxima of interference in the region of the incident ray, and the interpretation of the observations, always a matter of difficulty, would be more intricate.

Examining colloidal gold and silver, Scherrer concludes that the particles are distinctly crystalline, and that they fit into the same space lattice as the microscopic crystals similarly studied; the deduced sizes of the particles, moreover, agree with those determined by other methods, with the aid of the ultramicroscope or of osmotic pressure measurements. Even the smallest gold particles, no longer discernible by the ultramicroscope, seemed to have the same space lattice. The gels of silica (and also of stannic acid), former experiments had proved, undergo structural changes in the course of time; the aged specimens now examined show the characteristics both of amorphous and of crystalline particles, and in such gels crystallisation is evidently proceeding. Typical organic colloids, such as albumen, casein, gelatine, starch, cellulose, on the other hand, appear to be truly amorphous, and their colloidal particles probably consist of individual molecules or of groups of irregularly orientated molecules.

PROPOSED AMENDMENTS TO TRADE MARKS LAW.

THE Association of British Chambers of Commerce have issued a statement showing the supplementary amendments to the Trade Marks Bill put forward by the Executive Council of the Associated Chambers. The Special Committee of the Associated Chambers met on October 15 and unanimously recommended amendments intended to ensure, for the more efficient protection of holders of trade marks, that a search for similarity shall be made before a mark is registered in Part B, the proposed new section of the register formed to facilitate the registration of British trade marks in other countries.

Other amendments proposed relate to trade marks of chemical substances and to the admission of documents of title as legal evidence, while a proposed new clause, to be added to the Bill after Clause 11, would enact that when considering applications for the registration of trade marks, or oppositions to trade marks, the Registrar may have regard to the possibility of confusion arising not only in the United Kingdom, but also outside the United Kingdom. It is pointed out that some of the reasons why a search ought to be made are that nearly all countries have a search for similarity; if there is no search, all registered holders will have to keep a look-out every week on the *Trade Marks Journal*, because opposition is their only defence; that it would be better for the applicant for a B trade mark that a search should be instituted, because otherwise he might find his mark registered, and then be faced with a lawsuit; if a mark is registered in Part B, which is identical or very similar to one in Part A, then infringement is practically legalised; a great many marks are registered in England by traders in the United States, and there are several other complications which might follow the omission of a search.

With regard to chemical substances, it is pointed out that in Clause 6 (2) of the Bill the words "any single chemical substance" are very vague, and it is thought that a person who obtains a word trade mark for a chemical substance ought not to suffer forfeiture of that trade mark unless he uses it in such a way as to prevent the public from being able to call the chemical substance by any other name.

The President of the Board of Trade announces that he has appointed a committee to consider:—(1) Whether any extension or amendment of the Merchandise Marks Act is required in respect of the provisions relating to indications of origin; (2) the utility and effect of national trade "marks" or other similar (collective) marks, and how far they should be authorised or encouraged in this country; (3) how far further international action may be necessary for the purpose of preventing the false marking of goods. The secretary is Mr. M. F. Levey, of the Industrial Property Department of the Board of Trade, and all communications on the subject of the committee should be addressed to him at the Patent Office, 25, Southampton Buildings, W.C. 2.

FLAMELESS POWDER.—At a recent meeting of the French Academy of Sciences in Paris, M. Depech gave an account of experiments on the effect of adding charcoal, vaseline, and other substances to propellant explosive from the point of view of producing a flameless explosion at the gun. Vaseline and heavy petroleum oil proved to be the most effective, provided that suitable additions to the weight of the charge were made to make up for the addition of the non-explosive material.

BRITISH OVERSEAS CHEMICAL TRADE IN 1918.

(Continued from page 449.)

WE give below extracts from the annual statement, just issued, of the trade of the United Kingdom with foreign countries and British Possessions in 1918, compiled by the Customs and Excise Department. The figures relating to the chemical and allied trades will be found much more useful than those given in the monthly Board of Trade returns, owing to the detailed analysis of the countries of origin of imported, and the destinations of exported, chemical products. Each product is specified separately, together with the extent of the trade done with the more important countries, the corresponding figures for 1917 being in parentheses.

EXPORTS.

Muriate of Ammonia.—Russia, — (2,662cwt.); Sweden, — (19cwt.); France, 16,020cwt. (14,743cwt.); Spain, 347cwt. (1,995cwt.); Italy, 5,199cwt. (7,977cwt.); Turkey, 40cwt. (70cwt.); Japan, 75cwt. (6,941cwt.); United States, 2,269cwt. (19,684cwt.); other foreign countries, 4,166cwt. (5,368cwt.); Egypt, 6,779cwt. (3,929cwt.); British India, 4,983cwt. (11,324cwt.); Australia, 1,167cwt. (1,466cwt.); Canada, 1,734cwt. (3,887cwt.); other British Possessions, 1,427cwt. (4,459cwt.); total, 44,206cwt. (84,524cwt.).

Saltpetre (Nitrate of Potash), British Prepared.—Denmark, — (160cwt.); Portugal, 2,282cwt. (257cwt.); Italy, 400cwt. (1,403cwt.); Brazil, 3,416cwt. (748cwt.); Argentine Republic, 7,802cwt. (5,261cwt.); other foreign countries, 365cwt. (691cwt.); Australia, 22cwt. (262cwt.); other British Possessions, 2,169cwt. (1,153cwt.); total, 16,456cwt. (9,935cwt.).

Chromate and Bichromate of Potash.—France, 8cwt. (1cwt.); other foreign countries, 19cwt. (33cwt.); Egypt, 3,186cwt. (3,407cwt.); British East Indies, 587cwt. (3,786cwt.); Australia, 73cwt. (134cwt.); Canada, 139cwt. (158cwt.); other British Possessions, 322cwt. (259cwt.); total, 4,334cwt. (7,778cwt.).

Potash Compounds, Other Sorts.—Russia, — (£7,884.); Germany, — (£2,928.); France, £2,578. (—); China, — (£60.); Japan, £10. (£8.); United States, £489. (£1,000.); Brazil, £9,785. (£6,386.); other foreign countries, £3,702. (£3,033.); South Africa, £3,163. (£9,096.); British India, £2,634. (£8,328.); Australia, £4,595. (£4,410.); Canada, £2,064. (£6,080.); other British Possessions, £3,903. (£5,180.); total, £32,923. (£54,393.).

Soda Ash.—Russia, — (41cwt.); Sweden, 1,308cwt. (900cwt.); Norway, 424,301cwt. (364,328cwt.); Netherlands, 107,558cwt. (160,169cwt.); France, 433,472cwt. (305cwt.); Italy, 179,001cwt. (220,642cwt.); Turkey, 900cwt. (400cwt.); China, 192,844cwt. (229,493cwt.); Japan, 506,994cwt. (409,329cwt.); United States, — (8,472cwt.); Brazil, 105,473cwt. (71,879cwt.); Argentine Republic, 212,440cwt. (148,122cwt.); other foreign countries, 70,370cwt. (139,591cwt.); Egypt, 24,895cwt. (22,226cwt.); British South Africa, 36,314cwt. (49,508cwt.); British India, 553,958cwt. (766,891cwt.); Australia, 274,277cwt. (319,778cwt.); New Zealand, 49,126cwt. (38,713cwt.); Canada, 165,258cwt. (220,195cwt.); other British Possessions, 39,659cwt. (34,460cwt.); total, 3,378,148cwt. (3,205,442cwt.).

Soda, Bicarbonate.—France, 51,301cwt. (68,588cwt.); Italy, 40,615cwt. (41,622cwt.); China, 5,079cwt.

(4,159cwt.); Japan, 44,627cwt. (56,304cwt.); Brazil, 7,866cwt. (9,926cwt.); Argentine Republic, 11,081cwt. (25,705cwt.); other foreign countries, 19,305cwt. (36,127cwt.); Egypt, 1,545cwt. (5,150cwt.); British South Africa, 14,432cwt. (10,521cwt.); Bombay (including Karachi), 41,375cwt. (42,048cwt.); Madras, 11,505cwt. (7,894cwt.); Bengal, Assam, Bihar, and Orissa, 33,021cwt. (42,370cwt.); Burmah, 12,153cwt. (14,381cwt.); Western Australia, 3,018cwt. (3,474cwt.); South Australia, 4,699cwt. (3,898cwt.); Victoria, 26,468cwt. (16,994cwt.); New South Wales, 38,786cwt. (41,362cwt.); Queensland, 3,693cwt. (3,793cwt.); Tasmania, — (175cwt.); New Zealand, 21,779cwt. (6,908cwt.); Canada, 18,553cwt. (37,604cwt.); other British Possessions, 27,547cwt. (20,617cwt.); total, 438,848cwt. (499,620cwt.).

Soda, Caustic.—Russia, — (4,393cwt.); Sweden, 301cwt. (—); Norway, 1,969cwt. (9,192cwt.); Netherlands, 32,536cwt. (39,816cwt.); Java, 6,022cwt. (1,355cwt.); France, 39,779cwt. (9,849cwt.); Switzerland, 27,932cwt. (11,116cwt.); Portugal, 11,070cwt. (254cwt.); Italy, 113,604cwt. (178,421cwt.); China, 7,544cwt. (191cwt.); Japan, 11,418cwt. (2,110cwt.); United States, — (21cwt.); Mexico, 603cwt. (—); Chili, 5,119cwt. (639cwt.); Brazil, 64,781cwt. (10,322cwt.); Uruguay, 14,470cwt. (1,683cwt.); Argentine Republic, 46,956cwt. (13,703cwt.); other foreign countries, 19,874cwt. (5,681cwt.); Egypt, 8,815cwt. (14,413cwt.); British South Africa, 59,695cwt. (27,886cwt.); Bombay (including Karachi), 24,861cwt. (34,596cwt.); Madras, 6,404cwt. (5,997cwt.); Bengal, Assam, Bihar, and Orissa, 24,238cwt. (39,997cwt.); Burmah, 1,508cwt. (1,284cwt.); Western Australia, 1,351cwt. (1,369cwt.); South Australia, 2,795cwt. (3,073cwt.); Victoria, 28,190cwt. (10,254cwt.); New South Wales, 46,328cwt. (12,843cwt.); Queensland, 7,594cwt. (1,173cwt.); Tasmania, 101cwt. (16cwt.); New Zealand, 12,984cwt. (4,918cwt.); Canada, 1,994cwt. (20cwt.); other British Possessions, 10,293cwt. (4,922cwt.); total, 641,129cwt. (451,507cwt.).

Sodium Chromate and Bichromate.—France, 53,960cwt. (62,731cwt.); Switzerland, 2,397cwt. (671cwt.); Spain, — (20cwt.); Italy, 7,922cwt. (5,093cwt.); other foreign countries, 1,568cwt. (428cwt.); British India, 7,518cwt. (16,753cwt.); Australia, 6,199cwt. (6,692cwt.); Canada, 1,695cwt. (3,560cwt.); other British Possessions, 434cwt. (1,582cwt.); total, 81,693cwt. (97,530cwt.).

Soda Crystals.—Netherlands, — (10,173cwt.); France, 50cwt. (13,750cwt.); United States, 500cwt. (230cwt.); Chili, — (619cwt.); Argentine Republic, 53cwt. (13,702cwt.); other foreign countries, 528cwt. (5,710cwt.); Malta and Gozo, 1,937cwt. (2,456cwt.); Cape of Good Hope, 36cwt. (2,059cwt.); British India, 1,660cwt. (9,928cwt.); Canada, — (1,952cwt.); other British Possessions, 9,204cwt. (21,524cwt.); total, 13,968cwt. (82,103cwt.).

Soda, Sulphate (Saltcake).—Norway, 157,013cwt. (117,362cwt.); Netherlands, — (21,210cwt.); Spain, — (186cwt.); Italy, 900cwt. (6,000cwt.); Brazil, 125,601cwt. (47,383cwt.); other foreign countries, 5,109cwt. (30,695cwt.); total, 591,427cwt. (414,726cwt.).

Soda Compounds, Other Sorts.—Russia, — (4,853cwt.); Netherlands, 24cwt. (833cwt.); France, 117,307cwt. (43,977cwt.); Switzerland, 21,718cwt. (17,711cwt.); Portugal, 30,657cwt. (27,910cwt.); Spain, 10,179cwt. (19,458cwt.); Italy, 133,182cwt. (150,782cwt.); Greece, 14cwt. (10cwt.); Turkey, —

933cwt. (—); Japan, 14,740cwt. (16,708cwt.); United States, 9,021cwt. (23,038cwt.); Mexico, 11,977cwt. (1,698cwt.); Chili, 8,852cwt. (3,017cwt.); Brazil, 28,188cwt. (21,650cwt.); Argentine Republic, 43,985cwt. (56,255cwt.); other foreign countries, 40,585cwt. (25,458cwt.); Cape of Good Hope, 7,273cwt. (7,161cwt.); Natal, 11,710cwt. (9,286cwt.); British East Indies, 28,660cwt. (50,881cwt.); Australia, 40,854cwt. (38,595cwt.); New Zealand, 17,373cwt. (14,122cwt.); Canada, 10,959cwt. (9,436cwt.); other British Possessions, 18,543cwt. (16,427cwt.); total, 606,734cwt. (559,266cwt.).

Soda Compounds, Total.—Russia, — (9,389cwt., valued at £113,158.); Sweden, 1,610cwt., £1,345. (2,702cwt., £1,596.); Norway, 586,307cwt., £143,722. (498,501cwt., £87,444.); Netherlands, 141,584cwt., £110,033. (241,710cwt., £135,399.); Java, 13,314cwt., £16,060. (14,449cwt., £9,689.); Belgium, — (710cwt., £235.); France, 696,609cwt., £641,037. (199,200cwt., £278,843.); Portugal, 49,174cwt., £49,220. (31,870cwt., £17,967.); Spain, 10,673cwt., £15,150. (20,041cwt., £17,178.); Italy, 475,503cwt., £446,462. (604,344cwt., £499,453.); Roumania, — (403cwt., £358.); Turkey, 2,113cwt., £1,250. (550cwt., £417.); China, 220,702cwt., £69,632. (240,181cwt., £67,688.); Japan, 577,784cwt., £182,886. (484,490cwt., £144,523.); United States, 10,312cwt., £49,695. (55,650cwt., £36,471.); Mexico, 21,555cwt., £13,285. (2,117cwt., £772.); Chili, 36,683cwt., £23,311. (21,450cwt., £9,670.); Brazil, 331,909cwt., £211,527. (161,546cwt., £73,072.); Uruguay, 47,161cwt., £36,028. (30,598cwt., £13,688.); Argentine Republic, 316,159cwt., £183,243. (257,714cwt., £119,415.); other foreign countries, 106,724cwt., £179,500. (156,554cwt., £104,454.); South Africa, 131,944cwt., £154,111. (111,372cwt., £77,835.); Bombay (including Karachi), 228,249cwt., £134,124. (259,974cwt., £181,753.); Madras, 73,059cwt., £38,661. (53,213cwt., £50,975.); Bengal, Assam, Bihar, and Orissa, 389,342cwt., £139,216. (668,402cwt., £223,782.); Burmah, 45,692cwt., £17,226. (36,201cwt., £13,446.); Western Australia, 11,970cwt., £7,513. (12981cwt., £5,445.); South Australia, 29,967cwt., £14,375. (30,183cwt., £10,784.); Victoria, 184,699cwt., £122,598. (183,554cwt., £79,456.); New South Wales, 229,873cwt., £147,204. (203,282cwt., £79,651.); Queensland, 27,709cwt., £20,539. (33,203cwt., £12,063.); Tasmania, 1,559cwt., £720. (1,262cwt., £479.); New Zealand, 101,497cwt., £63,521. (65,865cwt., £33,650.); Canada, 499,042cwt., £119,040. (462,923cwt., £106,672.); other British Possessions, 151,469cwt., £124,668. (153,610cwt., £124,473.); total, 5,751,947cwt., £3,476,902. (5,310,194cwt., £2,631,954.).

Sulphuric Acid.—Switzerland, 11,166cwt. (12,609cwt.); other foreign countries, 1,583cwt. (660cwt.); Egypt, 5,053cwt. (757cwt.); Bombay (including Karachi), 23cwt. (78cwt.); Madras, 2cwt. (8cwt.); Bengal, Assam, Bihar, and Orissa, 41cwt. (227cwt.); Burmah, — (38cwt.); other British Possessions, 4,863cwt. (6,270cwt.); total, 22,731cwt. (20,647cwt.).

Tartaric Acid.—Russia, — (1,136cwt.); Netherlands, 16cwt. (501cwt.); Spain, — (755cwt.); Japan, 20cwt. (1,123cwt.); United States, 40cwt. (1,106cwt.); Argentine Republic, — (2,301cwt.); other foreign countries, 204cwt. (915cwt.); Australia, 1,183cwt. (6,065cwt.); Canada, 447cwt. (1,982cwt.); other British Possessions, 1,105cwt. (1,550cwt.); total, 3,015cwt. (17,434cwt.).

Chemicals and Chemical Preparations, Unenumerated.—Russia, — (£288,635.); Sweden, £4,576. (£12,885.); Norway, £209,286. (£151,274.); Denmark, £8,563. (£15,265.); Netherlands, £16,617. (£61,027.); Belgium, £21. (£13.); France, £668,584. (£674,724.); Portugal, £30,716. (£25,201.); Portuguese East Africa, £952. (£3,530.); Spain, £80,497. (£58,192.); Italy, £1,036,971. (£299,521.); Turkey, £975. (£251.); China, £16,419. (£23,407.); Japan, £100,396. (£162,731.); United States, £109,483. (£128,406.); Mexico, £2,456. (£892.); Chili, £3,406. (£8,118.); Brazil, £40,620. (£28,318.); Uruguay, £1,397. (£769.); Argentine Republic, £53,182. (£46,877.); other foreign countries, £88,500. (£90,398.); Egypt, £27,444. (£20,214.); Cape of Good Hope, £78,005. (£30,543.); Natal, £43,476. (£24,651.); Transvaal, £67,080. (£21,377.); Bombay (including Karachi), £191,680. (£280,738.); Madras, £17,207. (£12,369.); Bengal, Assam, Bihar, and Orissa, £38,733. (£37,839.); Burmah, £14,320. (£17,936.); Straits Settlements, £17,580. (£13,261.); Hong Kong, £7,395. (£5,424.); Western Australia, £9,994. (£14,046.); South Australia, £14,304. (£8,124.); Victoria, £79,161. (£70,617.); New South Wales, £104,108. (£79,457.); Queensland, £19,928. (£19,438.); Tasmania, £545. (£669.); New Zealand, £50,977. (£48,584.); Canada, £55,218. (£46,747.); British West Indies, £14,249. (£13,960.); other British Possessions, £49,013. (£52,749.); total, £3,374,034. (£2,899,177.).

Chemicals, Etc., Total.—Russia, — (£952,807.); Sweden, £12,071. (£28,002.); Norway, £412,768. (£412,677.); Denmark, £9,025. (£58,532.); Netherlands, £202,342. (£272,472.); Java, £29,064. (£27,760.); Belgium, £21. (£248.); France, £5,814,228. (£4,944,366.); Portugal, £256,727. (£149,244.); Portuguese East Africa, £22,022. (£28,603.); Italy, £2,011,898. (£1,435,152.); Spain, £318,868. (£145,967.); Greece, £35,162. (£532.); Roumania, — (£855.); Turkey, £3,208. (£1,417.); China, £105,560. (£106,822.); Japan, £633,868. (£465,399.); United States, £506,961. (£663,407.); Cuba, £13,375. (£5,808.); Mexico, £216,614. (£142,747.); Chili, £71,813. (£40,071.); Brazil, £433,237. (£232,206.); Uruguay, £61,830. (£28,912.); Argentine Republic, £526,092. (£382,665.); other foreign countries, £1,156,151. (£941,736.); Egypt, £257,894. (£170,264.); British West Africa, £39,112. (£53,599.); Cape of Good Hope, £318,684. (£301,495.); Natal, £277,060. (£232,464.); Orange Free State, £1,451. (£1,330.); Transvaal, £565,065. (£604,690.); Bombay (including Karachi), £670,867. (£928,345.); Madras, £128,176. (£143,998.); Bengal, Assam, Bihar, and Orissa, £293,268. (£395,708.); Burmah, £44,647. (£48,548.); West Australia, £116,464. (£132,198.); South Australia, £36,032. (£33,325.); Victoria, £336,624. (£306,724.); New South Wales, £334,160. (£286,542.); Queensland, £59,944. (£53,335.); Tasmania, £4,564. (£4,858.); New Zealand, £252,333. (£209,536.); Canada, £370,565. (£416,355.); other British Possessions, £328,898. (£321,849.); total, £17,288,713. (£16,113,570.).

China Clay.—Netherlands, 1,056 tons (4,526 tons); France, 37,766 tons (29,436 tons); Italy, 8,288 tons (15,253 tons); United States, 152,383 tons (213,851 tons); other foreign countries, 6,211 tons (8,557 tons); British India, 20,264 tons (25,903 tons); Canada, 6,365 tons (13,016 tons); other British Possessions, 131 tons (208 tons); total, 232,464 tons (310,750 tons).

(To be concluded.)

CHEMICAL WORKS LAYOUT.

AT the College of Technology, Manchester, on Tuesday, the second and concluding lecture was given by Mr. John Allan on "Site, Layout, and Construction of Chemical Plant." The first lecture, which was reported in our last issue, was devoted to a careful consideration of the conditions which influence the choice of a suitable site for the erection of a chemical works. The present lecture was concerned chiefly with the gravitation and level-flow systems of arranging the processes used, the former having the great advantage of requiring a considerably smaller ground area for the necessary buildings. Where the primary raw materials employed in the process were in liquid form, or in the form of solutions, the gravitation-flow system was well suited, as the materials could be easily transported to the top storey of the building, and permitted to pass by gravitation for treatment in the different stages of manufacture. Such a system of flow was less suitable than the level-flow system if the raw materials were of a heavy nature, if the process of manufacture was complicated and involved, or if the materials in passing through the process were subjected to much handling. Moreover, where large units of plant were required, as was the case in many processes employed in chemical works, the level flow system was essential. In arranging the layout of a chemical works very great facility was offered where only one product was being made, and as an illustration of this, Mr. Allan described in detail the layout of a plant for the extraction of aluminium oxide from bauxite. Where the operations were more complicated, and a series of processes was being carried out, as in the manufacture of dyes and the like, the layout of the works was a much more difficult matter. In concluding his lecture, Mr. Allan referred to the means to be adopted for conducting water, steam, etc., through the works. The mains should be easily accessible, and should be carried either alongside the walls, supported by brackets, or along bridges. Leakage of material could then be discovered at once.

EXPORT LICENCES FOR OIL-SEEDS.

THE Colonial Office has made it known that the Governments of Nigeria, the Gold Coast, Sierra Leone, and the Gambia have been requested, at the instance of the Food Controller, to prohibit the exportation from those colonies during the next few months to all destinations outside the British Empire of palm kernels, ground nuts, and copra, but to issue export licences to all exporters of those articles to the United Kingdom who apply for them on the following basis:—

(a) The licence to be transferable by the holder if desired, and to authorise the exportation to any country outside the British Empire to which goods may lawfully be exported of a fixed proportion of the amount of the article which that exporter has shipped to the United Kingdom.

(b) The proportions to be:—Palm kernels, a licence for 10 tons for every 90 tons shipped to the United Kingdom; ground nuts, a licence for 20 tons for every 100 tons shipped to the United Kingdom; copra, a licence for 100 tons for every 100 tons shipped to the United Kingdom.

It has been left to the discretion of the colonial Governments whether they should adopt the above arrangements as regards ground nuts pending receipt of information as to whether the Indian Government intend to impose

restrictions on the exportation to destinations outside the Empire of Indian ground nuts. When the above-mentioned export prohibitions have been imposed, other oil-seeds and oleaginous nuts, seeds, and products (with the possible exception of palm kernel oil) will be freed from export prohibitions in the British West African colonies and protectorates.

Under these arrangements the granting of export licences to exporters will be entirely a matter for the colonial Government, to whom all applications should be addressed.

STANDARDISATION OF ZINC CONTRACTS.

H.M. ACTING COMMERCIAL SECRETARY at Washington states that a movement has been started by the American Zinc Institute to establish a uniform standard contract on zinc sales. It is pointed out that the immediate object of the contract is the necessity to have covered in the contract the date by which shipping instructions must be given for the month's deliveries. Of late, it has been said, a great deal of trouble was caused by buyers not sending shipping directions during the month. The contract called for delivery to be made, and in consequence some sellers have claimed by such a failure that the buyer has forfeited his right to receive the metal.

The American Zinc Institute suggests that the most explicit form of contract is that which is used by the American Metal Company, and which, in part, reads as follows:

Quantities for which specifications have not been received by the 10th of the month during which shipment is to be made, are to be forwarded only as soon as convenient to the sellers after receipt of such specifications.

Subject to strikes, fires, floods, wars, delays in transportation, and all other causes beyond the control of either party; this contract to be deemed suspended so long as such causes prevent or delay its execution.

Each shipment to be considered a separate sale. Payment to be made in New York Exchange, and, if not made in accordance with the terms herein, sellers have the option of cancelling all undelivered quantities.

The secretary of the Institute, in drawing the attention of the various members of the Zinc Institute to the proposed standard form of contract, points out that it is needless to relate the great advantages that would result through having a single form of contract used through the zinc trade, in which buyers' and sellers' rights are distinctly set forth, and would prevent numerous misunderstandings and arguments that occur at present, and would further be in line with standardising and stabilising the industry.

It is also pointed out that the contract should contain:

(1) An analysis of the different grades of zinc.
(2) It should state the tons, unless stated to the contrary, to be 2,000 pounds each.

(3) It should state within what period of time the zinc would have to be shipped if sold for prompt shipment.

(4) By what date shipping instructions should be given for shipments to be made during that month, and in that connection the 20th day of the month is deemed suitable for zinc. (On copper contracts shipping instructions and specifications must be in by the 10th day, as copper has to be made up in special

forms, and therefore it is pointed out it is necessary to receive instructions earlier than in the case of zinc.)

(5) It should carry a strike clause, covering not only strikes, but all other contingencies beyond the seller's control.

(6) The payments should be made payable in New York Exchange or its equivalent.

SOCIETY OF CHEMICAL INDUSTRY.

NEWCASTLE-ON-TYNE SECTION.

THE first meeting of the winter session of the above section was held on Monday in the Armstrong College, Professor Bedson presiding. An address was given by Professor W. A. Bone, F.R.S., on the

"British Association Fuel Economy Committee's Second Report."

Professor Henry Louis opened the discussion by remarking that he was in rather an awkward position in discussing a report to which he was a party. The broad conclusion that production was falling off was one they could not get away from. The reasons were many and complex. Personally, he considered that the Minimum Wage Act had had a serious effect on output. It had been described by a North-country miner as: "The minimum wage is what you get for going down, and if you want more you have to work for it." That Act, coupled with the recent rises in wages, had had an effect on output. It was not that the men were not capable of working, or that our seams were being rapidly exhausted. Until the present minimum wage system was remedied we were not likely to do much better. The outlook was exceedingly grave. We were faced with a gradual diminution of output because we were the oldest coal-producing country, with the result that our best and easiest worked seams were being worked out, and we had to work thinner and poorer seams. He thought Professor Bone had suggested that output could be increased by the use of more machinery, as in America. He (Professor Louis) did not believe it. He believed there were very few places in the country where coal-cutting machinery might be introduced in which it was not already in operation to-day. The only thing was to get a healthy feeling among the coal-producers; to get the coal-producers to see that it was to their advantage, and to the advantage of the nation at large, that they should do as much as possible instead of as little as possible. To increase the output and economise on the product were the two great coal problems they had got to solve.

Dr. J. T. Dunn said he agreed with Professor Bone on decentralisation, and held that whatever Government money was spent on research should not be confined to the central official organisation. He believed that Professor Bone had spoken wisely in saying that all the technical knowledge of the country ought to be brought to bear on the fundamental investigation of the constituents of coal and a survey of the whole coalfield of the country. He did not think that a central body could hope to get the work done—that was, a practical survey of every coal seam in the kingdom. A great deal of investigation was necessary before the recommendations of the Fuel Board should be carried out.

Mr. T. Hardie said if one industry was dealing economically with coal it was the gas industry. It seemed to him an extraordinary thing that a committee of scientific gentlemen, after four years in which gas undertakings had supplied gas of all qualities which had shown no signs of danger in using and which had been reasonably usable, should suggest restrictions upon gas

managers based upon what they themselves put forward as a national policy.

Dr. J. E. Paterson said that he could not speak as a gas engineer, but, in common with all chemists, he had felt badly handicapped by want of knowledge of our own coal. It was almost impossible to go to buying departments and ask for certain coal because it was most suitable for a certain purpose, because they did not yet know sufficient about it. He felt the necessity for a long and exhaustive research on the fundamental properties of coal. That centralisation in investigation was a mistake he was certain. Different points of view were very necessary in arriving at the truth.

DYESTUFFS SUPPLIES.

IN reply to their letter to the Board of Trade urging that steps should be taken to secure an adequate supply of dyewares for the woollen and other industries, the Batley and Birstall Chamber of Commerce have received a letter from the Board, which says:—"The Board fully appreciate the necessity for securing a supply of such essential dyestuffs as are unobtainable in sufficient quantities from British sources of manufacture, and with this object in view are making arrangements, which it is hoped will be completed in the near future, for securing an interim supply of such dyestuffs from Germany under the terms of the peace treaty. An announcement as to these dyestuffs and the manner in which they will be available to consumers will shortly be made."

At Wednesday's meeting in London of the Associated Chambers of Commerce, the following resolution was moved by the Dewsbury Chamber, and seconded by Batley and Birstall:—"That this Chamber demands the immediate removal of all restrictions on the introduction of dyestuffs and the abolition of the Licensing Sub-Committee appointed by the Board of Trade to control such imports; or representation on such committee of smaller manufacturers, of merchants, and of the independent consumers."

The Select Committee on High Prices and Profits met on October 23 to consider what further action should be taken.

According to the London correspondent of the *Manchester Guardian* Major Barnes intimated his desire to secure from Sir Auckland Geddes an explanation of the contradiction that apparently exists between the statement made by him when giving evidence before the Select Committee that the Government had, when taking shares in the British Dyestuffs Corporation to the amount of £1,700,000., attached a provision limiting the profits of the company, and the fact that no such provision appears on the prospectus of the British Dyestuffs Corporation.

What seems to have taken place is that an agreement was made between the Board of Trade and the British Dyestuffs Corporation by which the Government undertook to lend the company £1,700,000., the loan being secured by a debenture and accompanied by a restriction of the dividend to 8 per cent. For some reason or other this agreement, after being duly completed by all the parties and ratified by the company, was set aside and the money applied to the purchase of shares in the company, such purchase having no conditions limiting dividends attached to it. There is clearly some discrepancy between the statements made by Sir Auckland Geddes in his evidence and the facts ascertained, and it would be interesting to learn what explanation Sir Auckland Geddes has to give.

ITEMS OF INTEREST.

BOGUS SUBSTITUTE FOR OLIVE OIL.—For selling an olive oil substitute which on analysis was found to be refined paraffin artificially coloured with an organic dye, a grocer at Fakenham, Norfolk, was fined £5.

IMPORTS OF FERTILISERS INTO FINLAND.—The Finnish Commercial Attaché in London has notified the Board of Trade that the restrictions on the importation of fertilisers into Finland have been removed.

DUTCH OIL AND SOAP INDUSTRIES.—We learn that the Dutch periodical *Olie en Vetten*, a technical and economic weekly for the Netherlands and Colonies, will be considerably enlarged with respect to information concerning oil, fat, soap, paints, and allied products.

SALE OF THE LATE SIR WILLIAM CROOKES' LIBRARY. As will be seen from our advertisement columns, Messrs. Hodgson and Co., of 116, Chancery Lane, London, W.C., will sell by auction on Thursday and Friday, November 13 and 14, the valuable and extensive library of the late Sir William Crookes, O.M., F.R.S.

RHODESIA MINERAL OUTPUT.—The British South Africa Company announces the following mineral output from Southern Rhodesia during September:—Gold, 53,021oz.; silver, 13,632oz.; coal, 43,139 tons; chrome ore, 1,816 tons; copper, 253 tons; asbestos, 934 tons; arsenic, 18 tons; diamonds, 31 carats. The number of producers is 142 and the value of the gold produced £223,719.

SPECIFIC GRAVITY OF ETHYLENE.—There have been great doubts as to the specific gravity of ethylene gas. The figures obtained by different experimenters have differed considerably from one another. M. T. Batuceas has determined it afresh, and found a new value 0.9749 times the specific gravity of air. This figure brings out the atomic weight of carbon as 11.996, 11.999, 12.005, or an average of 12.000.—*Gas World*.

INDIA AND AMERICAN DYES.—Representations made by the American Chamber of Commerce in London have resulted in the Government of India instructing their Customs officers to admit freely into India prohibited dyes and dyestuffs ordered before September 6 from other than ex-enemy countries, and shipped before January 1 next. The Australian Government, a few months ago, granted a period of grace amounting to 3½ months.

POTASH RECOVERY FROM CEMENT DUST.—Several Portland cement factories in the United States which have installed plant for the recovery of potash from their flue dust are said to have recouped the capital costs during the first year of working. In 1917, about 45 per cent. of the total production of potash was derived from brines, about 10 per cent. from kelp, nearly 9 per cent. from charred molasses residues, and about 5 per cent. from cement mills. Cement mill production of potash in 1918 was equivalent to 1,429 tons of pure potassium oxide.

GERMAN TAR INDUSTRY AND PEACE CONDITIONS.—The Tar Producers' Union in Germany writes to the *Kölnische Zeitung* that according to the peace treaty Germany must deliver 50,000 tons of coal-tar a year to the Entente countries. On the top of this it is probable that as a consequence of transfer of territory a considerable percentage of German coal-production, and therewith tar-production, will fall short. That means that owing to the small production of coal there will be a great decline in the production of tar. The German tar industry is not in a position to supply the inland requirements in tar products. The economic use of the quantities of tar still available is therefore an absolute necessity, along with a concurrent increase in the production of tar.

ASBESTOS PRODUCTION IN QUEBEC.—According to the report of the Quebec Bureau of Mines the production of asbestos in the province reached a new high record in 1918, and the industry is in a highly prosperous state. Both the tonnage and the value of the product exceeded all previous records. Asbestos in the shape of "crude" and "mill-stock," was shipped to the amount of 142,375 short tons, to which is to be added 16,850 tons of "asbestic," a by-product of low price, or in all a total tonnage of 159,225. The value of the asbestos proper was \$9,019,899., or with the "asbestic" \$9,053,945. As compared with the previous year's figures, 154,452 tons valued at \$7,240,697., this shows an increase of 4,773 tons, or 3.1 per cent. in quantity, and \$1,779,202., or 24.5 per cent. in value.

DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH.—Sir Henry Alexander Miers, D.Sc., F.R.S., Vice-Chancellor of the University of Manchester, has been appointed by an Order of Council dated October 16, 1919, to be a member of the Advisory Council to the Committee of the Privy Council for Scientific and Industrial Research.

LINSEED AND LINSEED OIL.—The Food Controller has issued an Order withdrawing linseed and linseed oil from the schedule of the Seeds, Oils, and Fats Order, dated June, 1919. The effect of this Order, which came into force on October 27, is that licences issued under the authority of the Food Controller will no longer be required to purchase or sell either linseed or linseed oil.

BUSINESS NOTICE.—Messrs. William and John Marvel, of Manchester, along with a few friends, have acquired a suitable works at Mossley, near Manchester, and have there commenced, under the name of the Mossley Color and Chemical Company Limited, the manufacture of all kinds of colours and pigments for the paint, paper, linoleum, and allied trades. The most up-to-date plant has been acquired. This country before the war was mostly dependent for these colours and pigments on supplies from Germany.

NEW INSULATING MATERIAL.—A new product suitable for use in electrical insulation is being obtained from the treatment of kelp in Australia, says *Engineering*. The moist precipitate is subjected to pressure and formed under pressure, after which it is hardened by treatment with formalin. The finished article is made by turning on the lathe, a process which is said to be perfectly successful, and a high polish is applied. The raw product is to be found in large quantities round the coast of Australia, and in particular on the Tasmanian shores.

FIRE.—From an unknown cause, there was a serious outbreak of fire on Wednesday, October 22, on the premises of Messrs. W. J. Bush and Co., Ltd., Manufacturing chemists, of Ash Grove, Hackney. The official description is as follows: "A brick building of one floor, about 60ft. by 20ft., used as a distilling-room, and the contents, damaged by fire, heat, smoke, water, and breakage. Richard Hampshire, aged 29; Walter Whaymand, aged 31 years; John Henry Hull, aged 27 years; and Thos. Wm. Arnold, aged 21 years, all severely burned and taken to hospital."

JAPANESE PATENT LAW.—According to a report published in the *Osaka Asahi*, the Japanese Government have established a committee for the revision of the patent laws under the chairmanship of Mr. Inuzuka, the Vice-Minister of the Department of Agriculture and Commerce. Three business men will have seats on this committee, which is to meet shortly at the Department of Agriculture and Commerce in order to prepare a Bill for the next session of the Diet. The four existing patent laws—i.e., patent law, designs law, utility models law, and trademark law—will be revised separately.

SOCIETY OF DYERS AND COLOURISTS.—At a meeting of the Manchester Section of the Society of Dyers and Colourists on Friday of last week, an illuminated address was presented to Mr. W. H. Pennington in appreciation "of the very valuable services rendered as chairman of the Section during the past 23 years." Mr. Pennington, in the course of a short review of his fifty years' association with the dyeing industry, said that the industry owed much to the foremen dyers of half a century ago, who, with their curious methods and mixtures, found glimmerings of scientific truth which they did not understand, although by their efforts and labours they laid the foundations of the scientific basis of the dyer's craft.

ARTIFICIAL COAL FROM SULPHITE-LYE.—At the Greaaaker cellulose mill, near Fredrikstad, Norway, a new method for producing fuel from sulphite-lye has recently been tried, and the result is exceedingly satisfactory. It will in this way be possible to extract surprisingly large quantities of fuel from this lye, which before was thrown into the sea. The mill will in this way obtain much more fuel than it needs for its own wants. For Norway, Sweden, and Finland, the new invention will be of considerable importance, as in this way a large part of the coal fuel which otherwise has to be imported, may be replaced with this artificial fuel. The factory is so far only built up to one-half of its intended size, but will soon be extended. The fuel is produced as a brownish powder, which is burnt in a special kind of oven. The factory and its new method have been the subject of much attention among specialists, and there is an influx of foreign engineers to look at it. The mill mentioned above will, besides fuel for its own use, have considerable quantities for sale.—*Paper Maker*.

CHEMICAL ENGINEERING CLASSES AT BIRMINGHAM.—Chemical engineering classes have been arranged for the winter session at the Birmingham Municipal Technical School. These classes last year were very successful, and the new course will consist of 30 lectures, for which Mr. W. A. Twine, A.M.I.M.E., A.I.C., chemical plant superintendent, Birmingham Corporation Gas Works, will be responsible. He has had a wide experience in chemical engineering and technology; and he makes full use of lantern and blackboard in showing chemical plant and processes. The syllabus is varied and comprehensive.

ZINC AND ZINC DUST PRICES.—Supplies of zinc dust are again very short, and the price of Australian high-grade (88-92 per cent. metallic zinc) has advanced to £75. per ton. A fair amount of atomised zinc dust—i.e., manufactured from virgin spelter—is now being made in this country. Some consumers find this atomised material satisfactory for their purposes, and it is generally obtainable at a few pounds below the price of the Australian "fume" dust. This atomised dust is only saleable when it exceeds 95 per cent. purity. Australian electrolytic zinc (99.95 per cent. purity) is unchanged at £42. per ton f.o.b. Australia for direct shipment to New Zealand, India, South Africa, and the Far East.

"POWERITE" JOINTING.—One of the most important items in the engineer's spares-box is a plentiful supply of gaskets for all joints. Moreover, the gaskets must be made of a reliable material, tested to resist high power, and withstand the action of steam, acid, oil, and alkalis. A dependable joint is a great boon to engineers, and to those to whom this important supply counts so much, the news that "Powerite" jointing is now available will be of great interest. Firms who are experiencing difficulty in obtaining jointing that will last without constant renewing are asked to communicate with the Powerite Steam Jointing Company, Ltd., 6-17, Devonshire Square, London, E.C. The proprietors have installed a large factory at Oakmoor, North Staffs.

CORNISH TIN MINING.—Mr. H. Rich, a director of Tinicroft Mines, Ltd., and Mr. William Thomas, the general manager of the Tinicroft mine, gave evidence on Thursday of last week before the Committee appointed by the Board of Trade to inquire into the non-ferrous mining industry. In their opinion, an amalgamation of the mines in the Central District would be advantageous. Mr. Rich said the Government should make a grant of £1,000,000. for this purpose, and he instanced the advance made by the Government to the Anglo-Persian Oil Company as a precedent. He thought that in view of the services rendered to the country by the Cornish tin-mining industry in the time of national emergency, the sympathy of the Government should assume practical shape in the manner indicated. Mr. W. Thomas gave technical evidence as to the position and prospects of the lodes in this area, and generally concurred with Mr. Rich.

TAR OILS IN GERMANY.—According to Professor H. Grossmann, of Berlin, says the *Technical Review* (quoting from the *Schweizerische-Chemiker Zeitung*) successful attempts have been made during the war to render Germany independent of foreign sources of substances hitherto derived from imported petroleum oil. Large quantities of tar oil were obtained from coal; and it is computed that the annual production of 1,500,000 tons of gas and coke-oven tars should yield some 15,000 tons of such tar oils. The production of tar by the low-temperature distillation of coal and lignites was also undertaken; but no accurate returns as to the quantity produced are yet available. Two principal methods of procedure are employed for obtaining the low-temperature tars. In the one, the distillation of coal is effected at a temperature not exceeding 500° C.: much tar, and little gas and ammonia being obtained. In the other method, which has hitherto been most generally employed, the coal is distilled in generators of various forms; the low-temperature distillates being removed without further subjection to a higher temperature than that of their production. In working-up these tars, large quantities of phenolic substances are obtained; and the utilisation in peace time of these products and of the coke produced is a pressing problem. Possibly Germany may be made entirely independent of imported tar oils by the use of the Bergin process, which renders possible the working-up of tar and tar products, including pitch, into very valuable materials, by subjecting them to the action of hydrogen. It may also be found possible to submit the raw coal or lignite to the action of hydrogen in such a manner that oil and benzene are obtained directly. The solution of this problem will put Germany on an entirely new footing as regards its supplies of combustible material and of power.

THE NEUHAUSEN ALUMINIUM INDUSTRY COMPANY.—Now that the war is over, and Germany is definitely defeated—only under these circumstances, it is well to emphasise,—the German directors forming part of the board of the Aluminium Industrie A.G., of Neuhausen, have retired from the directorate as from October 1, 1919. The withdrawal of these individuals is said to have been prompted by the desire to facilitate the reacquisition of the company's property in France. It will be remembered that the company is financially interested in the Société Française pour l'Industrie de l'Aluminium and the Société Anonyme des Bauxites de Frouée, of Marseilles, the latter producing crude bauxite and the former turning out calcined alumina. Shortly after the beginning of the war both companies were placed under French sequestration, on the ground, as was alleged, of German participation in the Aluminium Industrie A.G. and the presence of German directors on the board. The sequestration still continues at the present time, but negotiations are proceeding with a view to its removal. We know nothing of the real circumstances which dictated the action of the French authorities five years ago, but it is obvious that if the German directors had desired to assist the Neuhausen company in the respect mentioned they would have retired long ago, and not waited until the present time before handing in their resignations, which, after all, may be merely a nominal withdrawal. A catalogue of permitting of a resumption of the former state of affairs when conditions are favourable for the purpose. At the same time, the cause of the Neuhausen company will not have been advanced by the violent attack, evidently made on behalf of the German directors and the German interests in the company, which has just been made by a Frankfort newspaper on the French authorities and the French aluminium industry in connection with the maintenance of the sequestration.—*Elec. Rev.*

OUR BOOKSHELF.

PERFUMES AND COSMETICS. 4th edition. By George William Askinson, Dr. Chem. London: Hodder and Stoughton; 25s. net.

A very reliable book, which will be of material utility to those of our readers who are interested in the preparation of perfumery and cosmetics. "The Aromatic Vegetable Substances," "Chemical Products Employed," and "Operations Involved" are dealt with in lengthy sections. "The Yield of Essential Oils" is a tabulation of considerable importance. Various tables are included which are essential to good results.

KELLY'S DIRECTORY OF THE CHEMICAL INDUSTRIES, 1919. London: Kelly's Directories, Ltd.; £1. 5s.

This book was previously published under the title, "Directory of Chemists and Druggists, Including Manufacturing Chemists Etc." In the main it deals with the wholesale and retail chemists and druggists, etc., of Great Britain and Ireland, and as a compilation of such it is extremely useful. An effort has been made, however, to include the chemical industry, this accounting for the new title. Whilst the information contained about the chemical industry will be of service to retailers generally who require to approach chemical manufacturers from time to time, and *vice versa*, we fear that the new title may mislead many who require a purely industrial or industrial-commercial chemical directory. Pharmacy and pure or applied chemistry should never be incorporated in the same volume under the title used. The old title could not have been improved upon.

THE CONDENSED CHEMICAL DICTIONARY. Compiled by the editorial staff of the Chemical Engineering Catalogue. Publishers: the Chemical Catalogue Company, Inc.; \$5.

In this instance American energy supplies us with a book for which various individuals and firms have frequently searched in vain. The list of chemical items enumerated is very complete, covering both organic and inorganic products. It is obvious that to compress such a list into a volume of 500 pages makes brevity imperative; nevertheless, after taking this into account, it will be found that a very useful amount of working data, descriptive of every item, appears. In the case of synonyms, cross-references are used throughout.

LEGAL INTELLIGENCE.

Contract for the Sale of Permanganate of Potash: Arbitrators' Award.

A case arising out of a contract for the sale of permanganate of potash came before Mr. Justice Roche in the Commercial Court of the King's Bench Division on Tuesday. The plaintiffs, Messrs. Roth Schmidt and Co., of Great St. Helens, London, claimed from Messrs. D. Nagase and Co. Ltd., of Fen Court, London, the sum of £2,086. 8s. 2d., which plaintiffs said was payable to them by defendants pursuant to an award of Messrs. Alexander Pickering and Charles Mangold dated April, 1919.

Matters in dispute between the parties, in relation to a contract of September, 1918, for the sale of about 10,000lb. of permanganate of potash, were referred to the arbitrament and award of Messrs. Pickering and Mangold, and it was further agreed between them, said plaintiffs, that the costs of the reference and award should be in the discretion of the arbitrators. The arbitrators, having heard the parties, awarded that the permanganate of potash delivered by the defendants to the plaintiffs was not in accordance with the contract and that defendants should repay the sum they received from the plaintiffs with interest at the rate of 5 per cent. per annum, together with wharf charges and arbitrators' fees.

Defendants said the alleged award was bad on the face of it, in that it purported to award that defendants should repay the whole of the money received by them in respect of the goods, but did not award that plaintiffs were entitled to reject or return the goods. The award was also bad in that it awarded interest from the date of payment, for which there was no provision in the contract. Further, the award was bad for excess of jurisdiction. The contract was subject to the rules of the London Produce Brokers' Association, but the award was not in accordance with such rules, and the arbitrators, said defendants, had no jurisdiction to award the repayment of the purchase price.

Mr. D. C. Leck, K.C., opened the case for the plaintiffs, and said the claim was for the amount due under an award made on a contract for the sale to the plaintiffs of a quantity of permanganate of potash. Dealing with the points of defence, counsel said he did not know that they were likely to be insisted upon. He ventured to think that many of them were not really points of substance. The contract was subject to the rules and conditions of the General Produce Brokers' Association of London. The difficulty that arose at the hearing by the arbitrators was that the two arbitrators who were appointed by the parties were both members of the association, but neither of the contracting parties was a member of the association, and the committee of the association did not hear appeals except in cases where the parties to the contract were members of the association.

Mr. R. Goddard, for the defendants, submitted that the award was bad, and could not be enforced.

The hearing was adjourned.

On Wednesday Mr. Justice Roche gave judgment. His Lordship said one of the points of defence depended upon the procedure adopted at the arbitration. Defendants said there was an agreement that they should have the right to appeal from the award, and accordingly the award was not a final award which could be sued upon. A discussion took place as to whether the arbitration should be under the special rules of procedure of the General Produce Brokers' Association of London or whether it should be what was known as an open arbitration—that was to say, an arbitration conducted by the ordinary rules of law,—and he was satisfied on the evidence that the discussion really resulted in an agreement that it should be conducted in accordance with the ordinary rules of law. Therefore that defence failed. The next defence was that the award was bad, in that it purported to award the repayment of money, but did not award that plaintiffs were to return the goods. In his judgment, it necessarily followed by way of implication that the goods were to be returned, and that objection failed. The next objection raised was that the award was bad in that it awarded interest to run after the date of the award, and he held that in that respect the award was beyond his jurisdiction, and a small part of the plaintiffs' claim, amounting to £17. 19s. 6d., the plaintiffs could not recover. Dealing with the rest of the defence, his Lordship said he had to consider the point as to whether the contract was subject to the rules of the General Produce Brokers' Association of London. On the face of the written contract

it was said that the contract was to be so subject. He was not satisfied that there was any bargain between the parties that in doing away with the procedure of the General Produce Brokers' Association in regard to arbitration they were to do away with any of the substantive provisions of the produce brokers' rules governing the contract. Nevertheless, the defendants' contention, in his judgment, failed. They had entirely failed to satisfy him that the remedy granted by the rules was exclusive of all other remedies. He found in favour of the plaintiffs, and gave judgment for £2,055. 16s. 8d.

Sequel to a Soap Dispute.

At the London Bankruptcy Court on Tuesday an application was made for the discharge of Pieter Wachter, produce merchant, 47, Mark Lane, London, E.C. 3., and lately residing at 10, Hillsborough Road, East Dulwich, S.E. The Official Receiver reported that the Receiving Order was made on October 27, 1917, on a creditor's petition. Liabilities to rank for dividend were estimated at £254, and the assets were estimated to produce 9s. 2d.

The bankrupt was of Dutch origin and nationality, and about March, 1914, having been a produce merchant at Rotterdam, he came to this country as agent for a Dutch firm and took an office at 5, Duke Street, Tooley Street, S.E., with a capital of about £500. Owing to the war his principals failed, and at the end of July, 1914, he was called up for service in the Dutch Army, in which he held the rank of sergeant. In October, 1914, he obtained leave to come over here and see his wife, but never returned to Holland, so that he was now a deserter from the Dutch Army and unable to return to his own country. By the end of October, 1914, the whole of his capital had been lost on speculations for differences in various goods. He paid those losses, and then commenced business as a produce merchant. His business consisted of the importation of soap, desiccated coconut, and milk powders. He attributed his failure mainly to the adverse result of an action brought by him against Messrs. Grant, Hughes and Co. for damages for the non-delivery of 20 tons of white curd soap. The action was tried on March 5, 1918, and judgment went against him, with the result that the bankruptcy proceedings followed. The Official Receiver reported that the bankrupt's assets were not equal to 10s. in the £. on the amount of his unsecured liabilities; that he had omitted to keep proper books of account, and that he had contributed to his bankruptcy by rash and hazardous speculations.

Eventually the learned Registrar suspended the discharge for two years.

H. R. Merton and Co.'s Action for Slander.

In the King's Bench Division on Friday, October 24, before the Lord Chief Justice, an application to postpone the trial of the slander action brought by H. R. Merton and Co., Ltd., metal brokers, London, against Mr. Hughes, Prime Minister of Australia, was made on behalf of the defendant.

Mr. Stuart Bevan, K.C., for defendant, said the action was for defamation of character and for slander. The statements complained of were made in the summer and autumn of 1918. The first writ was issued in August, 1918, and the second in October of that year. There was an order for discovery; but on June 30, despite the absence of any affidavit of documents, the unusual course was taken of giving notice of trial. On that date Mr. Hughes, who had been in this country on business connected with the Peace Conference, was about to leave for Australia to take up his public duties, and it might have been under these circumstances that the notice of trial was given. The defence to the action was justification. The statements complained of in substance were that the plaintiffs, who were metal brokers, were of German origin and had German associations. Twenty pages of printed particulars had been delivered going into the whole history of the firm and involving very large discovery. There was a second ground on which the application for postponement of the trial was made—namely, the absence of two witnesses. It was decided to get Mr. Hughes to this country for the trial.

Mr. Douglas Hogg, K.C., for the plaintiffs, said he was content that the trial should stand over for a reasonable time, but not that it should stand over indefinitely. This was not an action for slander because the firm was called of German origin. If that had been the slander there would have been no action. The slander the plaintiffs complained of was the statement that, after four years of war, they continued to be working in the interests of Germany and to be agents of the enemy in this country. That was a very serious imputation

to make upon people of very high standing in the City who had been directors.

The Lord Chief Justice said that between now and the beginning of next sittings it would be possible to ascertain from Mr. Hughes when he could come to this country if it was thought necessary for him to be at the trial. The case could be mentioned again at the beginning of next sittings.

Soap Merchant's Failure.

At the London Bankruptcy Court last week, the public examination was appointed to be held of Sarah Alice Duffield and Wynyard Hamilton Ryde Weller, temporary Government clerk, late of 102, Woodside Road, Wood Green, partners in the firm of Lindley Duffield and Co., lately carrying on business at 1, and 2 Great Winchester Street, E.C. Upon the case being called on for hearing the debtor Duffield did not appear, but the Official Receiver said he had received a medical certificate on her behalf stating she was suffering from a nervous breakdown, and he would therefore only be able to examine the debtor Weller.

The joint statement of affairs filed by the debtor Duffield disclosed gross liabilities expected to rank against the estate for dividend estimated at £8,508. 11s. 2d., and assets estimated to produce £50., thus showing a deficiency of £8,458. 11s. 2d.

Replying to questions put by the Official Receiver, Weller stated that after his previous failure in 1915, when his liabilities amounted to £697., he was in employment, and since August, 1918, had been in receipt of a salary of £550. a year in a Government department. On July 1, 1917, he entered into partnership with Sarah Alice Duffield, but he put no capital into the business and was to receive £3. a week for keeping the books and one-half share of the net profits. Finding he could not give the time to the partnership business, he on September 1, 1917, wrote to F. L. Duffield (the manager) tendering his resignation, but took no other steps to dissolve the partnership; thereafter he never attended at the firm's offices, and in his view he ceased to be a partner as from that date, when there were no debts outstanding. Debtor said he did not know anything about an action brought against the company for breach of warranty in connection with a sale of a large quantity of soap, in which the company were ordered to pay £2,840 damages and costs. Debtor was questioned with regard to about 33 tons of soap which was under the control of the company at the termination of the business, and he said he believed the manager, Mr. Duffield, had invoiced that soap to himself at £15. per ton, in lieu of salary. He further stated that he never saw the books of the partnership and had no idea of the extent of the liabilities until the estimate given by his partner was mentioned at the first meeting of creditors.

Eventually the learned registrar concluded the examination of Weller and adjourned the examination of Mrs. Duffield.

Customs Seizure of Pyrogalllic Acid: Chemical Importer's Action.

A motion on behalf of the Crown to stay the Chancery action by Mr. John Brown, trading as Brown and Forth, chemical dealers and importers, of Farringdon Road, E.C., and Dolefield, Bridge Street, Manchester, came before Mr. Justice Sargent in the Chancery Division on Wednesday. The matter had been before the judge in the Vacation Court on a motion for an injunction by the plaintiff to restrain Mr. W. Buckley, Customs and Excise officer at Manchester, from dealing with 5 tons of pyrogalllic acid which he had seized under a Proclamation prohibiting the importation of certain goods under the section of the Customs Regulations Consolidation Act, 1876, dealing with "arms, ammunition, gunpowder, and other goods."

Mr. Giveen, for the Crown, asked for the action to be stayed pending the hearing of the proceedings instituted by the Crown on the revenue side of the King's Bench Division. He said the matter affected very widely the rights and privileges of the Crown. There was in it a substratum of detainee, and the King's Bench Division should be the venue of the trial. In his statement of claim the respondent said that the seizure was invalid and not justified under the Proclamation, and he demanded the delivery of the goods. In the defence it was said that the goods were imported on or about August 19 without any licence, and the defendant

seized them under the Proclamation. An information was filed on the Revenue side of the King's Bench Division, and was delivered on October 22.

Mr. R. A. Wright, K.C., for the respondent, said that since August 29 attempts had been made to have the matter brought to adjudication. The question was very simple, turning merely on the meaning of a particular clause in the Customs Consolidation Act. The plaintiff was a businessman whose operations had been interfered with, and he was not the only businessman in that position. A large part of the mercantile community was being interfered with by administrative acts which, so far as could be seen, were absolutely without justification. He submitted that his lordship had discretion to ensure that there was a speedy trial of the action.

In the end it was agreed that an early day should be fixed for the trial of the action, subject to the convenience of the Attorney-General.

Burnt By Acid: Workman's Compensation Claim.

In the Bow County Court, last week, before Judge Graham, K.C., sitting with Dr. Bate, as medical referee, application was made under the Workmen's Compensation Act, by Henry George David Turner, for an award against Messrs. Abram Lyle and Sons, sugar refiners, of Silvertown.

According to the applicant, on July 4, he was charging iron pipes with char, a kind of bone substance with acid in it, when there was an explosion, and some hot acid and char splashed into his face. He was badly burned on the face and neck, and some of the acid and char went into his eyes. The process was to charge the iron pipes, which were surrounded with furnaces, with this char in a wet form, and it came out dry two floors below. It was used in the process of sugar refining. Applicant said he was paid 25s. a week to July 30, when it was stopped, but he had not been able to work since, whilst his right eye was so bad that everything was a blur.

Dr. Crowley agreed that the lad was not fit to go back to work.

For the defence, Dr. Toogood said he did not believe a word the lad said about his sight; in fact, he had no hesitation in saying it was a lie. The lad was fit to go back to work amongst chemicals in July, and was more fit now. He did not consider that acid on the eyelid would hurt the eye, as the eyelid was there to protect the eye.

Dr. Bate examined the lad, and after a consultation with his Honour Judge Graham decided that he could have worked at the end of July, and found for the respondents, with costs.

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 4, Queen Anne's Gate Buildings, London, S.W. 1, whence, unless otherwise stated, further information may be obtained:—

British West Indies.

A firm of importers in Trinidad are desirous of representing United Kingdom firms as buying agents for cheap paraffin candles, on a commission basis. (Reference No. 883.)

A firm of importers in Trinidad are desirous of representing United Kingdom firms as buying agents for carbonic-acid gas, on a commission basis. (Reference No. 884.)

A firm of importers in Trinidad are desirous of representing United Kingdom firms as buying agents for manures and fertilisers, on a commission basis. (Reference No. 888.)

Italy.

An Italian desires agencies (preferably exclusive for Italy) for British firms dealing in toilet soaps. (Reference No. 896.)

Switzerland.

An agent at Zurich wishes to secure the representation in Switzerland of United Kingdom firms dealing in toilet soap. (Reference No. 902.)

Brazil.

A well-established firm of commission agents in Rio de Janeiro interested in chemicals are desirous of representing British firms in Brazil, and ask for catalogues, samples, prices, etc. (Reference No. 906a.)

THE FUTURE OF THE GAS INDUSTRY.

THE NEED OF THE CHEMIST.

MR. C. CARRINGTON BARBER, the new president of the Midland Junior Gas Association, delivered his presidential address at the opening meeting of the session, which was held at the Council House, Birmingham, on Saturday last.

The question of the conservation of fuel was, he said, of utmost importance. The price had risen considerably, and it behoved all gas engineers to make the fullest use of any class of fuel. Coke dust was for a long time a drug on the market, but a demand had been created for its use by burning it on boilers, the grates being suitably equipped. On the works upon which he was engaged, there had been installed two Babcock and Wilcox boilers, fitted with chain grates for that purpose, and they were working exceedingly well. By their use they were able to burn the whole of the dust made on the works in that manner.

The quality of gas coal had to be considered in respect to the ash content, not only because of its effect on the yield of gas per ton of coal carbonised, and the yield of tar and ammonia, but also because of its effect on the quality of the coke produced. When times became more normal and there was not the excuse of shortage of labour at the collieries, preventing the proper screening and picking of the coal, it would be the duty of gas engineers to insist upon a reasonable ash content. He had known cases in the past two or three years where the ash had been as high as 30 per cent., and generally over 20 per cent. It meant that for every 100 tons of coal carried by the railway companies, between 20 and 30 tons was inert material. Surely it would be the duty of the Government to see that every effort was made to ensure that all coal was properly screened, and thus make available wagons for more useful work.

The process of gas manufacture was a chemical process, and as such the gas engineer should have a sound chemical and physical knowledge in addition to being an engineer. Where the works were sufficiently large a chemist should always be employed. He considered that every works making over one hundred million feet of gas per annum came under that heading. The importance of that could not be emphasised too much, since in the majority of cases he would more than save his salary in a short time. When visiting different gas works, it had been astonishing to him to find in many cases that the engineer had been unable to tell him the quantity of ammonia passing the ammonia washers, or the amount of tar entering the purifiers. Those were details, but it was to a very great extent details that mattered, and much money could be saved if those and other matters which were often considered trivial were given closer attention. It was to their lot as juniors that much of that work devolved, and that was his reason for dwelling on the subject. The whole of the apparatus on the works dealing with the extraction of tar, ammonia, sulphur, etc., should be in the charge of the chemist.

BY-PRODUCT COKING.

AT the opening meeting of the session of the Staffordshire Iron and Steel Institute at Dudley on Saturday, Mr. W. Macfarlane said that during the war period over 1,750 by-product coke-ovens were laid down at a cost of nearly £5,000,000., to which the Ministry of

Munitions contributed £1,250,000. It was anticipated that the total output of coke from these ovens would be about 16½ million tons per annum when the plants were in full operation, approximately a 50 per cent. increase upon the pre-war output. This increase in the production of coke would require 8½ million tons additional coal per annum, representing the labour of 33,000 coal-miners. As far as practicable, all bituminous coals should be subjected to a coking, or semi-coking, process at a comparatively low temperature, so that by-products should not be wasted. If only half of the coal used in Great Britain for manufacturing and domestic purposes were semi-coked there would be a yield of two hundred million gallons of motor-spirit, which was double our pre-war output; two million tons of pitch, half a million tons of ammonium sulphate, and 40 million tons of semi-coke.

If the major portion of the 36 million tons of coal consumed in our homes were previously treated for residuals, even if only partially, there would be a national enrichment, and the air of our cities would be more pure, and sunlight more abundant and active. Alcohol might, for some purposes, be substituted for coal, and would help us a little way towards conserving our reserves. As a substitute for petrol, alcohol had a rival in coal-tar benzene, a product which was certain to be turned out in the future in far larger quantities than was formerly the case. More economic burning of coal would lead to the recovery of more coal-tar products, of which benzene was one of the most important and plentiful. Many experiments had been made on mixtures of alcohol and benzene as a fuel for motors. A mixture of alcohol with 10 per cent. of benzene furnished a cheap motor fuel, costing not more than 6d. per gallon, and utilisable in existing petrol motors with little or no alteration in the carburettor.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

(SPECIALLY CONTRIBUTED.)

There is no immediate prospect of a return to the production which the Cumberland by-product coke-ovens were securing five weeks ago. In the absence of a settlement of the iron-moulders' strike the hematite pig-iron trade necessarily remains dull, the local foundries themselves requiring quite 1,000 tons less of ordinary iron than was the case at the beginning of September, and the slackened activity in the steel-rail trade also accounts for a diminution in the make of a quality of iron for which local coke is almost exclusively used. The outlook, therefore, remains poor, and it is difficult indeed to believe that the re-lighting of additional furnaces will now be possible this year. In that event, of course, the by-product coking industry will continue to be hard hit. No more than two of the plants are in full operation, the majority at present working only at one-third of their capacity, and it is doubtful whether output can be maintained even at this low level. It is curious that despite the fall in the North-west Coast smelters' make of iron the absorption of East Coast coke is unchanged, the supplies this week to the Furness district totalling 13,500 tons, and to West Cumberland nearly 8,000 tons. The output of by-products has, of course, fallen off considerably. Much more benzole is required than can be made, and a similar state of affairs exists as regards sulphate of ammonia, which is going wholly to home consumers. Pitch is in livelier request and stocks have decreased, and creosote is also fairly strong.

RELAXATION OF EXPORT PROHIBITIONS.—The Board of Trade announce that the following goods, which have hitherto been included in List A of prohibited exports and have thus been prohibited to all destinations, have now been removed from it: Cotton-seed oil; oleo; sesame oil; lard, imitation (compound); and lard, neutral.

FERTILISER NEWS.

(SPECIALLY CONTRIBUTED.)

Nitrate of Soda.—Under existing conditions, with only one seller at fixed prices, a market can hardly be said to exist in Chili; but the industry is gradually returning towards a normal state, and a sufficient supply of tonnage is alone required to set things straight by the removal of the enormous stocks accumulated since the armistice. These, as already stated in these columns, reached on October 1 no less than 1,712,000 tons, or more than double the quantity carried at the corresponding date in the years before the war, and representing, at an average of 4,000 tons each, over 400 cargoes. There is, of course, no immediate prospect of such an amount of shipping being available, and extremely high freights have consequently had to be paid to tempt neutral vessels to the long voyage from the West Coast, while those of the Allies have been engaged in other directions. Fortunately, however, there are at last signs of an increasing supply, and the shipments of the Chilean fertiliser to Europe and the United States will no longer be on the negligible scale of the past nine months. Many of the fine French sailing ships which formerly ran like clockwork with coals from the Tyne to Iquique, and thence with nitrate to Dunkirk, Nantes, and Bordeaux, were sunk by German submarines, but the survivors are returning to the trade, the *Rhone* sailing last month from Chili; while up to 250s. per ton was recently paid for a big steamer to the Continent, 160s. has just been accepted by another for early 1920 despatch to the United Kingdom; and freights will, as we all along anticipated, eventually come down to a much lower level. So much for the nitrate outlook in Chili, the improvement in which is undeniable. That in Europe, by no means as clear, will be examined in due course.

Dutch Fertiliser Notes.—With respects to results of boring for potash at Ratum and Plantengaarde, in Holland, the Agricultural Minister proposes an allocation of 65,000 florins for a closer investigation of the strata for potash salts. One authority, however, maintains that reports hitherto received have been too optimistic; but, on the other hand, there is no reason to abandon the search. The results, it appears, show a considerable geological similarity with the developments in the Weser and Zanten borings.

A recent report on the Dutch fertiliser industry states that it has had to suffer considerably from the importation of Chilean saltpetre, the quantities of which have far exceeded the requirements of the country. Financial considerations also are the subject of much complaint owing to the activity of the Dutch Overseas Trust Company and the Dutch Export Company.

A syndicate has obtained the concession of the Asahan (Dutch East Indies) waterfall, and intends to take 10,000 H.P. from it, and constructional work will soon begin. It is principally intended for fertiliser production. The chief engineer for water power and electricity, Heer Roelofsen, is to be absent five months in America to collect information on nitrogen production, etc.

Sulphate of Ammonia.—There is a firm market for all fertilisers, but deliveries appear to be delayed pretty generally. There are still suggestions that the price of sulphate of ammonia to home users is regarded as sufficiently high to check business to an extent; but, in view of the number of orders coming in, it is difficult to see how this view can be justified. Against this, moreover, some profitable sales for export are said to have taken place at £24. per ton cash. It appears, therefore, that Continental farmers are able to afford to pay this figure plus freight, or something fully equal to £25. per ton for their fertiliser.

Basic Slag.—The delayed deliveries which mark most divisions of the fertiliser market at the present time are especially acute in basic slag. This is a matter that recurs every year, and so far appears to have defied all attempts to rectify it. It does not appear that farmers have been more than usually backward in placing their orders; the reason probably lies elsewhere, and the condition has no doubt been complicated very considerably by the recent railway strike.

Superphosphates.—Many manufacturers of superphosphate declare that they need a freer supply of rock phosphate, as we are said to be over 100,000 tons behind the war standard of 1918. During September the imports of rock phosphate into this country were 22,423 tons, as against 29,000 tons in September, 1918, and 36,500 tons in the previous September. So far during the first nine months of this year we have only imported 260,000 tons of phosphate of lime and rock phos-

phate, which is a drop of over 100,000 tons in comparison with the figures for the corresponding nine months of last year. There seems to be something like a world shortage of phosphate, of which this and other things are outward and visible signs. Take, for example, the recent report of a serious shortage of phosphatic fertilisers which is declared to have already prevailed in South Africa for nearly three years owing to lessened imports. Steps are being taken there to utilise more fully the Saldanha Bay phosphate deposit.

Bone Meals, etc.—Bone meals, raw and boiled, are busily inquired for, and prices seem to be above the closing values of the past season. At the same time, definite general quotations are not easy to get. Pure steamed bone meal, 1 per cent. ammonia and 60 per cent. phosphate, in bags, quotes £13. 10s. to £14. per ton, ex works; whilst pure dissolved bones, 3 per cent. ammonia and 32 per cent. phosphate, register £15. 10s. to £16. per ton. There is a fair inquiry for meat meal with values based on 30s. per unit of ammonia. There is not a great deal offering in tankage, and the nominal value is still round about 30s. for ammonia and 2s. for phosphate. In dried blood there is little doing, as the offerings are but small. The figures are as above.

Other Fertilisers.—Potash manures are still in small supply, but there are signs of improvement. In all other fertiliser descriptions very little trade appears to be passing, and the position seems to have been stereotyped for the time being in high prices and short supplies.

Alsation Potash.—The imports of Alsation potash salts during the week ended October 25 were 575 tons sylvinite, 14 per cent. (French kainit), and 389 tons of sylvinite, 20 per cent. (French potash salts). Current quotations are as follows: Sylvinite, 14 per cent., £7. per ton; sylvinite, 20 per cent., £8. 7s. 6d. per ton; and muriate of potash, 80 per cent., £19. 7s. 6d. per ton.

SOUTH WALES NOTES.

(SPECIALLY CONTRIBUTED.)

There are now nearly 400 mills operating, and still the outputs are not sufficient to supply the needs of foreign markets. Export business is very good, and there is now less difficulty in shipping arrangements. The Far Eastern markets are particularly strong just now, and it is likely that further mills will be set going shortly. The total shipments from Swansea for the week totalled 68,497 boxes, as against 104,838 boxes in the previous week. The receipts from the works were 8,000 boxes, thus leaving stocks in dock warehouses and vans at 166,949 boxes, compared with 152,107 boxes at the same date last year.

Patent-fuel prices are somewhat stationary, and, owing to the volume of business in hand, not many fresh orders are being entertained, there being sufficient demand for the next two months' production. Several large cargoes have been shipped this week.

The markets for coke are much stronger, and as much as £5 10s. per ton has been obtained for export business, which is chiefly directed to St. Malo, Buenos Ayres, Rouen, Treport, and Valencia. All the ovens are working well. The strike at Ebbw Vale has been settled, the manager, Mr. Fred Mills, having made a satisfactory offer, and in consequence of this Mr. Mills is to be asked to resign the chairmanship of the South Wales and Monmouthshire Iron and Steel Makers' Association. The Ebbw Vale men resumed work on Wednesday morning. Similar offers—which, it is thought, will be accepted—are to be made to the Tredegar and Dowlais men.

Sulphate of ammonia outputs have suffered during the continuance of this dispute, as some of the coke ovens had to be shut down for short periods. Sulphate of ammonia is passing very freely, and there are little or no stocks on hand. Fresh outlets for this fertiliser are presenting themselves, and with the anticipated increase in the number of ovens which will be working at the commencement of next year the yields will be steadily consumed. Export business is slightly increasing, but the home requirements at present will not allow much expansion of foreign business.

ANGLO-CHILIAN NITRATE AND RAILWAY COMPANY, LTD.—No interim dividend will be paid on the preference or ordinary shares.

NEW COMPANIES.

Anglo-United Oilfields, Ltd.—Capital £225,000., £1. shares. Office: 8, Princes Street, E.C. 2.

Centrifugal Separators, Ltd.—Capital £275,000., in 175,000 A. and 100,000 B. shares of £1. each. Objects: To take over the business carried on by the Hydraulic Separating and Grading Company, Ltd., and the patents and other assets thereof. Solicitors: Nicholson, Graham and Jones, 24, Coleman Street, E.C.

Electro-Metallurgical Extraction, Ltd.—Capital £30,000., £1. shares. Objects: To manufacture, recover, distil, refine, sell, and deal in all manner of chemical elements, products, by-products and residuals, etc. Solicitors: Herbert Smith and Co., 62, London Wall, E.C.

Trinidad Western Oilfields, Ltd.—Capital £150,000., 5s. shares. Registered office: 448, Strand, W. 2.

A. Stedman and Sons, Ltd.—Private company. Capital £25,000., £1. shares (10,000 ordinary, 10,000 non-cumulative 7 per cent. part preference, and 5,000 6 per cent. cumulative preference). Object: To take over the business of oil refiners, colour, paint, and varnish manufacturers and wholesale drysalers carried on at the Grove Works, Hatcham Road, Old Kent Road, S.E. Solicitor: W. H. Cahill, 22, Basinghall Street, E.C.

Callard, Ltd.—Private company. Capital £5,000., £1. shares (1,000 10 per cent. cumulative preference). Oil refiners, electro-platers, smiths, chemists, engineers, etc. Solicitor: H. S. Holt, 6, Gray's Inn Square, W.C. 1.

Calvery Dyes, Ltd.—Private company. Capital £25,000., £1. shares. Object: To carry on at Mirfield, Yorks, and elsewhere, the business of manufacturers of and dealers in aniline, and other dyes, etc. Solicitors: Clough and Crabtree, Cleckheaton.

E. R. Watts and Son, Ltd.—Private company. Capital £20,000., £1. shares. Scientific instrument makers, etc. Solicitors: Bolton, Jobson and Yate Lee, 2, Temple Gardens, E.C.

Four Ashes Manufacturing Company, Ltd.—Private company. Capital £100,000., £1. shares. Manufacturing chemists and manufacturers and distillers of tar and all products and derivatives therefrom, etc. Solicitor: W. O. Vizard, 10A, Featherstone Buildings, W.C. 1.

Frome Vinegar Brewery Company, Ltd.—Private company. Capital £12,000., £1. shares (6,000 A., 3,000 B., and 3,000 C.). Registered office: The Vinegar Brewery, Frome.

Heaths (London), Ltd.—Private company. Capital £5,000., £1. shares. Pharmaceutical, analytical, manufacturing, or consulting chemists, druggists, drysalers, oil and colourmen, etc. Solicitor: T. F. Gaskell, 71, Lord Street, Liverpool.

Lower Lansalton China Clay Company, Ltd.—Private company. Capital £100,000., £1. shares. Registered office: 17, Albion Street, Hanley.

Middridge Limestone Company, Ltd.—Private company. Capital £23,000., £1. shares (3,000 preference). Registered office: Cargo Fleet Iron Works, Cargo Fleet Road, South Bank, Yorks.

New British International Oil Syndicate, Ltd.—Private company. Capital £26,250., in 25,000 ordinary shares of £1. each and 25,000 founders' shares of 1s. each. Registered office: 3, London Wall Buildings, E.C.

Niggerins, Ltd.—Private company. Capital £5,000., £1. shares. Object: To take over the business of the Anglo-Canadian Trading Company. Chemical and colour merchants and manufacturers, and brokers, exporters and importers, engineers, etc. Solicitor: E. H. Banks, 26, North John Street, Liverpool.

Russells (Manchester), Ltd.—Private company. Capital £20,000., £1. shares. Manufacturers of and dealers in asbestos and insulating material, dealers in engineers' stores, oil refiners, chemical and dye manufacturers, manufacturers of and dealers in rubber, etc. Registered office: Lands End Works, Rhodes, near Manchester.

Sacol Chemical Company, Ltd.—Private company. Capital £10,000., £1. shares (6,000 cumulative 10 per cent. preference). Registered office: Bankside, Sculcoates, Hull.

William Jarvie, Ltd.—Private company. Capital £2,000., £1. shares. Registered office: Eclipse Chemical Works, Whittington Street, Coatbridge.

Selsey Utilities Company, Ltd.—Private company. Capital £15,000., £1. shares. Manufacturers of and dealers in manure, manurial products, and chemical and other fertilisers, etc. Registered office: Phipps Estate Office, High Street, Selsey.

Sozon Oil Company, Ltd.—Private company. Capital £3,000., £1. shares. Manufacturers of "Sozon Oil" for leather belting, etc. Registered office: 152, Marsland Road, Brooklands, Cheshire.

Tembuland Coal, Iron and Chemical Company, Ltd.—Private company. Capital £100,000., in 210,000 cumulative preference shares of 2s. each and 79,000 ordinary shares of £1. each. Registered office: 25, Rood Lane, E.C. 3.

Tetney Oil and Meal Company, Ltd.—Private company. Capital £500., £1. shares. Manufacturers of and dealers in fish meal, fish guano, meal and glue, etc. Registered office: 2-4, Cheapside, E.C.

Voxol Products Company (1919), Ltd.—Private company. Capital £50,000., £1. shares. Objects: To take over (a) the business of a tallow, grease, and oil refiner and fertiliser manufacturer carried on at Vauxhall Road, Liverpool, by O. Toole; (b) the business of edible fat and oil refiners and merchants carried on at Vauxhall Road, Liverpool, by the Voxol Products Company, Ltd. Registered office: 8, North John Street, Liverpool.

Alexanders, Ltd.—Private company. Capital £10,000., £1. shares. General merchants, commission agents, produce brokers, drysalers, oil and colourmen, importers, exporters, and manufacturers of and dealers in chemicals and their compounds, oils, paints, starches, etc. Registered office: 166, Buchanan Street, Glasgow.

John Scott and Watson, Ltd.—Private company. Capital £3,000., £1. shares. Object: To acquire the business carried on at 78, Berkeley Street, Glasgow, as the "Kildust Company," and the business carried on at the Phoenix Chemical Works as "Scott and McQueen," and to carry on the business of manufacturers of labour-saving preparations, etc. Registered office: Phoenix Chemical Works, 61, Pollok Street, Pollokshaws, Glasgow.

Robert A. Munro and Co. (Ireland), Ltd.—Private company. Capital £10,000., £1. shares. Chemical produce and fertiliser merchants, etc. Registered office: 102, Grafton Street, Dublin.

North-West Canada Oil and Gas Syndicate, Ltd.—Private company. Capital £5,005., in 5,000 ordinary shares of £1. each and 100 founders' shares of 1s. each. Registered office: 13, Copthall Court, E.C.

Premier Perfumery Company, Ltd.—Private company. Capital £1,500., £1. shares. Object: To take over from B. A. Chapman, Joan H. Daniel, and R. D. Judd the business of manufacturers and distillers of perfumes carried on by them in London. Registered office: 61-2, Chancery Lane, W.C. 2.

Pemberton, Ansell and Co., Ltd.—Private company. Capital £5,000., £1. shares. General merchants, manufacturers' and merchants' agents, importers and dealers in chemicals, oils, grease, etc. Registered office: 92, Fleet Street, E.C.

Paragon Chemical Company, Ltd.—Private company. Capital £5,000., £1. shares. Dye and chemical manufacturers, dyers, bleachers, etc. Registered office: The Paragon Chemical Works, Baxenden, near Accrington.

BOOKS RECEIVED.

"Business Organisation and Management." October, 1919; No. 1. A monthly magazine for the accountant, secretary, manager, and all engaged in commerce or industry. London: Sir Isaac Pitman and Sons, Ltd.; 1s. 6d. net.

"National Union of Manufacturers Incorporated: List of Members, 1919." Arrangement in alphabetical order and in directory form. Compiled to July 1, 1919; price 5s.

TRADE CATALOGUES.

Messrs. Allen, Harrison and Co., Cambridge Works, Knott Mill, Manchester.—Describing their wide range of chemical engineering specialities for dyers, chemical works, and allied industries. Various useful technical data and tables are included.

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

October 20th to 25th (inclusive).

- Determining Carbon Contents of Steel, Ferrous and Non-ferrous Alloys. Batty, G. 25,942.
Removal of Fats, Oils, etc., from Casks, etc. Bell, T. M. 25,992.
Removal of Volatile Solvents from Material Treated Therewith. Bollmann, H. 25,729.
Paints, Stains, and Varnishes, etc. Burlin, A. L. 25,810.
Cement Paint. Burlin, A. L. 25,811.
Plaster of Paris. Burlin, A. L. 25,114.
Regenerative Coke-ovens. Coke and Gas Ovens, Ltd.; and Kimbell, H. F. 26,026.
Liquefying or Reducing Viscosity of Oil. Cross, A.; and Miller, W. H. 25,644.
Filters. De Haën Chemische Fabrik List, E. 26,045.
Manufacture of Articles of Paraffin Wax, etc. Elborne, W. 25,852.
Non-porous Waterproof and Acid-resisting Cement. Elborne, W. 25,853.
Rotating Colour Mixing or Blending Devices. Ewart, J. S. 25,877.
Distilling Bituminous Coal, Brown Coal, and Shale by Superheated Steam. Gercke, M. 25,655.
Compounds of Radium. Hedstrom H. O. 25,688.
Purification of Sulphur. Hood, J. J. 26,231.
Alkyl-substituted Alkyl Halides, and Condensation Products Therefrom. Imray, O. (Soc. of Chemical Industry in Basle). 25,806.
Azo Dyestuffs. Imray, O. (Soc. Chem. Industry in Basle). 25,916.
Treatment of Minerals or Products Containing Iron and Titanium and/or Vanadium. Kjellberg, B. P. F. 25,687.
Preparing Sulphates of Sodium and Magnesium. Low, A. M. 25,943.
Copper Alloys. MacGuckin, C. J. G. 26,136.
Clarifying Liquids Containing Finely Divided Matter in Suspension. Mackey, W. M. 25,721.
Extraction by Solvents. McMullen, W.; and Rickets, W. J. 26,112.
Synthesis of Nitric Acid. Mage, L. A.; and Nougier, L. A. 26,135.
Water-soluble and Water-emulsible Substances. Melamid, M. 25,932.
Sodium Sulphate. Salzwirk Heilbronn. 25,676.
Solutions of Acetyl Cellulose. Silberrad, O. 26,158.
Centrifugal Fluid-extractor. Storr, F. R. 25,837.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 6d. in stamps to the Comptroller, Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane, W.C.

1918.

- Aeration of Sewage and Other Impure Liquids. Stott, O.; and Jones, E. R. 8,041. **133,722**
Determining the Heating Value of Gases. Strache, H. 8,960. **116,707**
Manufacture of Gas in Vertical Retorts. Jackson, G. J., and Woodall and Duckham. 14,712. **133,730**
Drying Plant. Gloess, M. P. P. 15,031. **119,240**
Edible Syrup from Sugar Beet-root. Alexander, H. S. 16,607. **133,744**
Magnesite Refractories. Pike, R. D. 16,742. **133,753**
Decolorising and Purifying Agents. Mumford, R. W. 16,757. **133,759**
Pulverising-mills. Sturtevant Mill Co. 17,175. **123,715**
Coating or Preservative Compositions. Hoizapfel, M. 17,375. **126,270**
Recovering Pyridine and Similar Organic Bases. Barrett Co. 17,663. **122,397**
Separation and Refining of Metals. Haglund, G. 18,495. **121,591**
Refractory Articles and Refractory Cement. Sankey, C. H. 21,315. **133,842**

1919.

- Paints, Primings, and Like Coating Compositions. Wingen, J. 233. **133,852**
Decomposing Paratitantracemide to Form Paratitantriline. Mitsui Kozan Kabushiki Kaisha. 2,951. **126,944**
Devices for Carrying Out Chemical Processes by Electrolysis. Gerber, V. 4,268. **133,883**
Solder Composition. Saracchi, A. 8,210. **133,900**
Castor Oil. Dave, T. P. 9,843. **133,905**
Nitro-naphthalene. Barnett, E. de B. 12,480. **133,918**
Centrifugal Extractors, Marks, E. C. R. (Troy Laundry Machinery Co.). 17,080. **133,926**

COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

1919.

- Electric Furnaces. Trembour, M. R. 25,052. **133,954**
Continuous Treatment of Hydrocarbons with Liquid Sulphur Dioxide. Allgemeine Ges. für Chemische Industrie 25,817. **133,962**
Combinations of Pyramidal Surfaces for the Purification of Liquids, Vapours, and Gases. Gaillet, P. H. A. 25,486. **133,971**
Pyroxylin Compositions. Du Pont de Nemours and Co., E. I. 25,494. **133,973**

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Calcium Nitrate. C. T. Thorssell, and H. L. R. Lundén, Gothenburg, Sweden. British Patent, 131,493, of 1918.

Calcium nitrate is formed by bacterial oxidation of calcium cyanamide by trickling the solution over a bacteria bed formed, for example, by a layer of garden soil mixed with powdered coke. Calcium cyanamide is dissolved in water which may contain carbon dioxide to precipitate free lime, and sufficient of the solution is added to a solution of calcium nitrate to obtain complete oxidation of the cyanamide in one treatment. Part of the calcium nitrate is separated, and to the remainder cyanamide solution is added to obtain a solution of the same composition as that previously treated.

Ammonium Compounds. C. J. Montgomery, Saltcoats, Ayrshire; and E. R. Royston, Liverpool. British Patent, 131,609, of 1916.

Ammonium compounds are obtained from the nitrogen of the atmosphere by introducing into the cylinder of an internal-combustion engine, after the ignition of the combustible mixture, either a hydrocarbon oil or spirit or hydrogen, and providing in the cylinder or in the exhaust-pipe, or in both places, a catalyst which causes the formation of ammonia. The catalyst used in the cylinder is one which promotes the combination of nitrogen and hydrogen, such as an osmium catalyst; and that used in the exhaust-pipe is one which will cause reduction of nitrogen, such as nickel. The catalyst is prepared by soaking asbestos sheets in a solution of the metal, and after heating the sheets mounting them between perforated metal sheets in the head *e* of the cylinder, on the head *h* of the piston, and in the exhaust-pipe *j*. The engine is provided with an air-inlet valve *b*, an oil-inlet valve *c*, and a valve *d* through which water is injected immediately

after the ignition of the charge. The excess of hydrocarbon may be introduced into the cylinder by leaving the oil-inlet *c* open longer than usual. The exhaust gases are passed through a shower of sulphuric or other acid, and then bubbled through the partially neutralised acid solution to concentrate it, or the gases are cooled to separate water and ammonia.

Chlorides. W. Heap, Stockport; and E. Newbury, Manchester. British Patent, 131,039, of 1918.

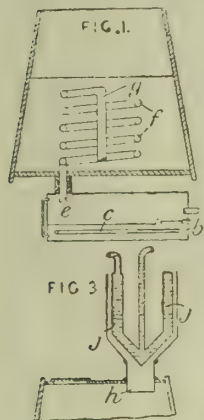
Anhydrous chlorides are obtained by treating with a mixture of chlorine and producer gas free from hydrogen an oxide, hydrate, carbonate, or organic salt or hydrated chloride of the metal. An example describes the production of chlorides of the cerium earths. The mixed gases may be passed over a catalyst such as animal charcoal before reaching the metal compound. The volume of chloride is equal to that of the carbon monoxide in the producer gas, but, according to the Provisional Specification, the carbon monoxide may be in excess.

Nitric Acid and Nitrogen Peroxide. W. R. Bousfield, Hendon, Middlesex; and Nobel's Explosives Company, Glasgow. British Patent, 131,642, of 1918.

The absorption of nitrogen peroxide from gases such as those obtained by the oxidation of ammonia or by arc processes, is effected by strong nitric acid with sufficient cooling to absorb the heat liberated. Particulars are given as to the amount of cooling required. In dealing with the products of the oxidation of ammonia, the bulk of the water is preferably removed by a preliminary cooling before absorption in the nitric acid. The nitrogen peroxide is recovered by distillation, and the nitric acid, after concentration if necessary, is used again; or the solution may be oxidised by means of oxygen in the known manner to produce nitric acid; or liquid nitrogen peroxide may be added to produce the known separa-

tion into two layers, from one of which 90—100 per cent. acid is obtained. The apparatus employed, when nitric acid is to be produced, is a combination of four elements, each of which is known *per se*—namely, means for producing a gas mixture containing nitrogen peroxide, means for bringing the gas into contact with liquid nitric acid, means for cooling the nitric acid, and means for oxidising the solution.

Fermenting Wort. A. T. Henley, Cork. British Patent, 131,021, of 1918.



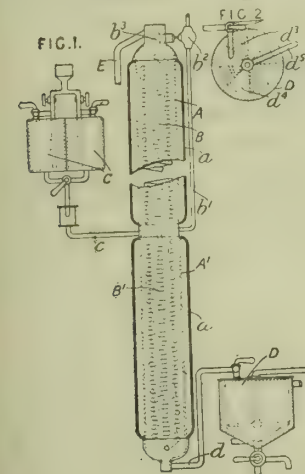
To prevent loss of alcohol in blowing air through fermenting wort, the air is either saturated with water-vapour at the temperature of fermentation before entering, or cooled to a sufficient degree on leaving the wort to condense any alcohol-vapour entrained by it. In the arrangement shown in Fig. 1, the air passes through a closed vessel *b* containing water kept at the required temperature by steam-pipes *c*, and thence passes through pipes *e*, *f*, *g* to the wort. In the form shown in Fig. 3, the air leaving the wort passes through a funnel-shaped outlet *h* with a hollow lining *j*, through which cooling liquid is circulated. The condensed alcohol-vapour runs back into the wort.

Hydrogen. E. K. Rideal and H. S. Taylor, London. British Patent, 131,328, of 1918.

In the manufacture of hydrogen by alternately passing steam over heated iron and reducing the iron oxide produced by carbon monoxide or by a mixture of carbon monoxide and carbon dioxide, the effluent gases from the reduction stage are converted into carbon monoxide for reuse therein by passing through a bed of incandescent coke, the temperature of which is maintained by the periodical blowing through of air or oxygen. The initial supply of carbon monoxide may be obtained by admitting steam to a producer, using the water gas produced in the preliminary reducing stages, and then passing the effluent gases through incandescent coke as described above.

Separating Liquid Mixtures. E. A. Cunningham, London. British Patent, 131,346, of 1918.

Continuous apparatus for separating mononitrotoluenes and other mixtures by fractional distillation and crystallisation consists of a packed distilling column A, A', Fig. 1, fitted with an internal heating coil B, B' together with crystallising tanks D in duplicate or divided into sections which are used alternately. The mononitrotoluene mixture is fed to the top of the lower section A' of the column by a pipe *c* supplied from alternately used feed tanks C. The vapours of the ortho and meta compounds generated in the section A' are separated in the section A, the ortho compound emerging by the vapour outlet E. The residual mixture of meta and para compounds is led by a pipe *d* from the base of the section A' to alternately used tanks D, and the para compound is crystallised out. The column A, A' is packed with metallic gauze or beads, and is provided with a steam or other jacket *a*. The supply of steam to the coil B, B' is regulated



by a valve *b*² in the supply pipe *b*¹ which is automatically controlled by a thermostat *b*³ at the top of the column. The relative temperatures of the sections A, A' can be controlled by adjusting the escape of steam from the ends of the steam coil. The bottom *d*³ of the crystallising tanks D, shown in plan in Fig. 2, is divided into segments, alternately perforated, and is covered with a segmental plate *d*⁴ connected to

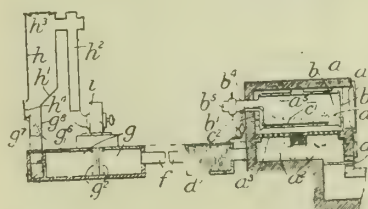
a lever *d*⁵. After crystallisation has taken place, the plate *d*⁴ is rotated to uncover the perforated segments and to allow drainage to take place.

Vanillin and Its Derivatives. Confectionery Ingredients, Ltd., F. E. Matthews, and A. T. King, London; and T. Kane, Gaywood, Norfolk. British Patent, 131,161, of 1918.

Vanillin esters and ethers are prepared by treating acyl or aralkyl derivatives of vanilloyl chloride in solution in toluene, xylene, or other inert solvent, at boiling temperature with hydrogen in the presence of an hydrogenating catalyst, such as palladium or nickel, which may be deposited on a carrier, such as barium sulphate or asbestos. Examples are given of the treatment of vanilloyl chloride *p*-toluenesulphonic ester; the acetate, benzoate, and carbonate, and the benzyl ether of vanilloyl chloride are also specified as parent materials. Vanillin is obtained by hydrolysing the esters and ethers in the usual manner. The Provisional Specification also describes the reduction of vanilloyl chloride to vanillin by the process set forth above. The esters and ethers of vanilloyl chloride referred to above may be prepared by treating vanillic acid with acyl or aralkyl chlorides and converting the products into the corresponding chlorides by means of thionyl chloride. According to the Provisional Specification, vanilloyl chloride is prepared by treating an alkali vanillate with thionyl chloride or phosgene.

Wood Distillation. P. Poore, London. British Patent, 131,006, of 1917.

Wood, peat, and other carbonaceous material in small pieces are dried in a kiln by waste gases from a furnace admixed with air, and the dried material is distilled in a retort and subjected to the action of superheated steam, while the products of distillation thus formed are passed to condensers for condensing tar, acetic acid, wood spirit, etc. The superheater is heated by the waste products from the distillation furnace. As shown, a cylindrical retort *b* is heated in a furnace *a* with rails *a*¹ for the retort to be removed for charging through an opening normally closed by a cover



*a*⁷. The flames from the fire pass a damper *a*⁸ and are led by flues *a*² through grids *a*³ and around the retort. Vertical flues *a*⁵ deliver the furnace gases to a superheater *d*, and a pipe *f* carries the gases through a tank *g* with screens *g*² for removing soot,

etc., the gases are mixed with air admitted through a passage *g*⁷ controlled by a damper *g*⁶, and pass through a pipe *g*⁸ to a drying chamber *h* with inclined bottom *h*¹, charging door *h*³, and discharging door *h*⁴. The waste gases and vapour from the chamber *h* are removed by a pipe *h*² and fan *i*. The retort *b* is fitted with covers *b*¹, *b*², and the cover *b*¹ being fitted with an outlet pipe *b*⁴ which is connected by means of a coupling *b*⁵ to a pipe leading to the condenser. Pipes *c*¹, *c*² lead the steam from the superheater *d* into the retort, and this steam is admitted to pass through the wood, etc., after this has been heated in the retort to a temperature of at least 100° C. A number of drying chambers as *h* may lead to one chimney, and means may be provided for by-passing part of the gases from the superheaters, or from the driers, or both. A secondary air supply may be provided at the top of the retort-heating furnace. According to Provisional Specification 13,321/17, baffle-plates or curtains may be provided in the drying-kilns.

Esters. A. Boake, Roberts and Co., Stratford, London; and T. H. Durrans and W. E. Ellis, Oxford. British Patent, 131,088, of 1918.

Esters are prepared by passing the vapours of an alcohol and a fatty acid over a catalyst applied to a suitable support. Suitable catalysts are ortho-, meta-, or pyro-phosphoric acid, sulphuric acid, acid sodium or potassium phosphate or sulphate, and zinc, calcium, or magnesium chloride; suitable supports are pumice, earthenware, coke, or gas-carbon, fire-brick, and asbestos. The application of the catalyst to the support may be effected in the following ways: Pumice is sprinkled with or immersed in sulphuric acid, or coke or gas-carbon is sprinkled with or immersed in ortho-phosphoric acid, and the treated support is then drained and heated to

REPORTS OF COMPANIES.

Ship Canal Portland Cement Manufacturers, Ltd.

The report for the year to March 31 last states that the directors were compelled to pass the half-yearly dividend on the cumulative participating preference shares due on June 1 and December 1, 1918. The restrictions under which the cement industry laboured, described in preceding reports, continued to prevail during the financial year under review. The speedy revival of the cement industry that was anticipated after the signing of the Armistice did not come to pass, attributable mainly to the unsettled labour, transit, and market conditions. For these reasons the raising of the embargo on the export of cement did not assist to the extent expected. The slump in the trade continued up to and after the end of the financial year. However, for some months past the demand has revived, and is being dealt with to the fullest extent that the general conditions prevailing will permit. The indications in all markets point to constantly increasing demand well in excess of the production capacity of the industry, and for a period on which no time-limit can be set. The directors are vigorously pushing forward the extensions to increase the production of cement to over 4,000 tons per week. The directors are also proceeding with the erection of a special installation for the production of carbo limo, and for the production of a new commodity (on account of a firm who are marketing the material under the name of "Rectisoil"), the carrier of which is carbo limo. There are indications of demand for carbo limo for other uses, and the special plant now being erected will, on completion, enable the directors to supply the indicated new outlets. The Board of Trade have granted the necessary order to enable the Mersey Power Company to supply bulk power to this undertaking, and it is hoped that this service will be available by the time the extensions are completed. After charging repairs and renewals to the working account, the directors have written off £10,000. to depreciation, leaving a credit balance of £14,781.; and £6,449. was brought in, making £21,230., which the directors propose to carry forward. To facilitate the company's financial arrangements, the directors entered into an agreement with the British Maritime Trust, Ltd., and to give effect to the conditions of that agreement the capital of the company was increased by the creation of a further 150,000 ordinary shares of £1. each and 1,500 deferred shares of 1s. each. None of these shares has been issued.

Sadler and Co., Ltd.

For the year to June 30, 1918, the net profit rose from £27,004. to £46,754., but in the past twelve months there was a partial setback to £33,045. The reserve for depreciation is again to get £25,000., but the allocation of £2,000. to the reserve is not to be repeated. The ordinary dividend is, however, to be retained at 9 per cent., having been 7 per cent. for 1915-16 and 8 per cent. for 1916-17. The undivided balance will be lowered from £6,825. to £4,221.

Associated Portland Cement Manufacturers (1900), Ltd.

At an extraordinary meeting on October 24, it was decided that all £10. shares in the company should be divided into ten £1. shares and numbered accordingly. It was also decided that the name of the company be changed to the Associated Portland Cement Manufacturers, Ltd.

DIVIDENDS.

MIAMI COPPER COMPANY.—Quarterly dividend of 50 cents per share on capital stock for quarter.

COMING EVENTS.

Society of Public Analysts.—Meeting, Wednesday, November 5, at the Chemical Society's Rooms, Burlington House Piccadilly, W., at 8 p.m. Papers: "Egyptian Bricks," By G. Rudd Thompson, F.I.C.; "The Analysis of Brazilian Zirconium Ore," by A. R. Powell and W. R. Schoeller, Ph.D.; "The Halogen Absorption of Turpentine," by Ethel M. Taylor.

The Institution of Civil Engineers.—Opening meeting, Great George Street, Westminster, S.W. 1, Tuesday, November 4, at 5.30 p.m. Address by Sir John Purser Griffith, the president, and presentation of medals awarded by the Council.

College of Technology, Manchester.—Tuesday, November 4, at 4.30 p.m. Lecture by Mr. W. H. Barnes on "Paint Grinding."

The Technical Inspection Association.—Paper by Professor Baly, C.B.E., F.R.S., on "The Spectroscope in the Science of To-day," at the rooms of the Royal Society of Arts, John Street, Adelphi, Friday, November 7, at 7.30 p.m. ...

The Chemical Society.—Meeting, Burlington House, Piccadilly, London, W. 1, Thursday, November 6, at 8 p.m. Papers: "Equilibria Across a Copper Ferrocyanide and an Amyl Alcohol Membrane," by F. G. Donnan and W. E. Garner; "The Peroxides of Bismuth," by R. R. Le G. Worsley and P. W. Robertson; "The Properties of Ammonium Nitrate—Part I.: The Freezing-point and Transition Temperatures," by T. M. Lowry and R. G. Early; "Organic Derivatives of Tellurium—Part I.: Dimethyl-tellurium-diiodide," by R. H. Vernon; "Intramolecular Rearrangement of the Alkylarylamine: Formation of 4-Amino-n-butylbenzene," by J. Reilly and W. J. Hickinbottom; "A New Modification of 3,4 Dinitro dimethylaniline," by H. Swann; "The Refractivities of Unsaturated Substances," by G. Le Bas; "The Molecular Refractions of Benzene and Aromatic Derivatives," by G. Le Bas; "Some 1 : 3-Benzodiazolecarbinic Acids and Their Reduction Products," by R. R. Baxter and R. G. Fargher.

Society of Chemical Industry: Manchester Section.—Meeting, Grand Hotel, Friday, November 7, at 7 p.m. Papers: "The Estimation of p-Phenylene Diamine," by T. Callan, M.Sc., Ph.D., and J. A. R. Henderson, D.Sc.; "The Estimation of Sulphuric Acids in the Presence of Organic Sulphonic Acids," by T. Callan, M.Sc., Ph.D., J. A. R. Henderson, D.Sc., and R. Barton.

GAZETTE NEWS.

LIMITED COMPANIES.—Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions, Orders, and Official and Other Notices.

Lead Wool Company, Ltd.—Resolved June 18, confirmed July 16: That it is expedient to reconstruct the company, and accordingly that the company be wound up. Alice J. Ball, Snodland, spinster, liquidator.

Wear Portland Cement Company, Ltd.—Resolved October 17: That the company be wound up. H. S. Squance, Sunderland, chartered accountant, liquidator.

British Lead Syndicate, Ltd.—Resolved October 8: That the company be wound up voluntarily. R. Henderson, 198, St. Vincent Street, Glasgow, writer, liquidator. Meeting of creditors at liquidator's, October 24.

DISSOLUTIONS OF PARTNERSHIP.

(Note.—When two dates are given in the following announcements, the first is the date of the dissolution. The date in parentheses is that of the official advertisement.)

Primus Edible Products Company (Walter Thos. Balding and Joseph St. Ludger), 9, Broughton Street, Hockley, Birmingham, edible fat manufacturers. April 30. Debts by W. T. Balding, who continues. (October 14.)

Purvis Hopkins and Sons (Hy. Hopkins Purvis and Alb. Hopkins Purvis, 20 and 21, Greek Street, Soho, colour grinders, and white lead, oil, and varnish merchants. December 31, 1918. Debts by A. H. Purvis. (October 17.)

Boyd, Finlay and Co., 36, Salamander Street, Leith, grain, hay, straw, treacle, and chemical manure merchants. May 31, by retiral of Geo. Young Finlay. The business will continue to be carried on by Thos. Geo. Boyd, along with Saml. Carter, 45, Lorne Street, Leith, and Jno. Hunter, 5, Waverley Place, Edinburgh, who have been assumed partners, and under the same name, and they are authorised to uplift all debts due to, and will discharge the whole debts and liabilities of, the firm. (October 14.)

CHEMICAL TRADE INDUSTRIAL COUNCIL.—The first meeting of the North-Western District branch of the Chemical Trade Joint Industrial Council was held in Liverpool on Tuesday, when Mr. Max Muspratt, of the United Alkali Company, Ltd., was appointed chairman, and Mr. R. Hewitt, of the National Union of General Workers, was appointed vice-chairman, with Mr. G. Martyn as secretary. This body consists of an equal number of employers and employed, and covers the whole North-West of England. Regular meetings will be held alternately in Liverpool and Manchester. An emergency committee was also appointed for prompt action between regular meetings.

CORRESPONDENCE.

***We do not hold ourselves responsible for the opinions expressed by our correspondents.*

Malachite Green Crystals.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—In response to the invitation contained in the letter from the British Chemical Trade Association, we have pleasure in drawing your attention to the fact that we have put down certain plant for the manufacture of malachite green. We are increasing this plant and will shortly be in a position to supply most of the ordinary requirements.

As a general comment on the substance of the letter we might say that we do think that the larger dyestuff users have been somewhat harsh in their criticisms of British dyestuff manufacturers, and to some extent the attitude of the users with regard to malachite green as expressed in this letter is a minor example of this.

For instance, in the present case we can assure you that if the users of malachite green had advertised their requirements

in any one of the trade journals at the time when they were badly in need of the colour, or if they had written a letter similar to the present one to one of the trade journals, we would immediately have responded by taking steps to meet their requirements to the best of our ability. However, we find that in general the dyestuff users have been rather apt to turn too readily to Swiss and American products. Of course, we know they have had very extreme difficulties, and we heartily sympathise with them, but it does not seem to have been generally recognised that during the war it was impossible for either British manufacturers, or, indeed, any other manufacturers (not excluding German manufacturers), to produce certain of the dyestuffs that we badly needed.

The reason for this did not lie in any insuperable difficulties in the processes, and was not due to any want of knowledge or experience, but solely to the fact that the Governments of the various countries required the whole of the available supplies of the necessary raw materials for these particular colours for war purposes.

Trusting that this letter may prove of interest to your readers, and assuring you that we shall be at all times pleased to do our utmost to meet the needs of new clients.—Yours, etc.,

THE LONDON DYE MANUFACTURING CO. LTD.,

P. A. LOEBBURY,
Managing Director.

Stratford, London, E. 15, October 24, 1919.

MARKET REPORTS.

TAR AND AMMONIA PRODUCTS.

WEDNESDAY.

Benzole: London, 90%, 2s. to 2s. 1d.; North, 1s. 11d. to 2s.; 50%, 1s. 10d. to 1s. 11d.; North, 1s. 9d. to 1s. 10d., naked; pure, 3s., naked, at works. Carbolic acid, crude, 60%, East and West Coast, nominally 1s. 7d. to 1s. 8d.; crystals, 39-40%, 9½d. to 9d., f.o.b. Crude tar, London, 45s. to 50s.; Midlands, 44s. to 46s.; North, 45s. per ton, ex works. Pitch, 77s. 6d. to 80s.; East Coast, 70s. to 75s., f.o.b.; West Coast, 62s. 6d. to 65s.; f.a.s. Solvent naphtha, naked, London, 90-100%, 2s. 5d.; North, 2s. 3d. to 2s. 4d.; 90-160%, naked, London, 2s. 5d.; North, 2s. 2d. to 2s. 3d. Crude naphtha, naked, 30%, 9d.; North, 8d. to 8½d. Refined naphthaline, £16. to £18.; salts, £6. to £7. Toluol, naked, London, 2s. 6d.; North, 2s. 5d. Creosote, naked, London, 6½d.; North, 5½d. to 5½d.; heavy oil, 6½d. Anthracene, 40-45%, 7d. per unit. Cresylic acid, 95%, 2s. 5d. to 2s. 6d.; 97-99%, 2s. 7d. to 2s. 8d., ex works, London, and f.o.b. other ports. Sulphate of ammonia: home trade, October £20. 10s., November £20. 15s., basis 24½%. Nitrate of soda, £22. to £22. 10s.

FERTILISER MATERIALS.

LIVERPOOL, THURSDAY.

Nitrate of soda continues very steady, the quotation on spot for 95-96% quality being £20. 2s. 6d. per ton, net cash, f.o.r. Liverpool, prompt delivery. East Indian bone meal: Shippers still maintain a firm attitude, the quotation for November-December shipment being £17. 10s. per ton, net cash, ex ship Liverpool, for 4½% ammonia and 52% phosphates. On spot Liverpool, holders require £17. 10s. per ton, net cash, for 4½% and 45% quality. Mineral phosphates: No alteration is to be reported in this market, and values at present are only nominal. Dried blood scarce, the value here being about 30s. per unit of ammonia per ton, net cash.

LONDON METAL MARKET.

THURSDAY.

Copper: Standard brands, £100. to £100. 5s., cash; £100. 15s., three months; electrolytic, £114. to £118. Tin: Standard, £276 15s. to £277., cash; £277. 15s. to £278., three months; Straits, £276. 15s.; English, £276. to £277. Lead: Soft foreign, £30. 10s.; English, £31. 5s. Spelter, £44. 10s.; hard, £31. to £32. Antimony, English regulus, 90%, £47. 10s. Aluminium £150. Nickel £205., delivered; packages extra. Quicksilver, £17. to £17. 5s. Bismuth 12s. 6d. Platinum 442s. per oz. Wolfram 32s. 6d. per unit.

TURPENTINE MARKET REPORT.

Messrs. James Watt and Son, Ltd., of 101, Leadenhall Street, London, E.C. 3, report that the stocks of turpentine on October 25 were: American, 34,261 barrels, compared with 4,086 barrels at the corresponding date of 1918; French, 640

barrels (599 barrels); and Spanish, 382 barrels (1,218 barrels). Deliveries during the week ended October 25 were 1,651 barrels, against 497 barrels last year, and since January 1, 60,843 barrels, compared with 20,725 barrels in 1918. The price on Saturday last was 126s. per cwt., compared with 105s. at the corresponding date of last year. October-December delivery was quoted at 126s. 6d., and January-April (1920) 128s.

MANCHESTER CHEMICAL MARKET.

THURSDAY.

Business in all branches of the trade continues brisk, both on home and export account, and values, as a whole, are well maintained. Caustic soda, 70%, is firmly held for £24. 10s., and in good demand. Bicarbonate of soda, bags, steady at £8. 10s. per ton. Bleaching powder unchanged at £17., on rails makers' works. Chlorate of soda easy at 6d. per lb. Potash quiet at 1s. 1d. per lb. Saltcake firm at 70s., net, per ton, carriage paid, in bulk. Soda crystals, bags, £5. 10s. 6d. per ton, carriage paid. Recovered rock sulphur, £17. per ton, f.o.r. There is no improvement in the position of copper sulphate, and price remains nominal at £40. per ton, f.o.b. Liverpool. Commercial hyposulphite of soda dearer at £19. per ton. Phosphate of soda firm at £27. per ton. Nitrate of soda scarce on the spot at £59., basis 100%. Concentrated sodium sulphide quiet at £22. per ton, in casks. White powdered arsenic continues in short supply, and price firm at £60. per ton. Yellow prussiate of potash slow of sale at 1s. 9d. per lb. Soda in active request, and price higher at 1s. per lb. Solid caustic potash, 88-90%, is now offered at £100. per ton. Carbonate of potash steady at £100. per ton, basis 85%. Lead salts are again quiet, but quotations are steady at £83. for white acetate, £68. for brown, and £54. for nitrate. Acetate of soda and acetic acid are unchanged at recent rates. English brown acetate of lime firm at £12. per ton; grey, £17. per ton; miscible wood naphtha, 10s. 6d. per gallon. Green copperas is in fair demand. Oxalic acid lower at 1s. 1½d. per lb., delivered.

SWANSEA MARKET REPORT.

THURSDAY.

Tinplate prices are exceptionally strong, and have advanced during the week; export prices for prompt delivery are 42s. to 42s. 6d. per standard box, f.o.b. Copper is not so active, and prices have weakened considerably for prompt dealings to £98. 5s. per ton and £99. three months. Tin steady at £273. 10s. cash and £274. 10s. three months. Silver 5s. 5d. per ounce. Lead is easier, with better demand at £29. 17s. 6d. per ton for Spanish and £31. 5s. for English. Zinc sheets steady: English at £65. to £70., and American £65. per ton, f.o.b. New York. Antimony, £47. 10s., f.o.b. Aluminium, £150. Quicksilver, £17. per bottle. Spelter active and somewhat easier at £45. per ton for delivery over November and December. Nickel, £205. per ton, including

delivery. London. Sulphate of copper inactive at £40. per ton for home purposes and £41. for export, less 5% in casks, f.o.b. Sulphate of ammonia steady at £20. 10s. per ton for prompt delivery. Nitrate of soda steady at 21s. 6d. to 22s. 6d. per cwt. for ordinary to refined, in bags. Seed oils firmly held at steady prices. Palm oil quiet. Lagos, £85.; softs, £84. 10s.; Benin, £84.; and hards, £81. 12s. 6d. per ton. Turpentine quietly steady at £6. 7s. per cwt. Arsenic in better demand, with white powdered at £58. 12s. 6d. per ton, in bags, f.o.b. Oxalic acid quiet at 1s. 1d. per lb., f.o.b. Pitch, £3. 3s. per ton, ex ship. Green copperas in good demand at £3. 10s. to £4. per ton, delivered.

LIVERPOOL CHEMICAL MARKET.

THURSDAY.

An active inquiry for chemicals has been experienced through the week to date, the demand on home trade account being brisk, and that on export account having increased. Difficulty has been met with in arranging for deliveries of fresh supplies of some of the heavier goods at early dates, owing to stocks of these goods at works and elsewhere being very small. More interest has consequently been shown in securing supplies for dates some distance ahead with a view to covering prospective requirements. Bleaching powder has been in moderate demand. Prices are: £17. per ton, free on rail or conveyance, in buyers' packages, for the home trade; and £15. to £18. per ton for export. Chloride of calcium has been quiet, and is £8. to £11. per ton, in casks, f.o.r. Caustic soda has been in active demand, and very little of it has been offered. Quotations are: £24. per ton for 76%; £22. per ton for 70 to 72%, and £19. per ton, for 60 to 62%. Nitrate of soda has sold more freely, and is £21. to £22. per ton. Saltcake has been in good request, and is £6. 10s. per ton, in casks, f.o.b. Soda crystals have been in fairly active demand, and are £5. 10s. per ton, in 2cwt. bags, f.o.r. at works. Bicarbonate of soda has sold readily, and is £8. 5s. to £10. per ton, according to terms of delivery. Borax has been in well sustained demand, but scarce. Ordinary is £48. per ton, and powdered, £49. to £50. per ton, in bags. Ammonia alkali has again met with a brisk inquiry, and makers are reported to have well sold their productions for some months to come. Prices may be given as £6. 10s. to £6. 15s. per ton, f.o.r. at works. Hyposulphite has been in moderate request, and is £16. per ton for ordinary, and £21. per ton for pea crystals in 1cwt. bags. Sulphite of sodium has been rather more in demand, and is £10. per ton for ordinary, and £16. to £18. per ton for pea crystals, in 1cwt. kegs. Sulphide of sodium has met with a steady inquiry, and is £20. per ton in casks, and £22. per ton in drums. Prussiate of soda has been in active demand, and is dearer. It is 11d. to 1s. per lb. Bichromate of soda has been in very fair request, and is 9d. per lb. Phosphate of soda has been more inquired for, and is £25. per ton. Chlorate of potash has been in good request, and is 1s. per lb. Permanganate of potash has again been quiet, and is 3s. 3d. per lb. Sulphate of potash has been very quiet, and is £25. per ton. Carbonate of potash has been in moderate request, and is £95. to £100. per ton for 80 to 85%. Caustic potash has been well inquired for, and is £120. per ton. Nitrate of potash has been more called for, and is £55. to £60. per ton for refined, and £40. per ton for ordinary. Canadian potashes have been very quiet. First quality Montreal are £200. to £220. per ton. and second quality, £190. to £210. per ton. Bichromate of potash has been in fair request, and is 1s. 6d. per lb. Yellow prussiate of potash has been more in request, and is 1s. 9d. to 1s. 10d. per lb. Sal ammoniac has been in very fair demand and scarce. Prices may be given as £85. per ton for first quality lump; £80. per ton for second quality, and £5. per ton extra for crushed. Sulphate of ammonia has been more inquired for. Prices are, £20. 15s. per ton for November; £21. for December; £21. 7s. 6d. for January, 1920; £21. 15s. for February, and £22. per ton for March to May, 1920. Carbonate of ammonia has been in fair request, and is 6½d. per lb. Muriate has been but little called for, and is £48. to £50. per ton. Magnesia has been more in demand. Carbonate is £2. 5s. per cwt., and sulphate, £11. to £16. per ton according to grade. Alum has had a rather brisk inquiry, and is still in very small supply. For home trade uses, £18. 10s. per ton is being quoted, and for export, £18. 10s. to £19. 10s. per ton. Aluminoferric has been very quiet, and is £8. 10s. to £12. per ton according to quality. Sulphate of alumina has been but little inquired for, and is £12. to £17. per ton, according to grade. Sulphur has been in moderately active demand, and in short supply. English flowers are £32. per

ton, roll is £28. per ton, and rock £22. per ton, in bags, f.o.r. Sicilian grades are: flowers, £28. per ton; roll, £22. 10s. per ton; and rock, £17. 15s. per ton. Cream of tartar has been in very fair request, and is £12. to £12. 5s. per cwt. Tartaric acid has been steadily called for, and is 3s. 2d. to 3s. 3d. per lb. Boracic acid has been more in request, and has been scarce. Crystals are £80. per ton, and powdered £82. per ton. From £2. to £3. per ton extra is charged for delivery in casks. Oxalic acid has been in quietly steady demand, and is 1s. 1d. to 1s. 2d. per lb. Citric acid has sold more readily, and is 4s. 3d. to 4s. 4d. per lb. White acetate of lead has been but little called for, and is £85. per ton. Arsenic has been rather more in request. White powdered is £58. to £60. per ton. Sulphate of copper continues inactive. From £40. to £41. per ton is quoted for home trade lots, and from £41. to £42. per ton for export; less 5%, in casks, f.o.b. at Liverpool.

TYNE CHEMICAL REPORT.

TUESDAY.

Market very steady, and there is a brisk demand, particularly for caustic soda and bleaching powder, both for home and export. Sulphur continues in good request, and is firm at £22. to £23. per ton at makers' works, in bags. Soda crystals locally are scarce and firm at £5. 10s. per ton, in bags.

The following prices are per ton, net: Bleaching powder, softs, £17.; caustic soda, 76-77%, £24.; do., 74-76%, £23. 10s.; do., 70%, £22. 5s.; do., 60%, £21. 10s.; recovered sulphur, 2cwt. bags, £22.; hyposulphite of soda, 5-7cwt. casks, £19.; do., 1cwt. kegs, £25.; sulphite of soda, 5-7cwt. casks, £12.; do., 1cwt. kegs, £20.; silicate of soda, 75° Tw., £9. 12s. 6d.; do., 100° Tw., £10.; do., 140° Tw., £10. 10s.; soda crystals, 2cwt. bags, £5. 10s.; sulphate of soda (salt-cake), in bulk, £4.; pure white sulphate of alumina, £19. 10s.; blanc fixe, £22.; sulphide of sodium, crystals, £18.; do., refined concentrated solid, 60-62%, £25.; hydrate of barium, crystals, £56.

COALS.—Market is steady, and values are very fully sustained. There is plenty of business available, but merchants are hampered with tonnage difficulties and the question of licences. To-day's quotations: Best Northumbrian steam coal, 95s. to 100s. per ton; do., second qualities, 90s. to 95s.; Northumberland small coals, 75s. to 80s.; do., seconds, 70s. to 72s. 6d.; best Durham gas coals, 80s. to 85s.; do., seconds, 65s. to 75s.; Durham bunker coals, 70s. to 80s.; do., seconds, 65s. to 67s. 6d.; foundry coke, 100s.; gas coke, 95s. to 100s.

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Wednesday.

During the past week the demand for heavy chemicals has continued to be fairly good, and, on the whole, prices remain on firm levels. Some bigish orders are reported as having been put through during the week, but the general report from the different firms is that the small bulk parcel is still in most favour. Quotations remain unaltered as follows: Arsenic, £62. per ton, net, Glasgow; bicarbonate of soda, £9. 15s. and £10. 10s. per ton for 6-8 casks and 1cwt. kegs, net, Liverpool; boracic acid crystals, English refined, £72. for 2cwt. bags; and borax crystals, £39. for 2cwt. bags, carriage paid; caustic soda, white, 70-72%, £25. per ton, net, Glasgow; chlorate of potash, 1s. 1d. per lb., net, Glasgow; chlorate of soda, 8d. per lb., net, Glasgow; citric acid, 4s. 4d. per lb., 5%, Glasgow; cream of tartar, 98%, £11 10s. per cwt., net, Glasgow; paraffin wax, U.K. deliveries, 125° 6½d. to 6¼d.; 121-39, 5¼d. to 5½d.; 118-209, 5d.; 110-129, 4d. to 4½d.; and 98-102°, 4d. to 4½d.; sal ammoniac, £80. and £75. per ton, net, any port, for first and second lump respectively; sal ammoniac crystals, £85. per ton, net, Glasgow; saltpetre, £3. net, Glasgow; tartaric acid, 3s. 6d. per lb., 5%, Glasgow.

Among the sea oils, the only alteration in price is in the whale-oil section, where pale variety has advanced from 90s. to 92s. There is a fair quantity of this oil on offer, and the same remark applies to brown at the old quotation of 76s. and black at its previously quoted level of 74s.; while yellow is not on offer. Newfoundland cod continues to go into consumption at 80s., with a good number of buyers coming forward at this price; while pale seal at 96s., and Menhaden at 80s., are also fairly strong features.

In the West of Scotland coal market demand remains steady, and supplies of fuel, on the whole, are to the short side. There are no alterations in prices, and the minimum figures are still according to the schedule issued by the Coal Controller.

IMPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LIST OF CONTRACTIONS USED IN THE IMPORT AND EXPORT LIST.

Blns.	Balloons.	Cbys.	Carboys.	Gals., Gl.	Gallons.	Qnty.	Quantity (otherwise undeclared).	qr.	Quarters.
Bls.	Bales.	Css. or Cs.	Cases.	or (Gus.)	Gallons.			lb.	Pounds.
Brls.	Barrels.	Cks.	Casks.	Hf. dps.	Hogsheads.	Ralts.	Ranlets.		
Bgs.	Bags.	Chts.	Chests.	Ilbds.	Kgs.	Sks.	Sacks.		
Bls.	Bottles.	Cylds.	Cylinders.	Kgs.	Kgs.	Slbs.	Slabs.		
Bds.	Bundles.	Dms. Drs.	Drums.	Ozs.	Ounces.	Tlbs.	Trees.		
Bkts.	Baskets.	Djns.	Drumjohns.	Pks.	Packages.	T. c.	Tons.	Cwts.	
Bxs.	Boxes.	Frkns.	Firkins.	Pns.	Puns.	Puncheons.			

Note.—There is no information available as to the net weights of the various items, nor do we recognise in them any standard.

BRISTOL.

Publication of Official Returns Suspended.

GLASGOW.

Week ending October 25.

BARIUM SULPHATE—
Antwerp, 650 bgs.
CALCIUM SILICIDE—
Rouen, 250 drms.
DYESTUFFS—
Tartar
Bordeaux, 128 cks.
GLYCERINE—
Bordeaux, 40 cks., 90 drms.
IRON OXIDE—
Malaga, 291 brls.
ROSIN—
Bordeaux, 1,260 cks.
WAX (SOLUTION)—
New York, 1 cs.
ZINC OXIDE—
Antwerp, 20 brls.

GOOLE.

Week ending October 25.

OXALIC ACID—
Rotterdam, 88 cks.
TAR—
Gothenburg, 219 brls.
ZINC ASH—
Copenhagen, 121 cks.

GRANGEMOUTH.

Week ending October 25.

FERRO SILICON—
Drammen and Skien, 619 cs.

GRIMSBY.

Week ending October 25.

DYESTUFFS (otherwise undescribed)—
Antwerp, 379 cks.
ZINC OXIDE—
Antwerp, 110 cks.

HULL.

Week ending October 25.

ACETATE OF LIME—
Stockholm, 333 bgs.
BEEFWAX—
Antwerp, 15 bgs.; Djibuti, 285 blks.
CAUSTIC POTASH—
Rotterdam, 382 drms.
CHROME ORE—
Karachi, 2,301 t.
DYESTUFFS (otherwise undescribed)—
Antwerp, 61 cks.
DYESTUFFS—
Myrabolans
Bombay, 8,681 bz.
FERRO SILICON—
Christiania, 250 cs.
MAGNESITE—
Christiania, 1 bz.
MANGANESE ORE—
Bombay, 4,950 t.

MURIATE (otherwise undescribed)—
Rotterdam, 1,781 bgs.

PHOSPHATE—
Bona, 4,490 t.
POTASSIUM SULPHATE—
Rotterdam, 1,839 bgs.

ROSIN—
Bordeaux, 25 cks.
TAR OIL—
Stockholm, 50 brls.
ZINC ASH—
Stockholm, 32 cks.

LEITH.

Week ending October 25.

NIL.

LIVERPOOL.

Week ending October 25.

ACETIC ACID—
Montreal, 508 brls.; Philadelphia, 111 brls.
AMMONIUM SULPHATE—
Montreal, 1,500 bgs.
ANTIMONY—
Shanghai, 55 cs.
CARBON BLACK—
Baltimore, 150 cs.
DYESTUFFS—
Dye Extract
Philadelphia, 290 cs.
Gambier
Batavia, 1,870 cs.
Tanning Extract
Baltimore, 610 bgs.
FERRO CHROME—
Rouen, 400 cs.
GLUCOSE—
Baltimore, 68 brls.
HEMATINE CRYSTALS—
Philadelphia, 25 brls.
IRON OXIDE—
Malaga, 200 brls.
MANGANESE ORE—
Bombay, 500 t.; Galveston, 439 t.
OLEO STEARINE—
Philadelphia, 200 tes.
PARAFFIN WAX—
New York, 42 bgs., 114 brls.; Philadelphia, 150 brls.
SOAP—
Philadelphia, 61 cs.
SODIUM PERBORATE—
New York, 80 brls.
SULPHATE OF QUININE—
Batavia, 675 cs.
TALLOW—
Philadelphia, 100 tes.; Sydney, 948 cks.
TAR—
Marseilles, 11 cks.
WAX—
Bathurst, 62 bls.; New York, 73 bls., 329 brls.; Philadelphia, 1,057 bgs., 300 brls.
WHITE LEAD—
Philadelphia, 896 bgs.

BARIUM SULPHATE—
Germany, £600.

BEEFWAX—
Aden, 11 pkgs.; Anglo-Egypt
Sudan, 390 pkgs., 395 bgs.;
British India, 54 cs.; B.W.I.,
12 brls.; Madagascar, 35 bgs.

CARBON BLACK—
U.S.A., 75 cs.

CAUSTIC SODA—
France, 1 c.

CHLOROPHYL—
Switzerland, £262.

CITRATE OF LIME—
British Guiana, 71 pkgs.

COAL PRODUCTS—
Antheene
Switzerland, 1 pkg.

DYESTUFFS—
Aniline Dye
Switzerland, 745 pkgs.; U.S.A.,
79 pkgs.

Argols
Spain, 128 pkgs.

Cochineal
France, 71 chts.

Gambier
Straits Settlements, 725 pkgs.

Indigo
British India, 9 chts.; Guate-
mala, 12 chts.

Myrabolans
British India, 22,307 pkgs.

Sumac
Switzerland, 3 pkgs.

Tanner's Bark
Cape, 35 t.; Natal, 38 t.; U.S.A.,
15 t.

Turmeric
British India, 187 pkgs.

FISH OIL—
Japan, 400 cs.; Portugal, 56 brls.

GELATINE—
Belgium, £275.; Denmark, £301.;
France, £400.; Holland, 9 t. 9 c.
and £119.

GLUE—
Belgium, £1,850.; France, 46 t.
18 c.; Holland, £37.

GLYCERINE—
Holland, £130.

HEXAMINE—
U.S.A., £250.

HYDROQUINONE—
France, £350.

MAGNESITE—
Holland, £100.

MAGNESIUM CHLORIDE—
Germany, £291.

MANGANESE DIOXIDE—
Sweden, £100.

MERCURY SUBIMATE—
Italy, £1,250.

OCHRE—
Holland, 4 brls.

PARAFFIN SCALE—
U.S.A., 101 t. 5 c.

PARAFFIN WAX—
British India, 200 t.; U.S.A.,
689 t. 1 c.

PARALDEHYDE—
Canada, £192.

PLUMRAGO—
China, 96 bgs.; British India,
75 cs.

POTASSIUM BROMIDE—
U.S.A., £500.

**POTASSIUM SULPHOGUAICO-
LATE**—
Switzerland, £785.

ROSIN—
France, 116 cks.; Portugal, 364
pkgs., 209 brls., 72 cks.; Portu-
gal, 364 pkgs., 209 brls., 242 cks.;
U.S.A., 933 cs., 400 brls.

SOAP—
Holland, £6,136.; U.S.A., £122.

SOAP STOCK—
U.S.A., £7,000.

SODA—
Switzerland, 4 c.

SODIUM PHOSPHATE—
Belgium, 40 t. 4 c.

TALLOW—
Argentine Republic, 56 t. 14 c.;
1,186 cks.; China, 27 t. 3 c.;
N.Z., 355 cks., 12 brls., 454 t. 4 c.;
N.Z., 355 cks., 12 brls., 543 t. 1 c.;
Uruguay, 495 t.

TANNIC ACID—
Switzerland, £245.; U.S.A., £200.

TAR—
Norway, 100 brls.; U.S.A., 200
brls.; Sweden, 365 brls.

TAR OIL—
Sweden, £186.

TARTAR (BROWN)—
Italy, £1,123.

TARTARIC ACID—
Italy, 60 pkgs.

ULTRAMARINE—
Belgium, 5 cks.

VEGETABLE WAX—
Madagascar, 38 pkgs.

WAX—
Holland, 6 cs., 9 cks.

WHITE LEAD—
Belgium, 8 brls., 59 cks.

WOOD OIL—
China, 420 brls., 1,100 cs.; Hong
Kong, 2,222 cs.

ZINC OXIDE—
Belgium, 100 cks.

MANCHESTER.

Week ending October 25.

DEXTROL—
New York, 880 bgs.
DYESTUFFS—
Bark Extract
Norfolk, 100 brls.; Philadelphia,
500 bxs.
Logwood Extract
Philadelphia, 20 brls.
FORMALDEHYDE—
New York, 112 brls.
MINERAL WHITE—
Tromsheim, 650 bgs.
OXALIC ACID—
Amsterdam, 30 cks.
PARAFFIN WAX—
Baltimore, 835 brls.
PHOSPHATE OF LIME—
Baltimore, 69 brls.
PHOSPHORUS—
Montreal, 500 cs.
SILICO MANGANESE—
Rouen, 3 cks.
STEARINE—
Amsterdam, 135 brls.
TALLOW—
New York, 225 brls.; Sydney,
90 cks.

LONDON.

Week ending October 25.

ANTIMONY (REGULUS)—
China, 50 t.

MIDDLESBROUGH.

Week ending October 25.

NIL.

NEWCASTLE-ON-TYNE

Week ending October 25.

IRON OXIDE
Malaga, 190 brls.**N. & S. SHIELDS.**

Week ending October 25.

NIL.

SWANSEA.

Week ending October 25.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

BRISTOL.Publication of Official Returns
Suspended.**GLASGOW.**

Week ending October 25.

ALUM—
Calcutta, 50 t. 7 c.

AMMONIUM SULPHATE—
Kobe, 200 t.; Yokohama, 50 t.

CHEMICALS (otherwise undescribed)—
Antwerp, 100 pkgs.; Basra, 2 pkgs.; Bombay, 43 pkgs.; Calcutta, 16 pkgs.; Gothenburg, 192 pkgs.; Lisbon, 18 pkgs.; Montreal, 225 pkgs.; New York, 720 pkgs.; Natal, 15 pkgs.; Rangoon, 61 pkgs.; Rouen, 59 pkgs.

COAL PRODUCTS (otherwise undescribed)—
Basra, £167.; Bombay, £90.; Calcutta, £562.; Gothenburg, £52.; Lisbon, £10.; New York, £1,320.; Natal, £278.; Rangoon, £76.; Rouen, £1,109.

DISINFECTANTS (otherwise undescribed)—
Bombay, £65.; Lisbon, £225.

DYESTUFFS (otherwise undescribed)—
Gothenburg, £10.

FERRO MANGANESE—
New York, 9 t.

GLUE, SIZE, AND GELATINE—
Montreal, £80.

GLYCERINE—
Delagoa Bay, £5,078.

LEAD NITRATE—
Montreal, £106.

MAGNESITE (CALCINED)—
Montreal, £80.

MAGNESIUM SULPHATE—
Basra, 16 c.; Delagoa Bay, 22,400 lbs.

PARAFFIN—
Rouen, 1 t. 7 c.

PARAFFIN WAX—
Antwerp, 20 t.; Natal, 24 t. 9 c.

POTASSIUM BICHROMATE—
Antwerp, £396.

SALAMMONIAC—
Basra, 110 cks.

SHEEP DIP—
Delagoa Bay, £945.; Natal, £927.

SOAP—
Basra, 2,630 bxs.; Antwerp, 2,080 bxs.; Calcutta, 4 bxs.

SODA ASH—
Antwerp, 30 t.; Gothenburg, £4,525.

SODIUM BICHROMATE—
Bombay, £260.; Calcutta, £172.

GOOLE.

Week ending October 25.

NIL.

GRANGEMOUTH

Week ending October 25.

COAL PRODUCTS—
Pith

Genoa, 1,740 t.

PARAFFIN WAX—
Rotterdam, 10 t.

GRIMSBY.

Week ending October 25.

NIL.

HULL.

Week ending October 21.

BLEACHING POWDER—
Bombay, 436 drms.

BORAX—
Amsterdam, 8 cks.

CHEMICALS (otherwise undescribed)—
Alexandria, 73 brls., 500 bgs.; Bombay, 700 brls., 100 drms.; Karachi, 200 brls., 800 bgs.

COAL PRODUCTS—
Tar
Karachi, 10 cs., 100 drms.

SOAP—
Alexandria, 3 cks.; Karachi, 6 cs.

LEITH.

Week ending October 25.

AMMONIUM NITRATE—
Dieppe, 11 t. 10 c., £120.

LIVERPOOL.

Week ending October 23.

ACETIC ACID—
Alexandria, 5 c., £24.; Antwerp, 18 c., £55.

ALUM—
Constantinople, 1 t., £18.; Fremantle, 10 c., £10.; Malta, 1 t. 18 c., £110.; Maranhao, 12 c., £57.; Rangoon, 2 t. 17 c., £46.; Sao Paulo, 1 t. 19 c., £43.; Vancouver, 6 t. 14 c., £142.

ALUM (AMMONIA)—
Corinto, 1 c., £8.; Malta, 1 t. 18 c., £110.

ALUMINA SULPHATE—
Christiania, 15 t., £290.; Para, 2 c., £4.; Villabona, 5 t., £90.

AMMONIA—
La Libertad, 1 c., £10.

AMMONIUM CARBONATE—
Bahia, 10 c., £31.; Batavia, 1 t. 19 c., £161.; Corinto, 1 c., £6.; Kobe, 15 t., £900.; La Libertad, 1 qt., £3.; Maranhao, 2 c., £5.; Monte Video, 1 t., £66.; Piraeus, 1 t., £60.; Porto Alegre, 2 c., £16.; Rio de Janeiro, 6 t. 12 c., £417.; Santos, 1 t. 9 c., £94.; Yokohama, 9 t. 1 c., £546.

AMMONIUM CHLORIDE—
Sydney, 1 c., £58.

AMMONIUM MURIATE—
Antwerp 10 t. 1 c., £473.; Montreal, 10 t. 6 c., £165.

AMMONIUM SULPHATE—
Las Palmas, 129 t.; Yokohama, 2,060 bgs.

ANTIMONY SULPHIDE—
Christiania, 2 c., £8.

ANILINE OIL—
Barcelona, 33 drms.

ANTIMONY OXIDE—
Dunkirk, 20 pkgs.

ARSENIC—
Lagos, 1 t., £60.; Lisbon, 10 c., £37.; Maranhao, 2 c., £13.; Rangoon, 3 t., £177.

BARIUM CHLORIDE—
Madrid, 2 t. 1 c., £50.

BASIC SLAG—
Callao, 50 t.

BLEACHING POWDER—
Calcutta, 30 t., £317.; Christiania, 65 t. 10 c., £480.; Lisbon, 32 t. 1 c., £441.; Maranhao, 4 t. 13 c., £77.; Oporto, 27 t. 2 c., £447.

BORAX

Antwerp, 58 t., £2,148.; Maranhao, 2 qrs., £5.; Novorossisk, 4 c., £9.; Para, 5 c., £14.; Santos, 1 t. 5 c., £55.

BORIC ACID

Guayaquil, 1 c., £10.; Maranhao, 1 c., £11.; Para, 2 c., £11.

CALCIUM CARBIDE—
Calabar, 3 c., £12.

CALCIUM CHLORIDE—
Alexandria, 12 t. 13 c., £95.; Maranhao, 2 t. 13 c., £20.; Pt. Said, 2 t. 10 c., £28.

CALCIUM SILICATE—
Para, 1 c., £5.

CAUSTIC SODA—
Adelaide, 16 drms.; Algoa Bay, 200 drms.; Bombay, 213 drms.; Bahia, 100 cks.; Batavia, 30 drms.; Constantinople, 262 drms.; Dalm, 168 pkgs., 168 drms.; Duala, 6 drms.; East London, 79 pkgs.; Fremantle, 141 drms.; Harbin, 50 pkgs.; Karachi, 50 drms.; Kobe, 87 cks.; Madras, 155 drms.; Manila, 155 drms.; Melbourne, 52 drms.; Moji, 52 drms.; Piraeus, 10 drms.; Porto Alegre, 1,400 drms.; Rangoon, 74 drms.; Rotterdam, 21 drms.; Sao Paulo, 150 drms.; Singapore, 26 drms.; Sydney, 216 drms.

CHEMICALS (otherwise undescribed)—
Barbados, 2 qrs., £2.; Masterton, 1 t., £44.; Stamboul, 1 t. 12 c., £12.

COAL PRODUCTS (otherwise undescribed)—
Montreal, 9 c., £156.

COAL PRODUCTS

Aniline Dye
Barbados, 2 qrs., £1.; Barcelona, 1 t. 5 c., £844.; Copenhagen, 2 c., £60.; Genoa, 1 t. 3 c., £590.; Montreal, 2 t. 10 c., £132.; Oporto, 4 c., £141.

Carbolic Acid
Guayaquil, £3.; Kobe, 19 t. 9 c., £1,373.; Yokohama, 4 t. 19 c., £277.

Carboshil
Algoa Bay, 10 t. 1 c., £105.

Creolina
Bahia, 2 t. 9 c., £288.; Champereico, 4 c., £14.; La Guaira, 2 c., £7.; Maranhao, 17 c., £100.; Porto Alegre, 2 t. 19 c., £288.; Rio de Janeiro, 2 t. 9 c., £208.

Creosote
Christiania, 44 t. 13 c., £350.

Dyes
Bombay, 1 c.; Havre, 7 t. 18 c., £3,794.

Naphthalene
Maranhao, 1 c., £13.

Pitch
Aviles, 280 t.

Tar
Accra, 5 t. 10 c., £79.; Bathurst, 1 c., £4.; Corinto, 11 c., £4.; Las Palmas, 11 c., £5.; Lagos, 5 c., £10.; Larne, 1 t., £20.; Opobo, 11 c., £6.; Patras, 1 t., £9.; Para, 10 c., £45.; Pt. Harcourt, 18 c., £9.; Sierra Leone, 13 c., £12.

COPPERAS—
Alexandria, 60 pkgs., 72 brls.

COPPER SULPHATE—
Algiers, 103 pkgs.

CREAM OF TARTAR—
Christiania, 4 c., £50.; Halifax, N.S., 2 t. 4 c., £310.; St. John, N.B., 5 t. 14 c., £758.

DISINFECTANTS (otherwise undescribed)—
Alexandria, 5 t., £184.; Choralque, 1 c., £5.; Corinto, 6 c., £7.; Kingston, Ja., 12 c., £34.; Monte Video, 1 qt., £1.; Parahyba, 2 c., £12.; Para, 1 t. 6 c., £65.; Secondee, 4 c., £20.; Tas Ma, Bolivia, 1 c., £5.; Trinidad, 8 c., £9.

FERRO MANGANESE—
Hamburg, 100 t.; N. Orleans, 200 t.

FERRO TUNGSTEN—
Gothenburg, 1 t.

FISH OIL—
Bilbao, 5 brls.

FULLER'S EARTH—
New Orleans, 3,259 bgs.; Vera Cruz, 400 bgs.

GLUE—
St. Lucia, 2 pkgs.; Yokohama, 100 bgs.

GLUE, SIZE, AND GELATINE—
Alexandria, 120 pkgs.; Calcutta, 10 pkgs.

LEAD CARBONATE—
Maranhao, 1 c., £6.

MAGNESIA—
Sydney, 22 pkgs.

MAGNESIUM CHLORIDE—
Cape Town, 5 t. 1 c., £85.; Durban, 5 t. 3 c., £83.

OXALIC ACID—
Montreal, 6 c., £50.; Punta Arenas, 1 c., £10.

PITCH—
Antwerp, 250 t. 13 c., £814.; Bathurst, 3 c., £2.; Grand Bassam, 4 c., £2.; Lagos, 3 t. 9 c., £20.; Monrovia, 11 c., £5.

POTASSIUM BICHROMATE—
Alexandria, 10 t. 16 c., £1,724.; Constantinople, 1 t. 1 c., £166.; Calcutta, 3 t., £25.; Rio de Janeiro, 2 t., £182.; Smyrna, 6 c., £44.

POTASSIUM CARBONATE—
Lisbon, 2 c., £14.

POTASSIUM CHLORIDE—
Kobe, 36 t., £2,208.; Shanghai, 40 t., £2,640.; Vigo, 2 c., £14.

POTASSIUM NITRATE—
Corinto, 3 c., £15.

SALAMMONIAC—
Baltimore, 2 t., £151.; Galatz, 1 t., £55.; Karachi, 7 t. 10 c., £527.; Limassol, 2 c., £7.; Montreal, 1 t. 5 c., £90.; Melbourne, 10 c., £36.; Punta Arenas, 2 c., £15.; Rouen, 5 t. 6 c., £358.; Salonica, 1 t. 1 c., £74.

SALICYLIC ACID—
Genoa, 4 c., £7.

SALTPETRE—
Parahyba, 5 c., £16.; Vigo, 1 t., £54.

SHEEP DIP—
Buenos Ayres, 93 t. 8 c., £3,868.; Cali, 10 c., £21.; Manizales, 16 c., £80.

SOAP—
Accra, 1,200 cs.; Adelaide, 28 bxs.; Alexandria, 12 pkgs., 948 bxs.; Algiers, 5 cs.; Amsterdam, 350 cs.; Antwerp, 23 cs., 6,300 bxs.; Assinie, 50 cs.; Athens, 169 cs.; Attuaboe, 100 bxs.; Bangkok, 16 pkgs.; Belewian, 30 bxs.; Bombay, 968 bxs.; Buenos Ayres, 63 bxs.; Calcutta, 112 bxs.; Colombo, 869 bxs.; Cologne, 425 cs.; Constantinople, 50 cs.; Durban, 452 cs.; Malta, 16 cs.; Martinique, 300 cs.

SOAP

Paphos, 20 pkgs.; Piraeus, 95 bxs.; Rotterdam, 16 bxs.; Salonica, 2,385 bxs.; Santos, 5 bxs.; Saltpond, 200 bxs.; 100 pkgs.; Secondee, 600 bxs.; Sherbro, 12 pkgs.; Sierra Leone, 400 bxs.

SODA ASH

Adelaide, 115 pkgs.; Amsterdam, 230 pkgs.; Algoa Bay, 276 pkgs.; Batavia, 330 pkgs.; Buenos Ayres, 1,513 pkgs.; Bombay, 3,600 pkgs.; Chchofo, 840 pkgs.; Cape Town, 237 pkgs.; Delagoa Bay, 193 pkgs.; Dalny, 5,037 pkgs.; Kobe, 865 pkgs.; Melbourne, 293 pkgs.; Monte Video, 410 pkgs.; Piraeus, 100 pkgs.; Rotterdam, 1,000 pkgs.; Samarang, 272 pkgs.; Shanghai, 582 pkgs.; Soerabaya, 1,775 pkgs.

SODA CRYSTALS—

Bangkok, 16 pkgs.; Batavia, 118 pkgs.; Cape Town, 690 pkgs.; Singapore, 25 pkgs.

SODIUM BICARBONATE

Cape Town, 100 pkgs.; Fremantle, 61 pkgs.; Galatz, 100 pkgs.; Halifax, N.S., 370 pkgs.; Kingston, Ja., 28 pkgs.; Manila, 230 pkgs.; Monte Video, 50 pkgs.; Montreal, 1,314 pkgs.; New York, 30 pkgs.; Piraeus, 34 pkgs.; Rotterdam, 410 pkgs.; Samarang, 80 pkgs.; Secondee, 414 pkgs.; Soerabaya, 50 pkgs.; Stamboul, 400 pkgs.; Smyrna, 20 pkgs.

SODIUM CYANIDE—

Batavia, 25 pkgs.

SODIUM SILICATE

Buenos Ayres, 476 pkgs.; Delagoa Bay, 83 pkgs.; Melbourne, 387 pkgs.; Montreal, 32 pkgs.; Piraeus, 63 pkgs.; Porto Alegre, 157 pkgs.; Santos, 317 pkgs.; Shanghai, 240 pkgs.; Sydney, 48 pkgs.

SULPHUR—

La Union, 1 c., £13.; Maranhao, 1 c., £8.

SULPHUR FLOWERS—

Ceara, 1 c., £8.; Corinto, 3 c., £20.

SULPHURIC ACID—

Maranhao, 7 c., £15.

SUPERPHOSPHATE OF LIME—

Las Palmas, 10 t.

TARTARIC ACID—

Christiania, 4 c., £68.; Lima, 4 c., £72.; Punta Arenas, 1 c., £35.

WHITE LEAD—

Lisbon, 3 t.

ZINC CHLORIDE—

Alexandria, 9 t. 13 c., £500.; Bombay, 9 t. 15 c., £422.; Sydney, 1 c., £47.

ZINC PERCHLORIDE—

Copenhagen, 5 c., £65.

ZINC SULPHATE—

Buenos Ayres, 1 c., £8.; Quebec, 2 c., £33.

LONDON.

Week ending October 22.

ACETANILID—

Odessa, 2 cks., £24.; Rostoff-on-Don, 1 c., £19.; Shanghai, 1 c., £7.

ACETIC ACID

Launceston, 2 cks., £6.; Melbourne, 5 cks., £13.; Pt. Moresby, 10 cks., £20.; Suva, 2 cks., £14.; Sydney, 18 cks., £56.

ACETIC ANHYDRIDE—

Melbourne, 3 cks., £14.

ACETO SALICYLIC ACID

Cape Town, 1 c., £11.; Fiume, 7 cks., £359.; Fremantle, 1 c., £12.; Melbourne, 5 cks., £122.; Novorossisk, 3 cks., £119.; Naples, 1 c., £39.; Sydney, 5 cks., £115.

ALUM

Brussels, 5 c., £9.; Calcutta, 5 c., £12.; Lisbon, 2 c., £8.

ALUMINA SULPHATE

Christiania, 6 c., £19.

AMMONIA

Alexandria, 2 drms., £5.; Bilbao, 1 c., £9.; Boulogne, 28 drms., £250.; Bombay, 18 cks., £36.; Calcutta, 5 cks., £10.; Buenos Ayres, 20 cks., £39.; Cape Town, 5 cks., £10.; Demerara, 6 cks., £8.; Durban, 5 cks., £10.; East London, 4 cks., £8.; Lisbon, 20 cks., £39.; Pelotas, 5 cks., £6.; Pt. Elizabeth, 1 c., £8.; Shanghai, 5 cks., £10.

AMMONIUM BIPHOSPHATE

Amsterdam, 1 c., £40.

AMMONIUM BROMIDE—

Shanghai, 1 c., £8.

AMMONIUM CARBONATE—

Bangkok, 9 c., £35.; Cape Town, 11 c., £41.; Charkoff, 10 c., £45.; Constantinople, 1 t., £85.; Hiogo, 10 t., £598.; Hong Kong, 1 c., £7.; Pelotas, 4 c., £19.; Penang, 9 c., £35.

AMMONIUM CHLORIDE

Calcutta, 1 c., £14.; Christchurch, 5 cks., £16.; East London, 2 kgs., £6.; Lyttleton, 2 cks., £29.; Pelotas, 1 c., £28.; Shanghai, 4 cks., £17.; Wellington, 2 kgs., £6.

AMMONIUM CHLOROHYDRATE

Rio de Janeiro, 1 c., £8.

AMMONIUM HYDRATE

Shanghai, 1 c., £11.

AMMONIUM NITRATE—

Antwerp, 11 t., £297.

AMMONIUM SULPHATE—

Dunkirk, 150 t., £3,550.; Paris, 400 t., £10,600.

AMMONIUM SULPHOCYANIDE—

Philadelphia, 1 c., £8.

AMMONIUM VALERIANATE—

Constantinople, 1 c., £10.

AMYL ACETATE—

Brussels, 3 drms., £328.; Paris, 7 drms., £112.

ANTIMONY SULPHIDE—

Dunkirk, 2 pkgs., £44.

ARSENIC

East London, 10 c., £35.; Karachi, 2 t., £140.

BARIUM NITRATE—

Bombay, 20 drms., £50.

BISMUTH

Pelotas, 1 c., £7.; Shanghai, 1 c., 4 cks., £111.

BISMUTH CARBONATE—

Auckland, 14 cks., £11.; Constantinople, 1 c., £17.; Durban, 1 c., £13.

BISMUTH CITRATE—

Constantinople, 7 cks., £25.

BISMUTH OXIDE—

Constantinople, 7 cks., £10.

BISMUTH SALICYLATE—

Constantinople, 7 cks., £77.

BISMUTH SALTS—

Beyrout, 1 c., £5.

BISMUTH SUBNITRATE—

Constantinople, 7 cks., £303.; Sydney, 4 pkgs., £9.

BORAX—

Cape Town, 15 c., £30.; Durban, 2 c., £8.; Malta, 10 c., £20.; Santos, 25 t., £975.

BORIC ACID—

Calcutta (F.), 4 c., £15.; Cape Town, 1 c., £5.; East London, 5 c., £20.; Lisbon, 5 c., £14.; Medan Deli, 2 c., £15.; Piraeus, 1 c., £5.; Rio de Janeiro, 2 c., £13.; Shanghai, 12 c., £45.; Suva, 1 c., £5.

BUTYL ACETATE—

Paris, 1 dm., £11.

CABLE WAX—

Antwerp, 1 t.

CALCIUM & SODIUM HYPOPHOSPHITE

Paris, 10 cks., £244.

CALCIUM CARBIDE

Kalundini, 16 c., £56.

CALCIUM LACTATE—

Lyttleton, 1 c., £6.

CAMPHOR

Marseilles,

CARNAUBA WAX

Abo, 1 t., £18.

CAUSTIC POTASH—

Alexandria, 1 c., 2 cks., £37.

CAUSTIC SODA

Brussels, 25 t. 2 c., £451.

CERESINE WAX

Amsterdam, 10 c.; Antwerp, 1 t. 10 c.; Dunkirk, 1 t.; Melbourne, 5 c.

CHEMICALS (otherwise undesignated)

Aden, 2 cks., £13.; Bombay, 3 cks., £41.; Calcutta, 1 c., £8.; Canton, 2 cks., £19.; Cape Town, 2 cks., £48.; Christchurch, 2 cks., £22.; Dunedin, 2 cks., £70.; Malta, 2 cks., £24.; Melbourne, 4 cks., £77.; Pt. Elizabeth, 3 cks., £34.; Salonica, 1 c., £21.; Sydney, 1 c., £34.; Wellington, 10 cks., £179.

CHINA CLAY—

Bombay, 25 t.

CITRATE OF IRON

Buenos Ayres, 4 cks., £61.

CITRIC ACID—

Barcelona, 2 t., £838.; Brisbane, 1 c., £12.; Cape Town, 5 c., £114.; Charkoff, 10 c., £247.; Christiania, 1 c., £23.; Constantinople, 2 t. 10 c., £1,250.; Montreal, 1 t. 5 c., £565.; Mormugao (F.), 1 c., £6.; New York, 5 t., £2,239.; Pt. Elizabeth, 2 c., £45.; Rangoon, 1 c., £19.; Shanghai, 5 c., £119.; Toronto, 10 c., £226.

COAL PRODUCTS—

Alizarine
Bombay, 4 cks., £118.; Madras, 100 cks., £3,182.; Tuticorin, 3 cks., £118.

Aniline Colour

Bombay, 1 dm., £48.; Brussels, 1 c., £57.

Aniline Dye

Gothenburg, 10 kgs., £434.; New York, 2 cks., £40.; Paris, 1 pcl., £18.; Perth, 1 c., £11.

Aniline Oil

Rotterdam, 1 dm., £50.

Betanaphthol

Amsterdam, 1 brl., £25.; Rotterdam, 1 kg., £20.

Carbolic Acid

Beira, 2 cks., £5.; Kobe, 311 pkgs., £2,966.; Melbourne, 49 drms., £44.; Sydney, 4 pkgs., £5.

Creosote

Gothenburg, 750 brls., £1,294.

Cresylic Acid

Montreal, 10 cks., £89.

Naphtha (Solvent)

Dieppe, 15 drms., £250.

Naphthalene

Calcutta, 59 cks., £199.; Cape Town, 1 c., £5.; Hong Kong, 1 c., £19.; Novorossisk, 38 cks., £180.; Tientsin, 69 cks., £135.

Paranitraniline

Rotterdam, 1 kg., £20.

Pitch

Alexandria, 500 cks., £305.; Calais, 160 t., £548.

Pyridine

Piraeus, 21 drms., £732.

Tar

Beira, 20 drms., £9.; Cape Town, 60 drms., £8.; Penang, 38 cks., £66.

COPPER SULPHATE—

Christiania, 2 t., £80.

CREAM OF TARTAR

Auckland, 2 t., £431.; Beira (F.), 1 c., £17.; Buenos Ayres (F.), 1 c., £11.; Durban, 1 c., £12.; Durban (F.), 2 c., £26.; East London, 4 c., £44.

DISINFECTANTS (otherwise undesignated)

Antwerp, 4 t. 19 c., £265.; Auckland, 8 c., £27.; Beira, 1 c., £7.; Bombay, 13 c., £43.; Calcutta, 2 c., £7.; Canton, 2 c., £12.; Cape Town, 2 c., £6.

DISINFECTANTS (otherwise undesignated)

Colombo, 7 c., £24.; Dar-es-Salaam, 9 c., £18.; Dominica, 2 c., £6.; Durban, 1 t. 6 c., £69.; East London, 1 c., £8.; Fremantle, 1 c., £11.; Hong Kong, 1 c., £6.; Limon, 11 c., £33.; Penang, 1 t. 1 c., £48.; Pt. Elizabeth, 2 t. 6 c., £100.; St. Lucia, 2 c., £3.; Shanghai, 1 t. 19 c., £60.; Suva, 1 c., £8.; Toronto, 1 t. 2 c., £60.

ETHER—

Alexandria, 7 cks., £63.

ETHER (METHYLIC)—

Hong Kong, 4 drms., £14.

ETHER (SULPHURIC)—

Pelotas, 3 cks., £12.

ETHER (SULPHURIC AND METHYLIC)—

Alexandria, 1 c., £8.

ETHYL CHLORIDE—

Toronto, 1 c., £38.; Vancouver, 2 cks., £76.; Winnipeg, 1 c., £38.

FATTY ACIDS—

Trieste, £1,730.

FORMALDEHYDE—

Alexandria (F.), 6 cks., £8.; Trinidad, 3 brls., £83.

GELATINE

Moji, 3 c.

GLUE, SIZE, AND GELATINE

Alexandria, 2 t.; Antwerp, 13 t. 13 c.; Auckland, 11 c.; Bombay, 1 t. 10 c.; Boulogne, 5 c.; Buenos Ayres, 4 c.; Callao, 18 c.; Cape Town, 2 c.; Calcutta, 1 c.; Constantinople, 4 c.; Durban, 5 c.; East London, 2 c.; Fiume, 5 t.; Jaffa, 1 t.; Karachi, 1 t.; Malta, 1 t.; Montreal, 9 c.; Ostend, 4 c.; Osaka, 5 t. 8 c.; Rotterdam, 18 t.; Yokohama, 21 t. 12 c.

GLYCERINE

Buenos Ayres, 1 c., £8.; Shanghai, 2 c., £14.

GLYCEROPHOSPHORIC ACID—

East London, 1 c., £15.; Sydney, 1 c., £27.

HYDROCHLORIC ACID

Jamaica, 1 c., £5.

HYDROCYANIC ACID

Brisbane, 1 c., £16.

HYDROFLUORIC ACID—

Tokio, 5 cks., £17.

HYDROGEN PEROXIDE—

Alexandria, 5 cks., £28.

HYPOPHOSPHITE SALTS—

Paris, 3 cks., £42.

HYPOPHOSPHORIC ACID

East London, 1 c., £5.

HYPOPHOSPHOROUS ACID—

Melbourne, 1 c., £9.

IODINE (RESUBLIMED)

Calcutta, 1 c., £26.; Lisbon, 2 cks., £88.; Shanghai, 1 c., £51.

IRON & AMMONIUM CITRATE—

Brussels, 1 c., £11.; Fremantle, 2 cks., £26.; Toronto, 1 c., £10.

IRON & POTASSIUM TARTRATE

Constantinople, 1 c., £8.

IRON LACTATE—

Alexandria, 1 c., £30.

IRON PERCHLORIDE—

Bombay, 2 cks., £8.

IRON REDACTATE—

Calcutta, 1 c., £8.

LACTIC ACID—

Adelaide (F.), 1 c., £20.; Calcutta, 6 cks., £16.; Fiume, 1 c., £7.; Havre, 10 cks., £160.

LEAD ACETATE—

Auckland, 1 c., £7.; Calcutta, 1 c., £10.

LITHIUM BENZOATE—

Brussels, 1 c., £5.

MAGNESIA—

Adelaide, 20 cks., £59.; Brussels, 1 c., £5.; Pt. Elizabeth, 1 c., £49.

MAGNESIA (CALCINED)

Launceston, 1 c., £5.

MAGNESIUM CARBONATE—

Cape Town, 1 ck., £5.; Otago, 3 cs., £15.; Sydney, 6 cs., £29.

MAGNESIUM CITRATE—

Auckland, 13 cs., £56.; Cape Town, 1 cs., £42.; East London, 1 cs. (pt.), £7.

MAGNESIUM SULPHATE—

Bombay, 4 c., £7.; Canton, 13 c., £25.; Cape Town, 10 c., £11.; Delagoa Bay, 5 c., £11.; Durban, 10 c., £22.; Lourenco Marques, 3 c., £7.; Melbourne, 8 c., £52.; Porto Alegre, 4 c., £12.; Pt. Said, 1 t., £51.; Sydney, 4 t. 18 c., £200.

MANGANESE DIOXIDE—

Auckland, 1 ck., £8.

MERCURIALS—

Constantinople, 2 cs., £79.

METHYLIC ALCOHOL—

Oran, 5 drms., £215.

METHYL SALICYLATE—

Constantinople (F.), 1 cs., 40 drms., 50 cs. (pt.), £493.; East London, 1 dr., £10.

MINERAL WAX—

Buenos Ayres, 16 c.; Malta, 4 c.; Valparaiso, 1 t.

MURIATIC ACID—

Jaffa, 1 c., £8.

NICKEL SULPHATE—

Sydney, 1 ck., £8.

NITRIC ACID—

Jamaica, 1 c., £5.; Malta, 2 c., £6.

OXALIC ACID—

Calcutta, 1 ck., £9.

PARAFFIN WAX—

Batoum, 2 t.; Lyttleton, 1 t. 13 c.

PHENYL ACETALDEHYDE—

Melbourne, 1 cs. (pt.), £7.

PHOSPHORIC ACID—

Amsterdam, 1 crby., £9.; Cape Town, 2 cs., £10.; Melbourne, 7 cs., £41.; Paris, 15 crbys., £146.; Sydney, 5 cs., £45.; 89 cs., £374.; Swatow, 1 cs., £10.

PLUMBAGO—

Bombay, 11 t.; Cape Town, 5 t. 7 c.; Genoa, 1 t. 13 c.; Piraeus, 2 t.

POTASSIUM ACETATE—

Christiania, 2 cs. (pt.), £17.

POTASSIUM BICARBONATE—

Christchurch, 1 cs., £10.

POTASSIUM BICHROMATE—

Auckland, 1 c., £11.

POTASSIUM BISULPHITE—

Paris, 6 cks., £68.

POTASSIUM BITARTRATE—

Constantinople, 1 cs. (pt.), £12.

POTASSIUM BROMIDE—

Bombay, 2 cs., £55.; Shanghai, 3 cs. (pt.), £11.

POTASSIUM CARBONATE—

Alexandria, 1 cs., £18.; Calcutta, 1 cs., £11.

POTASSIUM CHLORATE—

Cyprus, 1 cs., £9.

POTASSIUM CITRATE—

Montreal, 2 cs. (pt.), £25.; Toronto, 1 cs., £23.

POTASSIUM CYANIDE—

Buenos Ayres, 4 cs., £49.; Calcutta, 1 cs. (pt.), £14.; Odessa, 3 cs., £120.; Shanghai, 4 cs., £70.

POTASSIUM IODIDE—

Calcutta, 1 ck. (pt.), £87.; Melbourne, 1 cs. (pt.), £2.; Shanghai, 1 cs., 3 cs. (pt.), £107.

POTASSIUM PRUSSATE—

Fremantle, 1 kg., £10.; Sydney, 1 kg., £34.

POTASSIUM SULPHIDE—

Rio de Janeiro, 1 ck., £19.

POTASSIUM SULPHOGUAICO-

LATE—
Buenos Ayres, 1 cs. (pt.), £50.; Christiania (F.), 1 cs. (pt.), £30.; Constantinople (F.), 2 cs. (pt.), £150.

POTASSIUM TARTRATE—

Buenos Ayres (F.), 2 c., £76.; Calcutta, 1 c., £31.; Stockholm, 1 cs., £10.

PYRAMIDON—

B. Ayres (F.), 1 cs. (pt.), £44.

QUININE—

Calcutta, 9,000 ozs.; Cape Town, 30 ozs.; Karachi, 1,200 ozs.

ROCHELLE SALTS—

Habana, 1 t., £140.

SALAMMONIAC—

Amsterdam, 3 c., £12.

SALICYLIC ACID—

Auckland, 1 cs., £13.; Cape Town, 1 cs. (pt.), £11.; Launceston (F.), 1 cs. (pt.), £5.; Naples, 1 cs., 2 cs. (pt.), £66.

SALT—

Auckland, 20 t.; Copenhagen, 4 c.; Lyttleton, 90 t.

SALTPETRE—

Bilbao, 10 c., £26.; Durban, 10 c., £32.; Eten, 10 c., £31.; East London, 9 c., £28.

SHEEP DIP—

Buenos Ayres, 15 t., £600.; Delagoa Bay, 2 t. 7 c., £86.; Durban, 9 t. 9 c., £401.; Pt. Elizabeth, 1 t. 18 c., £86.

SILVER NITRATE—

Beyrout, 2 cs. (pt.), £24.; Constantinople, 1 cs. (pt.), £55.; Durban, 6 cs. (pt.), £18.; Cape Town, 1 cs. (pt.), £9.

SILVER PROTEINATE—

Constantinople, 1 cs., 1 cs. (pt.), £96.

SOAP—

Aleppo, 8 c.; Alexandria, 4 t. 5 c.; Amsterdam, 17 c.; Amoy, 2 c.; Antwerp, 216 t. 8 c.; Auckland, 9 c.; Barbados, 1 c.; Beira, 1 c.; Bilbao, 13 c.; Boston, 1 t. 5 c.; Bombay, 10 t. 14 c.; Boulogne, 52 t. 3 c.; Brisbane, 10 c.; Buenos Ayres, 1 c.; Canterbury, 1 c.; Calcutta, 3 t. 7 c.; Cape Town, 4 c.; Chinde, 1 t. 5 c.; Cologne, 168 t. 2 c.; Colombo, 7 t. 8 c.; Delagoa Bay, 1 c.; Damerara, 4 c.; Durban, 1 t. 4 c.; Fiume, 30 t. 15 c.; Galatz, 19 c.; Genoa, 1 t. 16 c.; Gibraltar, 6 c.; Halifax, 10 c.; Helsingfors, 50 t.; Hong Kong, 1 t. 2 c.; Jaffa, 3 c.; Jamaica, 8 c.; Launceston, 4 c.; Lisbon, 2 c.; Marseilles, 22 t. 10 c.; Madras, 15 c.; Montreal, 9 c.; Mazagan, 17 t.; Mozambique, 4 c.; Melbourne, 8 c.; Nantes, 4 c.; Naples, 1 t. 8 c.; New Plymouth, 3 c.; Ostend, 12 t.; Pt. Elizabeth, 1 c.; Pt. Said, 1 c.; Rotterdam, 19 t. 11 c.; Seychelles, 2 c.; Shanghai, 6 c.; Singapore, 13 c.; St. John, N.B., 7 c.; Sydney, 4 c.; Toronto, 5 t. 9 c.; Trinidad, 1 t. 2 c.

SODA (CALCINED)—

Pt. Said, 6 c., £6.

SODIUM AND POTASSIUM TAR-

TRATE—
Constantinople, 1 cs. (pt.), £7.

SODIUM BENZOATE—

Buenos Ayres, 1 cs. (pt.), £9.; Pelotas, 1 cs., £25.

SODIUM BICARBONATE—

Cape Town, 8 c., £15.; Delagoa Bay, 3 c., £6.; Durban, 10 c., £10.; Hankow, 12 c., £9.; Smyrna, 6 c., £15.; Toronto, 5 c., £12.

SODIUM BISULPHATE—

Piraeus, 1 t., £7.

SODIUM BISULPHITE—

Bombay, 1 t., £32.; Paris, 18 c., £26.; Penang, 2 t. 10 c., £75.; Pt. Swettenham, 1 t. 5 c., £38.; Singapore, 1 t. 5 c., £38.

SODIUM BROMIDE—

Calcutta, 1 cs., £7.; Launceston (F.), 1 cs. (pt.), £7.

SODIUM CACODYLATE—

Buenos Ayres, 1 cs. (pt.), £10.

SODIUM CARBONATE—

Salonica, 2 c., £7.

SODIUM CITRATE—

Montreal, 2 cs. (pt.), £21.

SODIUM CYANIDE—

Delagoa Bay, 32 t., £2,990.

SODIUM HYDRATE—

Alexandria, 6 cs. (pt.), £7.

SODIUM HYPO—

Bombay, 2 t. 10 c., £75.; Hong Kong, 8 c., £12.; Penang, 1 t., £28.; Pelotas, 4 c., £22.; Rio de Janeiro, 1 t. 19 c., £49.; Salonica, 1 t., £29.

SODIUM IODIDE—

Calcutta, 1 cs. (pt.), £23.

SODIUM METABISULPHITE—

Nantes, 5 c., £13.

SODIUM NITRATE—

Bombay, 20 drms., £92.; Cyprus, 1 cs. (pt.), £11.

SODIUM OXALATE—

Brisbane, 1 t., £215.

SODIUM PHOSPHATE—

Amsterdam, 14 c., £88.; Christiania, 2 c., £13.

SODIUM PRUSSATE—

Montreal, 9 t. 19 c., £928.; New York, 40 t., £2,265.; Tokio, 20 t., £1,352.

SODIUM PYROPHOSPHATE—

Sydney, 1 t. 3 c., £123.

SODIUM SALICYLATE—

Buenos Ayres, 1 cs. (pt.), £5.; Melbourne, 1 cs. (pt.), £12.; Naples, 1 cs. (pt.), £13.

SODIUM SULPHATE (GLAUBER

SALTS)—
Brisbane, 1 t. 2 c., £12.

SODIUM SULPHITE—

Brussels, 2 c., £7.; Bombay, 12 cs., £43.; New York, 1 t. 1 c., £28.; Penang, 1 t., £25.; Salonica, 2 c., £9.

SODIUM TARTRATE—

Calcutta, 1 c., £6.; Lisbon, 1 c., £5.

SODIUM THEOBROMINE—

Fiume, 4 cs., £178.

SULPHATE OF QUININE—

Genoa, 2,999 ozs.

SULPHUR—

Constantinople, 12 c., £30.; Helsingfors (F.), 10 t., £253.; Piraeus, 10 c., £21.; Suva, 2 c., £6.

SULPHUR (FLOWERS)—

Helsingfors, 5 t., £180.

SULPHURIC ACID—

Alexandria, 1 t., £33.; Jamaica, 1 c., £5.; Pelotas, 1 c., £5.; St. Lucia, 1 c., £7.

TALLOW—

Nantes, 14 t.; Trieste, 180 t.

TANNIC ACID—

Buenos Ayres (F.), 1 cs., £37.; Christiania (F.), 1 cs. (pt.), £18.

TAR (STOCKHOLM)—

Singapore, £314.

TARTARIC ACID—

Auckland, 1 t. 3 c., £352.; Cape Town, 11 c., £191.; Christiania, 2 c., £34.; Durban, 3 c., £46.; Durban (F.), 1 c., £12.; Galatz, (F.), 2 t., £750.; Klang, 2 c., £50.; Lyttleton, 1 t. 13 c., £504.; Melbourne, 2 t. 10 c., £731.; Montreal, 6 t., £1,862.; Mormugao (F.), 1 cs. (pt.), £6.; New York, 4 t., £1,228.; Rangoon, 1 c., £10.; Shanghai, 1 cs. (pt.), £10.

THEOBROMINE—

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TIN SALTS—

Antwerp, 1 brl., £36.

WAX—

Gothenburg, 1 t. 5 c.; Malta, 13 c.

WHITE LEAD—

Auckland, £24.; Barbados, £17.; Dunkirk, £650.; Ostend, £378.; Rangoon, £91.; Shanghai, £2,345.; St. Kitts, £32.; Wellington, £56.

ZINC CHLORIDE—

Sydney, 1 cs., £15.

MANCHESTER.

Week ending October 25.

ALUM (GROUND)—

Montreal, 571 bgs.

ALUM (LUMP)—

Alexandria, 45 brls.; Quebec, 140 pkgs.

ALUMINA SULPHATE—

Montreal, 924 sks.

AMMONIA—

Bordeaux, 28 drms.

ANTIMONY SALTS—

Gothenburg, 10 cs.

BLEACHING POWDER—

Gothenburg, 211 cks.; Montreal, 106 pkgs.

CAUSTIC SODA—

Alexandria, 293 pkgs.

COAL PRODUCTS (otherwise undes.)

Antwerp, £1,700.; Dunkirk, £235. Tonnay, £2,600.

COAL PRODUCTS—

Carbolic Acid

Boston, 49 cks.

DISINFECTANTS (otherwise undes.)

Montreal, 355 pkgs.

MAGNESIA—

Alexandria, 2 cs.

MAGNESITE—

Malmö, 100 bgs.

MANGANESE SULPHATE—

Philadelphia, 20 cks.

SALT—

St. John, N.B., 9,870 sks.; Malmö, 2,670 sks.; Quebec, 6,400 sks.

SOAP—

Bordeaux, 10 cs., 1 ck.; Montreal, 7 cks.

SODA ASH—

Montreal, 400 cks.

SODA CRYSTALS—

Alexandria, 5 pkgs.

SODIUM BICARBONATE—

Antwerp, 300 bgs.; Rotterdam, 50 bgs.

SODIUM HYDROSULPHATE—

Philadelphia, 50 kgs.

SODIUM PRUSSATE—

Boston, 25 cks.; Montreal, 5 cks.; Philadelphia, 32 cks.

SODIUM SULPHIDE—

Bordeaux, 123 drms.

MIDDLESBROUGH.

Week ending October 25.

ALUMINA SULPHATE—

Melbourne, 1 t.

CHROME ORE—

Rotterdam, 1 t.

COAL PRODUCTS—

Benzole

Rotterdam, 10 t., £255.

Naphthalene

Fremantle, 2 t., £36.; Melbourne, 21 t., £366.; Natal, 2 t., £37.; Sydney, 8 t., £154.

PITCH—

Antwerp, 1,149 t., £3,735.; Rotterdam, 1,624 t., £5,278.; Santander, 2,244 t., £7,294.

WOOD PRESERVATIVE—

Bulawayo, 8 c., £17.

NEWCASTLE-ON-TYNE

Week ending October 25.

BEESWAX—

Bergen, 1 t.

RED LEAD—

Bergen, 1 t.

N. & S. SHIELDS.

Week ending October 25.

NIL.

SWANSEA.

Week ending October 25

PRICES CURRENT.

THURSDAY, Oct. 30, 1919.

PREPARED BY MESSRS. HIGGINBOTTOM AND CO., 21, SPRING GARDENS, MANCHESTER.

The values stated are F.O.R. at makers' works, or at usual ports of shipment in U.K., unless otherwise specified
The prices in different localities may vary.

Acids:—		£	s.	d.
*Acetic 40% and 60%	per cwt.	29/-	&	43/6
* " Glacial	per ton	85	0	0
Arsenic, S.G. 2,000°	per ton	70	0	0
Boric, Crystals	"	72	0	0
*Fluoric	per lb.	0	0	7
*Muriatic (Tower Salts), 28° Tw.	per carboy	0	6	6
*Nitric, 80° Tw.	per ton	32	0	0
Oxalic	per lb.	0	1	1½
Phosphoric, 1,750°	"	0	1	9
*Sulphuric (fuming, 70%)	per ton	—	—	—
* " (Pyrites, 168°)	"	7	18	9
* " (" 140°)	"	4	10	0
* " (free from arsenic, 144°)	"	5	7	4
Tannic (commercial)	per lb.	0	2	6
Tartaric (crystals)	"	0	3	2
*Acetone	per ton	80	0	0
*Alum, loose lump (delivered)	"	17	0	0
Alumina Sulphate (pure)	"	17	0	0
Aluminoferic (in slabs)	"	8	10	0
Aluminium (Ingot Metal, 98/99%)	per ton	150	0	0
*Ammonia, Anhydrous	per lb.	0	2	0
* " *880	per ton	33	0	0
* " *920	per ton	20	0	0
" Carbonate	per lb.	0	0	6½
" Muriate (grey)	per ton	47	10	0
" (sal ammoniac) 1st & 2nd, per cwt.	80/-	&	75/-	
" Nitrate	per ton	60	0	0
" Phosphate	"	110	0	0
" Sulphate (grey), London, net	"	—	—	—
" " Hull	"	—	—	—
" " Manchester	"	—	—	—
*Aniline Oil (pure)	per lb.	0	1	2
Aniline Salt	"	0	1	2
Antimony	per ton	45	0	0
" (tartar emetic), 43/44%	per lb.	0	3	1
" (golden sulphide)	"	0	1	3
Arsenic, white powdered	per ton	60	0	0
Barium Chloride (in casks)	"	23	0	0
" Carbonate (native), 92/94%	"	11	10	0
" Sulphate (native levigated)	"	£7 to £14		
Baryta Chlorate	per lb.	0	1	3
*Bisulphide of Carbon	per ton	55	0	0
*Bleaching Powder, 35%	"	17	0	0
* " Liquor, 7%	"	6	0	0
Casein (commercial)	"	90	0	0
Chromium Acetate (crystals)	per lb.	0	1	0
Calcium Chloride	per ton	8	0	0
China Clay (at Runcorn), in bulk	"	70/-	to	90/-
Coal-tar Products and Dyes:—				
Alizarine (artificial), 20%	per lb.	0	2	0
Magenta	"	18/-	to	35/-
Anthracene, 40/50%.A, f.o.b., L'don, per unit,	"	0	0	7
Benzol, 90's (naked)	per gal.	0	2	0½
" 50/90's	"	0	1	10½
Carbolic Acid (crude, 60°)	"	0	1	7½
" (crystallised, 40°)	per lb.	0	0	9½
" Acid (pale liquid, 97/98%)	per gal.	0	2	9
*Creosote (ordinary), naked	"	0	0	6½
*Crude Naphtha, 30% at 120°C.	"	0	0	9
*Grease Oils, 18° Tw. (naked)	per ton	6	10	0
Pitch, f.o.b., Liverpool or Garston	"	3	2	9
*Solvent Naphtha, 90% at 160°	per gal.	0	2	5
Copper	per ton	100	0	0
" Sulphate	"	40	0	0
Dross Salts	"	39	0	0
*Glycerine (crude), 80%	"	72	0	0
* " (industrial, S.G. 1,260)	"	110	0	0
*Iodine	per oz.	0	1	0
*Iron Nitrate, 80° Tw.	per ton	12	0	0
" Sulphate (copperas), delivered	"	4	5	0
" Sulphide	"	9	0	0
Lead (Foreign Pig)	"	30	10	0
" Litharge Flake	"	45	0	0
" Acetate (white)	"	83	0	0
" " (brown)	"	68	0	0
Lead, Carbonate (White lead), pure	per ton	50	0	0
" Nitrate	"	56	0	0
Lime, Acetate (brown)	"	12	0	0
" " (grey), 80%	"	17	0	0
Magnesium Chloride	"	15	10	0
" Carbonate (light)	per cwt.	2	7	8
" Calcined Magnesite	per ton	21	10	0
" Sulphate (Epsom Salts) (coml.)	"	12	0	0
" (druggists)	"	16	0	0
Manganese, Sulphate	"	75	0	0
" Borate	"	95	0	0
*Methylated Spirit, 64° (industrial)	per gal.	0	5	7
*Naphtha (Wood), Solvent	"	0	10	0
" " Miscible, 60° p.	"	0	10	6
Oils:—				
*Cottonseed	per ton	95	0	0
*Linseed	"	90	0	0
Stearine, 115-120° M.P.	"	95	0	0
Potassium, Bichromate	per lb.	0	1	6
" Carbonate, 85%	per ton	100	0	0
" Chlorate	per lb.	0	1	0
" Hydrate (Caus. Pot.) 88/90%	per ton	105	0	0
" " 75/80%	"	95	0	0
" Potash Hydrate Liquid, 50°Bé	"	65	0	0
" Nitrate (refined)	"	55	0	0
" Permanganate (commercial)	per lb.	0	3	3
" Prussiate (yellow)	"	0	1	9
" (red)	"	0	5	6
" Sulphate, 90% (ex ship)	per ton	25	0	0
" Muriate, 80%	"	25	0	0
Silver (metal)	per oz.	0	5	6½
Sodium (metal)	per lb.	0	1	3
" Acetate	per ton	49	0	0
" Arseniate, 45%	"	60	0	0
" Borate (Borax), Crystals	"	39	0	0
" Bicarbonate (2 cwt. bags)	"	8	5	0
" Bichromate	per lb.	0	0	11
" Carb. (Caustic Soda-ash), 48%	per ton	12	10	0
" (Alkali), 58% (bags)	f.o.r. {	6	10	0
" (Soda Crystals), (bags) car. pd.	wks. {	5	10	0
" Chlorate	per lb.	0	0	6
" Cyanide (100% basis) for export	"	0	0	11
" Hydrate (76% C. Soda) (f.o.r.)	per ton	24	0	0
" " (74% C. Soda)	"	23	5	0
" " (70% C. Soda)	"	22	0	0
" " (60% C. Soda)	"	21	0	0
" (pure liquid, 90° Tw.)	"	10	2	6
" 77/78% Powdered (99%) Hydrate	"	24	10	0
" Hyposulphite (commercial)	"	19	0	0
" Manganate, 25%	"	65	0	0
" Nitrate, 96%, retd., f.o.r., L'pool	"	21	0	0
" Nitrite, 100%	"	59	0	0
" Phosphate	"	27	0	0
" Prussiate	per lb.	0	1	0
" Silicate (glass) Alkaline	per ton	12	5	0
" (liquid, 100° Tw.)	"	9	10	0
" Sulphate (Saltcake), delivered	"	3	10	0
" (Glauber's Salt)	"	4	0	0
" Sulphide (conc.), 60/65% casks	"	22	0	0
" Sulphite	"	11	0	0
Sulphocyanide, Ammonium, 95%	per lb.	0	2	0
" Barium, 95%	"	0	1	4
" Potassium	"	0	2	4
" Calcium, 70%	per lb.	0	4	0
Sulphur, (Flowers)	Sicilian per ton	22	10	0
" (Roll Brimstone)	"	22	0	0
" Brimstone (best thirds)	"	—	—	—
" (ex ship)	"	13	10	0
Tallow	"	100	0	0
Tin Crystals	per lb.	0	2	0
" English Ingots	per ton	278	0	0
Titanium, Potass. Oxalate	per lb.	0	1	6
Titanous Chloride	per cwt.	4	10	0
Zinc (Spelter)	per ton	44	10	0
" Powder, 88/92%	"	70	0	0
* " Chloride (solution, 102° Tw.)	"	24	0	0
" Sulphate, Crystal	"	22	0	0

* Packages extra or returnable; otherwise, prices usually include packages.

THE CHEMICAL TRADE JOURNAL AND CHEMICAL ENGINEER.

No. 1694.

LONDON, SATURDAY, NOVEMBER 8, 1919.

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EDITORIAL NOTICES.

Readers are invited to forward items of intelligence, company reports and balance-sheets, or cuttings from local newspapers of interest to the trades concerned.

CURRENT TOPICS

INVIGORATING THE CHEMICAL INDUSTRY.

MR. H. B. FERGUSON, at the annual dinner of the Chemical Industry Club, in London, placed his finger on several weak spots in the organisation of the British chemical industry. The weaknesses which he discussed are not new ones—they have been written about and talked about times without number, and for a good many years—but on the accepted principle that reiteration, to the point of becoming wearisome, is essential before reforms are brought about, Mr. Ferguson's remarks may be productive of some good. That there is need for the application of new methods and new ideas in the conduct of the chemical industry, and for that matter in most other branches of industry, in order to meet the rapidly changing conditions, no one will dispute. As far as the chemical industry is concerned, that fact is recognised clearly enough by chemical manufacturers themselves. Indeed, in many cases the remedies that are being urged upon them are already being applied, but generally the rate of application is much too slow. Unless the reforms from within are greatly accelerated, manufacturers will find themselves in the rear by the time conditions are such as to permit the forces of international competition in the markets of the world to have free play. A point which the speaker particularly emphasised, and justifiably so, was the fact that British manufacturers had been held back by the attempt to organise the industry with the aid of men who were not chemists. In that statement he was supported by Mr. John Gray, the President of the Society of Chemical Industry. It has often been said of chemists in the past that they were incapable of carrying out work of an administrative character. This reproach could hardly have been based on proved incapacity, for the simple reason that few chemists have had the opportunity to prove the contrary. Where such an experiment has been made it has invariably been with advantageous results. In Germany such a system is, and has been for years, the rule rather than the exception, and to this fact alone is due largely the extremely prosperous position of the German chemical industries. Only by widening the sphere of the chemist's activities, and by offering him some greater inducement

than has hitherto been his lot, will the maximum benefits from the application of science to industry be forthcoming.

TECHNICAL RECORDS OF GOVERNMENT FACTORIES.

IN the work of organising the Government factories which during the war were devoted to the manufacture of explosive materials, a very considerable amount of valuable data relating to the processes in operation was collected and utilised for the purpose of effecting economical working. Some of that information has already been made public, and formed the subject of an article which appeared in these columns in our issues of February 8, 15, and 22 last. That information is now supplemented by a report issued by the Department of Explosives Supply of the Ministry of Munitions. An account is given of the statistics of explosive manufacture as developed by the Factories branch of the Department. The statistics are considered from two points of view, the first being the plant or technical aspect, and the second the costing aspect. In connection with the first, the records of plant working are dealt with, and the methods of summarising these in order to ascertain the efficiencies of the plants and the consumption of raw materials; while under the second are considered the methods of finding the actual costs of the finished product, as well as the cost on a comparative basis. The report is divided into the following sections: (1) The material manufactured by the factories, and a general account of the processes involved; (2) the technical aspect of acids manufacture and treatment, and the technical records concerned therewith; (3) the actual costs records dealing with acids manufacture and recovery; (4) the comparative costs for acids; (5) the manufacture of explosives such as nitroglycerine, nitrocellulose, TNT, cordite, picric acid, phenol, etc., with the technical records involved; (6) the method of finding the actual costs of these substances; (7) flow-sheets showing the efficiencies of plants and the consumption of materials involved in these manufactures; and (8) comparative costs. The ground covered is thus very wide, and many of the sections should be of much interest to readers in the chemical industries. These will be dealt with at length in our next issue.

SYNTHETIC AMMONIA.

THE belated and much discussed report of the Nitrogen Products Committee, appointed in 1916 by the then Minister of Munitions, is, according to an announcement made this week, to be issued shortly. The appearance of this document may to a large extent help to clear up the mystery which for some reason or other has been attached to the operations of the Ministry of Munitions in connection with the fixation of atmospheric nitrogen. For the present we must content ourselves with the statement made that there is now reason to judge that by a modification of the scheme which the Ministry had adopted, the production of synthetic ammonia is commercially practicable. A further point, and one which should cause some little satisfaction, is that the Government have decided that further development should be left to private enterprise.

COLORIMETRY IN TECHNICAL ANALYSIS.

A MEETING of the Newcastle and District Section of the National Association of Industrial Chemists was held on Saturday last under the chairmanship of Mr. J. W. Martindale, B.Sc. A paper on "Colorimetry in Technical Analysis" was read by Mr. E. Turner, B.Sc.

Mr. Turner said the colorimetric method of technical analysis was employed almost exclusively in the determination of extremely minute quantities of substances, and consequently was bound to be one of strictest accuracy. He claimed that colorimetry was not only accurate but direct in result. As it was frequently only a matter of matching a colour against a standard and the multiplying of the standard equivalent by a simple multiple it would be seen that the result was quickly gained. There were three ways of carrying out tests colorimetrically. When the colour could be obtained upon a strip of paper it was better to match the colour obtained against a series of standards previously prepared. Where the colour could not be obtained in that way, but only in solution, the method adopted was to obtain a colour with certain quantities of reagents and the test substance; then, using the same quantities of reagents another solution was prepared without any test substance. A standard solution of test substance was then added to the second substance until a depth of colour similar to the first was obtained. The amount of substance in the standard solution added was the required test. The third method involved the use of colorimeters, and of those he considered the Mills to be by far the best and most extensively employed.

Dealing with the conditions necessary to the successful application of colorimetry, Mr. Turner said that colorimetry was founded on the fact that selective colour absorption was constant in a given substance so long as the physical and other conditions remained unchanged. The conditions were a normal light, a common colour standard, a normal vision, and a substance with a characteristic colour. Normal light was made up of the six spectrum colours, and daylight was the nearest approach to that. Diffused daylight enabled determinations to be made with greater accuracy than bright sunlight. The use of the Lovibond chart was of great assistance in describing by letter and number the exact shade and tint of colour obtained. It was obvious that normal vision was necessary, although an experimenter suffering from colour-blindness to a limited degree might carry out useful work providing his infirmity remained unchanged. He added that it was important to take into account the colour given by the water used to effect a solution. An interesting description of apparatus, illustrated by diagrams, followed before Mr. Turner proceeded with the application of colorimetry. One of the most important colorimetric tests in an alkali works was the estimation of arsenic in rectified oil of vitriol. The three methods of estimating arsenic were by Marsh's test, which was accurate, though long and tedious; the production of arsenic sulphide; and Gutzeit's tests. The various tests were described in detail, and the speaker concluded by saying that instances could be multiplied. He had only wished to raise the value of colorimetric analysis in their eyes and induce them to seek its help when estimating small quantities of substances with accuracy.

The chairman, and Messrs. Hargest, Rodgers, and Hord, contributed to the short discussion which followed, all bearing out a great deal claimed by Mr. Turner for colorimetric analysis.

LABORATORY CHEMICALS OF DOMESTIC ORIGIN.

By DR. M. O. FORSTER, F.R.S.

AT the annual general meeting of the Society of Chemical Industry, last July, attention was drawn to the pressing need of a British organisation fulfilling the functions of Kahlbaum, Schuchardt, Merck, and Schimmel (*Journal Soc. Chem. Ind.*, 263 T.).

Owing to the backward state of the organic chemical industry in this country prior to the war, no serious domestic attempt had ever been made to provide raw materials for the researches pursued by college and university staffs. Several factors contributed to this condition of affairs. From the purely commercial aspect the enterprise was unattractive, because it involves the skilled manipulation of a very large number of quite small quantities. In many cases the materials are seldom demanded, and such preparations represent locked-up capital, with an added risk of deterioration. In the next place, obliging Germans were ready to deliver 5,000 items at reasonable prices within a fortnight of receiving an order; moreover, they were willing to quote special rates for large quantities and to furnish also rare materials which did not appear in their lists. Any well-founded complaint as to the quality of a particular substance was met by a prompt supply of the purified article, and all these facilities were occasionally decorated with most entertaining letters in Anglo-German, expressing condolence, astonishment, and roseate promises of better behaviour in the future. The days when one infuriated dealer addressed a complainant embryo professor as "*Sie junger Mann*" instead of "*Sehr geehrter Herr*" were long since past. Altogether, it was very pleasant and amusing to order laboratory chemicals from Germany.

It has always been doubtful whether the industry was a profitable one, even in that country, where a large internal demand was assured; but cheap bottles and inexpensive *preparateurs* contributed to making both ends meet. Nevertheless, it richly deserved to be profitable, there being no question as to the great value of the service which it rendered. To research workers themselves it is unnecessary to emphasise this, because they are fully conscious of it, but it may be worth while to offer an explanation to others.

Even the best-equipped laboratories contain a very limited range of chemicals which are not in common use. Organic research has undergone such enormous development during the past forty years that the beginning of a fresh inquiry involves not only a bright idea but at least a few grammes of a material which is generally uncommon. It is admitted by active investigators that infant mortality of ideas attains a high percentage, ranging around 95. The labour of making one hundred relatively obscure compounds on the chance of five being useful is clearly wasteful if it is carried out by the man who can perhaps apply the five to developing the germ of a new general reaction or even of a new industry. As conducted at colleges, research work is pursued largely by men whose energies are, or should be, devoted primarily to instruction; but these are the very men whom it is most profitable to encourage in practising research, because they are reviewing their subject afresh each year in the light of new knowledge, and are responsible for infusing each oncoming generation of students with enthusiasm for chemistry. Hence the time-and-idea-saving function of laboratory chemicals in ample range.

A concerted effort to establish this industry in Great Britain is now required. Praiseworthy attempts to meet the need are being made by several manufacturers, and these should be encouraged, co-ordinated, and amplified; the field is too vast for individual cultivation, it requires too much detailed organisation. It should not be impossible, however, to consolidate these individual efforts in an organisation which would proceed somewhat as follows:

Taking Kahlbaum's pre-war list of 5,000 separate items as a basis, the first step would be to make a census of those compounds which are being produced already by various firms, with which, as affiliated members of the organisation, arrangements would be made for continued production of these and other materials for which they seem best fitted by their particular resources. Such a census would reveal the deficit as dividing itself roughly into two classes, (a) materials obtainable from the dye-makers and elsewhere in bulk, but in a commercial form requiring purification before distribution, and (b) materials not made in this country. Members of class (a) would be purchasable from the factories in question, and would frequently constitute the starting-materials for (b), which would require to be allocated among the constituent firms of the organisation; only in this way can overlapping be minimised.

For their own benefit the organisation would either establish a central distributing agency or would issue a comprehensive list covering their united products and indicating the firm to which purchasers should apply. At present the consumers have no means of knowing, without elaborate inquiry, whether certain materials are being made in this country, and if so, whence they are obtainable. This is because, although a limited number of old-established firms are making a gallant attempt to meet the situation, there exist also several small-range producers whose activities do not allow of adequate advertisement. All these should be correlated.

Meanwhile, the consumer must exercise patience. Howling for importation of German products, whether free or by licence, may well be postponed for at least one year in order to give time for the organisation of existing facilities to take effect. Such postponement will not seriously retard the prosecution of research in this country, because (a) the college staffs are fully occupied with the business which comes first to their hands—namely, teaching,—and (b) there are plenty of problems arising from war-researches which await solution. Moreover, in view of the success with which the colleges and universities produced synthetic drugs in the opening years of the war, it should be feasible to utilise their resources in the early stages of this particular enterprise. Excellent training for the more advanced students in working out the details of more difficult preparations would thus be offered.

It is not pretended that co-ordination of existing efforts and their amplification will be a simple matter, but winning the war was not a simple matter. The real danger lies in the fact that the vital importance of this industry, having been overlooked in the past, is now threatened with eclipse by the perplexing variety of post-war problems with which the chemical manufacturers are confronted. Such manufacturers are aware, however, that it is only by the cultivation of new ideas that

industry expands, either through economising production, finding unforeseen applications of natural resources, or utilising the by-products of existing operations, and they may be assured that new ideas will grow and multiply when fertilised by an ample range of laboratory chemicals.

CORNISH TIN-MINING INDUSTRY.

THE committee appointed by the Board of Trade to consider the question of non-ferrous mining in the United Kingdom met on October 28, 29, and 30, under the chairmanship of Mr. H. B. Betterton, M.P.

Mr. J. Faull, manager of the Tresavean Mine, near Lanner, in Cornwall, gave evidence to the effect that his company had spent large sums of money in unwatering a mine which has been a big producer of copper-ore in the past, and in developing a promising tin-ore shoot in the lower levels. They had been prevented from reaching the profit-earning stage by the intervention of the war. He outlined a scheme for further development, and suggested that the Government should assist on the principle of making advances for specific and agreed development to the extent of one-half of the estimated expenditure.

Mr. J. Nile, manager of the Grenville Mines, Cornwall, stated that serious losses had been incurred during the war, and that unless financial assistance was forthcoming to enable the mine to centralise the dressing-plant and to improve the system of pumping it would be impossible to continue operations. The mine made considerable profits in the years 1911-1913, but during the last three years had worked at a heavy loss. They had been further handicapped by a series of accidents at the time when men were returning from the Army, resulting in serious flooding of part of the mine. The company had in view a large scheme of development which, in Mr. Nile's opinion, held out good prospects of success.

Mr. H. E. Fern, the receiver and manager of Wheal Kitty, in the St. Agnes district of Cornwall, expressed the opinion that this district is exceedingly rich in mineral contents, and that an amalgamation of the mines in the district, if financial assistance was forthcoming, would result in re-establishing the industry and would result in considerable diminution of working costs. He thought the industry in many cases had suffered in the past from bad management and unsound financial methods. He thought the tin-ticketing system had worked to the disadvantage of the Cornish tin-mining industry, and welcomed the signs that a change in the methods of selling tin-ore was being introduced. Although he agreed with a suggestion that the nationalisation of royalties would probably do away with many of the difficulties due to the multiplicity of owners with which they now had to contend, he was not in favour of the nationalisation of the mining industry as a whole, as he did not think it would be administered by the Government as well as by individuals. He thought that representations should be made to the Commission recently set up for special consideration in the matter of railway rates, as is suggested in the case of the agricultural interest. He strongly advocated the establishment of a Department of Mines, with which copies of all mining plans should be deposited, the plans being at all times available for inspection.

Mr. T. E. Bennett gave evidence on the working and prospects of Kit Hill and Hingston Down Mines of the Duchy of Cornwall.

QUALITY OF AMERICAN DYES.

IN a report issued to the stockholders of the American Chemical Foundation, quoted in the *Board of Trade Journal*, a claim is made in favour of the superior quality of American dyes. The total American output of dyes in 1917 is valued in the report at 57,796,228 dollars, and that of 1918 at 83,095,404 dollars. During 1918 the export trade grew rapidly, the total exports of dyes for the fiscal year amounting to 16,921,388 dollars. In June, 1919, aniline dyes valued at 743,476 dollars were cleared for export from the port of New York.

The present strong American demand for Swiss dyes is accounted for in the report by the fact that most of the vat dyes are not manufactured in America in any quantity, but it is stated that the six months' supply of German dyes, permitted by the Government to come forward under the supervision of the War Trade Board is expected to remedy some of the defects in the vat dye situation. Meanwhile, three different plants are manufacturing indigo in quantities, and are promising other vat dyes in the near future. In regard to the control of dye factories in the occupied areas in Germany, a resolution was adopted by the dye section of the American Chemical Society that an urgent request should be made to the President that America should have her share in the operating control of these factories, and that qualified representatives should be stationed there, the information gained to be used for the benefit of the American industry.

It was also resolved that as the manufacture of dye from coal-tar distillates involves the same process and material as that used in the manufacture of explosives and poison gas for military purposes, the question of the importation of dyes and bases of intermediates be made a military question, on the ground that importation is a menace to the possible future defence of the country, as it fosters foreign industries which would furnish an enemy with munitions of war, and discourages the development of home industry essential to defence.

Among other resolutions passed was one endorsing pending legislation to establish an independent Patent and Trade-mark Office, and a United States Court of Patent Appeals at Washington, and one protesting against the printing on hotel laundry bills of announcements to the effect that no responsibility would be assumed in caring for guests' laundry, owing to dyes.

A prominent American manufacturer does not agree with some of the claims advanced in the above report. He asserts that the public demands fast dyes, and manufacturers will soon be tired of employing dyes which will not give satisfaction.

NEW ISSUES. -An issue of 4,000,000 7 per cent cumulative Preference shares of £1. each at par is announced by Messrs. Lever Brothers, Ltd., Port Sunlight. The present issue is made to provide for the portion of the cash consideration shortly payable in respect of the purchase of the ordinary shares of the soap businesses of Joseph Crosfield and Sons, Ltd., and William Gossage and Sons, Ltd., from Brunner, Mond and Co., and also to provide further working capital required in connection with the development and extension of the company's business generally. The subscription list will be closed on or before Monday next. -An issue of 1,500,000 £1 shares of the Scottish-American Oil and Transport Co. at par was offered on Monday for public subscription. The company has been formed particularly for the purpose of acquiring common stock of the Southern Oil and Transport Corporation, of Delaware, U.S.A.

THE CHEMICAL INDUSTRY CLUB.

FIRST ANNUAL DINNER.

THE first annual dinner of the Chemical Industry Club was held at the Tallow Chandlers' Hall, London, on Friday of last week. Prof. W. B. Hodgkinson, C.B.E., presided, and among those present were Sir William Pope, K.B.E., Mr. H. B. Ferguson (technical adviser to the Military Governor, Cologne), Mr. John Gray (president of the Society of Chemical Industry), Mr. Samuel Rideal (president of the Society of Public Analysts), Mr. Julian Baker (chairman of the London Section of the Society of Chemical Industry), Mr. R. B. Pilcher (registrar of the Institute of Chemistry), Mr. F. Cooper (Master, Worshipful Company of Tallow Chandlers), Mr. E. H. Coley (hon. sec.), Capt. C. J. Goodwin (hon. treasurer), Dr. Robert Mond, and Mr. A. Chaston Chapman. The company numbered nearly 100.

Following the toast of "The King,"

Mr. H. B. Ferguson proposed the "British Chemical Industry." He said he felt it an honour to be asked to come from Cologne to propose so important a toast, and it was a presumption on his part to address so representative an assembly as was present. Nevertheless, possibly what he had to say might in some slight measure accelerate the industry in attaining its ultimate destination, that of surpassing the chemical industry of any other country.

NATIONAL IMPORTANCE OF THE CHEMICAL INDUSTRY.

When one reviewed the great strides and astounding progress that the application of chemical science to industry had played during the past generation, said Mr. Ferguson, one was forced to the conclusion that if the same progress was made in the future it would not be far distant before the nation which possessed the greatest chemical industry would be commercially the most prosperous and possess the weapon to ward off a repetition of such struggles as we had been through in the past five years.

While possibly an appreciative address bestowing praise on the great strides our chemical industry had made during the past five years might be more pleasant to listen to, it was only by the frank acknowledgment of our faults and the study of our shortcomings that progress was made, and, therefore, having had the opportunity of living for the past nine months in the land which to-day possessed the greatest chemical industry in the world, and having, further, been through a great many of their factories, and studied their methods and their organisation, he felt it would be of greater advantage if he dwelt upon those particular phases of the chemical industry in which our great German competitor excelled us, than on those branches in which we surpassed the Germans.

Whilst it was admitted that the British scientist was second to none in reasoning powers and inventive ability, nevertheless we had been too content in the past to lay the foundation-stones of almost every branch of science, and had not always followed up our discoveries and accrued the most benefit from them. Particularly was this so in the chemical industry, in which, until recent years, we had primarily confined ourselves to the manufacture of heavy chemicals.

Some 20 or 25 years ago the Germans, realising that in those days, not having the shipping and trading connections that we had, they were in no position to compete

with us in the manufacture of heavy chemicals, shrewdly turned their attention to converting their heavy chemicals into pharmaceutical products, fine chemicals, organic dyes, etc., realising that the railway and shipping charges on these commodities bore relatively a smaller percentage to the total cost than was the case with heavy chemicals. The men who founded the greatest chemical combine in the world, the Interessens Gemeinschaft, were men of great courage and scientists of extraordinary vision. They sunk all internal jealousies in the one great effort of making their chemical industry as a whole as perfect as possible. Some of their methods unquestionably were not very creditable. They pursued a policy of forcing to the wall foreign competitors by underselling them, never by buying them, and later re-imbursed themselves for what they had been out of pocket by putting up the price. They obtained all the advantages of the American system of amalgamation and trusts without the disadvantage of destroying individual competition among their members, for each factory maintained a separate identity and its own board of directors, although coming under the combine. They further supported a world system of commercial intelligence, which is one of the most elaborate organisations of its kind.

NECESSITY FOR ORGANISATION.

If we were going to compete successfully with this great octopus on the other side of the Channel, it was incumbent upon us to start, in order to protect ourselves, some such organisation. There was already in embryo such an organisation, the Association of British Chemical Manufacturers, to deal with internal matters at home, but they must support the organisation to the same extent as the German chemical manufacturers had supported theirs. They could not be suffering from individual jealousies and imagine that they were going to win the prize. Therefore, the Association of British Chemical Manufacturers was using at the present time the skeleton system of world commercial intelligence which had been laid down by the Federation of British Industries, and inasmuch as the great metal and textile industries were supporting the Federation, the cost that would fall upon the chemical industry for foreign intelligence of a commercial nature would be reduced to a minimum.

The Germans had taken the same pride in their chemical industry that we in the past had bestowed on our Navy, and the German capitalist and the German banks had supported their chemists in the construction of some of the boldest-planned work that man had created, even with very little hope of an immediate return, realising that capital which backed the application of science to industry would, in the long run, obtain a return for its investment. As a result of Germany's support of her chemical industry, she had taken an increment of profit off the great textile industries of this country, and, in fact, the textile industries of the world, through her monopoly of organic dyes, and who could say the time was not far distant when she would not place a similar tax on the very food we grow in our Empire through the sale of cheap nitrates as fertilisers.

In the past five years we had launched out into almost every branch of chemistry, and we were beginning to realise in a hazy way the great importance of the chemical talent which we have in this country and which we had not been making use of. It was an anomaly that we, with all our talent, should have allowed the Germans to have outstripped us in many branches of the chemical industry, and it was natural to seek a reason for this.

The reason was the want of appreciation of the latent capabilities of the young chemist as he left the university. These young men were confined, as a rule, in some chemical laboratory in one of our factories, where for the rest of their existence they spent their time messing with test tubes and chemical reagents with no wider horizon than the four walls of their laboratory to look to, and no hope of a just return for their talents and their labour, while the works and the plant were being operated too often by men with little or no technical training.

NEED FOR THE TRAINED CHEMIST.

Some seemed to think in a hazy way that it was Germany's wonderful system of organisation which was responsible for her progress in the chemical industry. We were just as good organisers in this country as the Germans, and he could assure them that in the metal and many other industries to which we had applied ourselves, it would be found that in mass production, motion study, and many other methods of cheap production, mostly emanating from America, we were not one whit behind Germany, but our failure in the chemical industry had been due to the attempt to organise it with men who were not chemists. Having controlled some hundreds of chemists in one of the largest national factories, he wished to say a word, for the benefit of the chemists who were present, on administration.

The young chemist coming out of the university was in no position to control anything, and the longer he stayed in the university the more fixed his ideas became and the more difficult it was to train him. When he first came on the works he would be put into the laboratory until such time as he had learned methods of sampling and analysing the particular products dealt with in the factory. He then might be put in liaison between the laboratory and the factory, and later he went on as control chemist on the plant. Some men were naturally not gifted with the personality for controlling labour and administering their work. These would have to remain on research work or the study of plant yields and efficiencies, but he could assure them that the average chemist in this country was capable of being a very good administrator if he was given only the opportunity and the chance. The first thing he must do was to write a complete description of his plant and then a complete description of the method of operating it, and his most important studies of all at first should be along the lines of controlling labour. The confidence of labour was the first thing that the man who attempted to control labour must obtain, and it could be better obtained in the off-duty time than under the strict discipline existing during factory hours.

It was only by the industry combining together in the manner he had outlined that they could face the future competition of the other great nations without fear.

Mr. John Gray (president of the Society of Chemical Industry), who replied to the toast, endorsed what Mr. Ferguson had said as to the necessity for pulling together in the industry. They had only one master—viz., the public,—and the industry or the trade which could serve the public best and cheapest was the industry which was going to make headway and progress. There was undoubtedly a great deal of latent talent in the industry, but if the industry was to progress at all it must attract to it the very best brains in the country. It was quite true that in the past the young chemist had not been adequately remunerated, and not only that, but he did not receive the encouragement to advance in his pro-

fession that he ought to have received. There was too much standing aloof by the men who had made a certain position. These young men should be taken by the hand and helped forward, and he could conceive of nothing better to achieve this than by clubs such as the Chemical Industry Club.

With regard to training young men in administration, he favoured the policy of every promising young man being taken into the deliberations of the senior administration, not necessarily for the purpose of taking part in them, but for the purpose of learning what was involved in the higher management work of the concern. He knew that was being done in some cases with great success. They must all agree that the days of exclusiveness were over and that they must get closer together with the members of the staff and encourage them in every possible way.

THE NATIONAL CHEMICAL FEDERATION.

Sir William Pope, proposing "The Chemical Industry Club," said the British Empire was entering upon a period of technical and industrial prosperity which had never been equalled before. At present they were more or less taking stock of the situation to see what they were going to do in the future. As chemists they should see first that their profession took its proper place in national affairs, and secondly, that they got a proper remuneration for their efforts. First of all they might inaugurate a body which would bring together all the great societies interested in chemical affairs. Such an organisation was, in fact, in being, and was gradually and slowly and very painfully emerging. The National Chemical Federation was in existence, and consisted of representatives of the 15 or so societies which were intimately concerned with chemical matters. That, however, was starting the business at one end. To start at the other end they needed some sort of social organisation which would bring all chemists together, men of different types and different modes of thought, and cause them to meet together in a friendly kind of way for informal conversations and exchange of opinion. He confessed that when he heard a year or so ago that the Chemical Industry Club was projected, he was not very sanguine as to its success, and he was very happy to be able to confess that he judged his fellow-chemists wrongly, and to congratulate the founders of the club upon the ability they showed in reading the signs of the times, and the skill with which they had already constructed a large and powerful club.

Mr. H. E. Coley, hon. secretary to the club, responded. They had among their members men whose names were laboratory names, and they had manufacturers, but they had not all the manufacturers, nor all the leading chemists. Those who had reached the top of the pinnacle did not, perhaps, need such a club as this. It was a club proper, not a hole-and-corner club, and the leaders of the profession and the leaders of the trade should support it because it gave an opportunity for the young men, whom they were likely to employ, to broaden their minds in such a way that they were of greater value when they got them into their employ than they would otherwise have been.

The toast of "The Worshipful Company of Tallow-Chandlers" was proposed by Mr. H. M. Ridge, and responded to by the Master of the company, Mr. F. Cooper.

The final toast, that of "The Guests," was proposed by Mr. Bernard F. Davis, and responded to by Dr. S. Rideal and Mr. Julian Baker.

SOCIETY OF CHEMICAL INDUSTRY.

LONDON SECTION.

THE first meeting of the session was held in the rooms of the Chemical Society, Burlington House, on Monday, Mr. Julian Baker, chairman of the Section, presiding. It was announced that Dr. Charles Keane, the retiring chairman, had been elected a vice-president. On the motion of the chairman, seconded by Dr. M. O. Forster, the sincere thanks of the London Section were accorded to Dr. Keane and Dr. Stephen Miall for the admirable manner in which the arrangements for the annual general meeting in July were carried out.

BLACK-LEAD PENCILS AND THEIR PIGMENTS IN WRITING.

In a paper on this subject Mr. C. H. Mitchell dealt first with the history of pencils, and showed how difficult it has been to improve upon the quality of the Borrowdaile (Cumberland) graphite, which was first discovered in 1560, and was used from that time onwards until the latter half of the 18th century for all the black used throughout Europe. The graphite was simply sawn into thin veneers with a wedge-shaped edge, the veneers being glued into a square groove in the wooden holder, the upper segment of wood then being glued on top. About 1840, the Borrowdaile mine, which was only at first worked for a few months in the year, but later more continuously, showed signs of exhaustion, and various methods of using the graphite dust in the works were tried. The most successful of these was Brockenden's process, in which the finely sifted graphite was subjected to a pressure of 5,000 tons [this figure was challenged in the discussion] per square inch, while air was simultaneously exhausted from the press. This yielded compact blocks of graphite which could be sawn up in the same way as the natural graphite. In 1761 Faber's works were established in Nuremberg, and mixtures of powdered graphite, with sulphur, resins, gums, and other ingredients, were used for pencil pigments, but the modern process of pencil manufacture originated with Conté, of Paris, in 1795. This consisted of mixing finely elutriated clay and graphite into a paste, which was forced through small openings in a cylinder in order to produce circular threads of pigment. These were dried, heated in a covered crucible, and glued into the grooves of the wooden holders. The hardness of the pencil depended on the proportion of clay and the degree of baking. This process was introduced into England early in the 19th century, and overlapped the older one, which continued to be the principal process. A further development was the incorporation of wax with the pigment. Various other additions, such as lamp black, sulphur, and resin, have from time to time been incorporated with the graphite composition, and the pigment in some of the cheaper grades of pencil consisted largely of lamp black.

The author gave results of analyses of a large number of pencils, obtained for the most part from the Geological Museum, but also from Messrs. Acheson and Mr. Birkbeck, the former proprietor of the Greta Pencil Works at Keswick. The various specimens investigated showed the following proportions of carbon:—Borrowdaile graphite, 90.33 per cent.; another sample showed 90.73 per cent.; Ceylon graphite, 92.78 per cent.; Swedish graphite, 43.84 per cent.; Swedish graphite, 79.63 per cent.; Canadian graphite, 93.21 per cent.; Siberian graphite, 77.45 per cent.; Acheson's graphite, for pencils, 99.83 per cent.; and Acheson's graphite, for electrodes, 96.8 per cent. In judging the suitability of a graphite

for pencil-making, the chemical points to which attention should be directed were: (1) The proportion of carbon; (2) the amount of silicates; and (3) the iron. The physical nature of the graphite was also important, and the author pointed out that it was possible to say, by a microscopical examination of the marks made by graphite on paper, why certain specimens of graphite, relatively poor in carbon, gave better results than specimens of more crystalline graphite containing more carbon. The paper also described methods of analysis of pencil pigments.

Prof. J. W. Hinchley said that the manufacture of pencils was a secret industry, and it was obvious from the paper that the author had no inside knowledge of the present practical conditions. He thought more reference might have been made to the English workers, and he believed there was still in Wolff's works here the original press for compressing graphite dust. The pressure, however, was 200 tons, and not 5,000 tons as the author had said. The material could not stand the stress which would be set up with that pressure. A most common wax used at one time was spermacetti, but its high price now prevented its common use. The modern manufacture of lead pencil was far away from the Conté process, and the similar process which Hardmuth claimed to have invented three years later. He did not know any maker that produced a pencil which could compare with the old Borrowdaile graphite, untouched as it was except by nature.

Dr. W. R. Ormandy said that scratches produced by pencils were due to the silica in the clay, and although it was possible to get rid of the greater portion of the siliceous matter by washing and using 97 tons of water to 3 tons of clay, there was still a very large amount of siliceous matter present. He had found in one of the clay pits in East Prussia a clay which was of such a low quality that it was only used for making drain pipes, but by an electrical method they were able to separate the clay from the other matter, and, whereas it was originally sold for 6s. per ton, the pencil manufacturers of Germany had paid £30. per ton for it during the war. Moreover, the dispersed clayey substance had the power of absorbing dyes to a degree which was absolutely unequalled by any of the ordinary or natural clays.

Prof. Hinchley said that artificial graphite was almost impossible as a pencil-making material. The question of cost put it out of court altogether. It might be used, but there was no money in it.

Mr. Mitchell, replying to the discussion, confessed blank ignorance of the present methods of pencil manufacture. The figure of 5,000 tons pressure had been questioned by himself also, but he found it referred to in print on two occasions.

SHAWINIGAN CHEMICAL INDUSTRIES.

In this paper, Capt. E. T. Sterne gave a most interesting account, illustrated with coloured lantern slides, of the development of the water-power at Shawinigan Falls, in Canada, in general, and the chemical industries which have arisen there in particular. There are now installed 320,000 H.P., with extensions of an additional 650,000 H.P., which will become available as the district develops. The total possible water-power, however, is capable eventually of giving 1,000,000 H.P.

One of the earliest chemical industries is the manufacture of aluminium upon the well-known Hall process by the Northern Aluminium Company. The Belge-Canadian Pulp and Paper Company is the second largest chemical industry to be located at Shawinigan, and the

works are now producing 165 tons of ground wood-pulp, 90 tons of chemical pulp, and 90 tons of paper per day. Carbide manufacture has been carried on by the Canada Carbide Company since 1903, the capacity of the works being 200 tons of carbide per day, the power demanded being 40,000 H.P. The Shawinigan Electro-Metal Company came into existence in 1915, owing to the shortage of magnesium metal, and during the last three years of the war supplied magnesium in both stick and powder form to the extent of about 600 lb. per day. One of the latest additions is the Canadian Aloxite Company, which is manufacturing abrasives of various kinds as a subsidiary of the Carborundum Company of America. The Canadian Ferro-Alloys Company has recently completed a plant for the manufacture of ferro-silicon and other ferro-alloys, and utilises 6,000 H.P. There are also the Prest-o-lite Company, which manufactures compressed acetylene gas, and the Canadian Electrode Company, which deals in carbon electrodes for electric furnace purposes.

Possibly the most interesting chemical development at Shawinigan, however, and one of the most notable achievements in the chemical world during the war, has been the development of the process for the manufacture of acetic acid and acetone from calcium carbide. This was directly the result of the British authorities approaching the Shawinigan Water and Power Company. Work was started in December, 1915, and intensive research was carried on by five Canadian chemists, with the result that construction work was started in May, 1916, and in January, 1917, the first carload of acetone was shipped across the Atlantic. The process divides itself into the following five stages, each of which was described in detail in the paper:—(1) Production of acetylene from calcium carbide; (2) production of mercuric oxide from metallic mercury; (3) production of acetaldehyde from acetylene; (4) oxidation of acetaldehyde to acetic acid; (5) conversion of acetic acid into acetone. The average efficiency over a period of some months was about 85 per cent. In March, 1918, a duplicate plant was started for the American Government, and was completed when the armistice was signed. The combined output would have been 1,600 tons of acetic acid per month, and the company intends to work both plants now commercially.

The Chairman, in proposing a vote of thanks to the author for his paper, which, he said, was hardly one which lent itself to discussion, said that the fermentation process, as carried out in this country, was substantially regarded as a failure.

CLIP FOR RUBBER CONNECTIONS.

There was exhibited at the meeting a clip for preventing rubber connections from slipping off glass and metal tubing, and for attaching pressure-taps to pumps, designed by Dr. Charles A. Keane and Mr. G. Patchin. This takes the form of a hinged brass grip about an inch long, which is placed over the rubber tubing, the two halves being fastened together by means of a screw with a milled head. Its effectiveness in practice was demonstrated by its application to various apparatus.

NEWCASTLE SECTION.

THE members of the Newcastle Section of the Society of Chemical Industry on Thursday night (October 30) paid a visit to the iron and steel works of Messrs. Palmers, at Jarrow on Tyne. The visit, which was the first of a series arranged for the winter session, was of great interest to the fifty members who took part in it. Mr. Hewitson Hall, general manager of the iron and steel

works, was in charge of the party, and he was assisted by the following officials: Mr. G. W. Hewson, works' chemist; Mr. T. H. Pearson, engineer; Mr. J. H. Riddale, blast-furnace manager; Mr. J. Knowles, electrician; and Messrs. Hargest and Rogers of the works' laboratory.

The first part of the works visited proved especially interesting to chemists, being the gas-engine house and the gas-cleaning shed. The four massive gas-engines, used for blowing and providing electric power, are driven entirely by the waste gas from the furnaces, which, as Mr. Hall explained, had formerly just been sent into the atmosphere. The cleaning process, consisting of a special "shaking" plant which collects the flue-dust from the gases, was carefully inspected. The amount of potash eventually recovered from the dust is very considerable and of great value. From the cleaning shed the party went to the blast-furnaces, where tapping was in progress. The "tap," in this instance, was conveyed in a 40-ton ladle direct to a mixer in the steelworks. At the steelworks the mechanical charger was an object of interest, and a large basic furnace in process of construction provided an admirable opportunity for examining the structure of a steel furnace. A visit to the cogging and bar mills and the engine works concluded the tour.

Later the party was entertained to supper by the company, and Mr. Hall presided over the gathering.

Dr. J. H. Paterson moved a hearty vote of thanks to Mr. Hall and his assistants, which was seconded by Mr. W. Jones and carried with acclamation.

In responding, Mr. Hall said of late years it had become increasingly evident to enlightened minds that the progress of industry, and progress even outside industry, lay largely in the field of chemical research. The iron and steel industries had been forced by circumstances to probe deeply into the chemical aspect of every matter which was to undergo reorganisation. Prior to the war it was easy to get people to invest money in any wild-cat scheme in Patagonia, but it was difficult to get people to spend money in making scientific researches in industry at home. He was glad to say, however, that their efforts in that direction had met with success, and the object they set out with—to save fuel and labour costs—had been more successful than they anticipated. He referred to the tremendous success of the utilisation of waste gas from the furnaces. Before the war Germany had led the way in the utilisation of waste power, and he thought it was a tragedy that we had been so late in starting on the same lines, especially when they remembered that the war had proved that the brains were in this country all the time. They had a long way to go yet, and during the next five years the economical development of the production of iron and steel would have to be pressed forward to meet the competition of America in the markets of the world.

GIFTS FOR SCIENTIFIC RESEARCH.—At a general meeting of the members of the Royal Institution on Tuesday, Sir James Crichton-Browne, treasurer and vice-president, in the chair, the special thanks of the members were returned to Mr. Richard Pearce for his donation of £100 to the fund for the promotion of experimental research at low temperatures; to Mr. Robert Mond for his gift of laboratory material; and to Sir Humphry Davy Rellston for his gift of a drawing of Sir Humphry Davy's birthplace and a water-colour of his statue in the Market Place, Penzance. Lord Rayleigh, Mr. E. Griffin, Lieutenant-Colonel A. E. le Rossignol, and Mr. E. Basil Wedmore were elected members. The chairman announced the death of Professor A. P. N. Franchimont, an honorary member.

IMPORT RESTRICTIONS ON DYES.

A SPECIAL correspondent of the *Morning Post* has written the following interesting article, in which the facts concerning the restrictions on the importation of German dyes into this country, and the position of British dye consumers, are discussed:—

Considerable misapprehension would appear to exist in regard to the importation of German dyestuffs into this country. It has been said that delay in the ratification of the Peace Treaty is having a serious effect on the wool textile industry in Yorkshire, owing to the inability of the Board of Trade to grant licences for the importation of German dyewares until conditions of the Treaty become operative. This is not the case.

The position is that under annexe 6 to the Reparation Clause of the Peace Treaty the Allies have the right, through the Reparation Commission, to call upon Germany to deliver 50 per cent of the stocks of dyestuffs existing in that country or under German control on the day of the coming into force of the Peace Treaty. While legally it is not possible to anticipate this, the British Government, in their desire to assist those industries which consume dyestuffs, have made arrangements for an interim supply, which will shortly be available in this country. The Board of Trade, in a letter to the Bradford Chamber of Commerce, dated October 22, state:

"The Board fully appreciates the necessity for securing a supply of such essential dyestuffs as are unobtainable in sufficient quantities from British sources of manufacture, and with this object in view are making arrangements, which it is hoped will be completed in the near future, for securing an interim supply of such dyestuffs from Germany under the terms of the Peace Treaty. An announcement as to these dyestuffs and the manner in which they will be available for consumers will shortly be made."

GERMANY CRIPPLED.

These imported dyestuffs, it has to be kept in mind, will consist only of products not obtainable or not procurable in sufficient quantities in this country. They will come in under licences granted by the Licensing Committee of the Board of Trade. The policy of this Licensing Committee is to give the re-created British dyeware industry an opportunity of establishing itself—not exclusively for the benefit of the industry, but for the protection of consumers. Therefore, while there is no wish to prevent consumers from getting the materials which they really need, there will be no such thing as indiscriminate imports. This action is being taken in the interest of the consumer, who no longer desires to be under the menace of the German monopoly. What this German monopoly meant in the past and the manner in which it was wielded was strikingly illustrated by Dr. Lisa Haneberg in the *Berliner Tageblatt*. Analysing the powers of the Reparation Commission in regard to dyewares, he remarked:

"Assuming that the German output of dyes were composed in the following proportions: (1) 30 per cent. of azo and triphenyl-methane dyes, (2) 20 per cent. of indigo, (3) 20 per cent. of sulphur dyes, and that of the remainder 20 per cent. were the extremely difficult vat dyes, such as thioindigo and anthraquinone dyes, the Commission has it in its power to deplete Germany altogether of certain dyes, and thereby to cut her off from the world market, while at the same time creating a monopoly for itself. Of the groups named, for instance, the first three are more easy to manufacture.

The Commission will, therefore, not require their surrender, as the enemy countries are themselves able to produce them. On the other hand, it will demand delivery of anthraquinone and thioindigo dyes, which the Entente countries have, in spite of all efforts, not been able to produce, and which they need to complete their range of colours. This, however, will deprive the German industry of the possibility of concluding the so-called 'combined contracts'—i.e., German factories will no longer be able to bring pressure to bear on their customers to buy azo dyes from them rather than from other manufacturers, by means of a declaration that the difficult German vat dyes will only be sold on condition that a certain amount of the other types are taken with them."

SAFEGUARDING BRITISH INDUSTRY.

The question may naturally be asked: "What about the assertion that after the war Great Britain would be independent of supplies from Germany?" So she will—in time. In spite of all the difficulties of the period of the war, the British dyestuffs industry made very great progress, but time must be allowed those who are handling the question to make good. The Germans had been at work steadily for nearly thirty-five years, for the greater part of which period the British industry was stagnant. It is a terribly complicated and scientific question, which must be solved in the interest of the consumers. During the period of solution no one wants to deny them the supplies they need, but these must be controlled, and the Germans must not be allowed to come freely into our market. To avoid misconception it may be well to refute the assertion that the wool textile trade of this country is suffering from lack of German dyestuffs. This is part of an insidious campaign, said to have been inaugurated by pre-war agents for German dyes in this country, who are in danger of losing much business through the import restrictions. The wool trade in this country just now is full up with work, and its members are in a better position to-day, from the point of view of raw materials and dyestuffs, than their competitors in any part of the world.

AMERICAN PROTECTIVE MEASURES.

In regard to fostering the dyestuff industry, the Americans are taking the same viewpoint as the Government of this country, but their measures, through the tariff, are much more drastic. So keen are the United States about safeguarding the industry in the interests of national defence that in the Longworth Bill, now before Congress, it is proposed to raise the duty on finished dyestuffs from 30 per cent. *ad valorem* and 5 cents a lb. surtax to 45 per cent. *ad valorem* and 7 cents per lb. surtax, and the tax on intermediate products from 15 per cent. *ad valorem* and 2½ cents per lb. surtax to 40 per cent. and 6 cents respectively. At the same time it is proposed to introduce a licensing system whereby no synthetic dyes or coal-tar derivatives of any sort can be imported into the United States of America without a definite licence. The text of the Longworth Bill contains the following passage: "The Commission shall issue no licence which, alone or with other outstanding licences, shall permit the import of a quantity sufficient to discourage, postpone, or endanger the domestic manufacture of such products."

BRUNNER-MOND DEVELOPMENT.—It is stated that Messrs. Brunner, Mond and Co., Ltd., have purchased land at Stafford for the erection of works to be devoted to their ammonia-soda process.

A NEW SILICIOUS FILLING MATERIAL.

AMONG the results of the war that can be described as beneficial must be placed the fuller realisation of the value of "waste" products. The need for replacing some article the supply of which was curtailed, if not entirely interrupted, by war conditions, led to more than one revolution in manufacturing processes, while the closure of markets often left no option but an endeavour to earn a profit by the utilisation of products formerly consigned to the dump as "waste."

Few industries have had to contend, even in normal times, with a greater hindrance in the shape of unusable residue than that of slate quarrying, where at least 70 per cent. of the rock won in the past was waste. The appearance of the waste heaps of such quarries as the famous Penrhyn and Dinorwic, in North Wales, renders sufficiently credible the statement that the commercial success of such a project as slate quarrying is to be measured by the area and accessibility of the land available for tipping purposes. It is safe to assume that the slate waste heaps of North Wales to-day cover many hundreds of acres of valuable land.

At last, however, a move has been made in the direction of turning the millions of tons of waste slate comprised in these unsightly masses into articles of commercial value, by the process of finally reducing the large fragments into powder form, and the opportunities for its use in industry will be manifest from the accompanying typical analysis:—

	Per cent.
Silica (SiO_2)	60.66
Alumina (Al_2O_3)	20.36
Ferric Oxide (Fe_2O_3)	8.26
Lime (CaO)	0.96
Magnesia (MgO)	2.10
Potash (K_2O)	1.41
Soda (Na_2O)	3.08
Carbonic anhydride and combined water..	3.17
	100.00

The North Wales Development Company, Ltd., which has acquired a fifty years' lease of the Pantdreiniog slate quarries at Bethesda, Carnarvonshire, has been carrying on varied and extensive experiments since the end of 1918, and is now marketing the powdered slate under the name of "Myrtox," exhaustive tests having shown its commercial value in many directions.

A full list of the trades and processes in which a silicious inert filler, which is essentially the description of the fine slate powder, can find an application is obviously not easy to give; but among others it has been demonstrated that it is useable in the following manufactures: Asphalt, bricks, cement, abrasive soaps, cleansers, glass, linoleum, moulded and mechanical rubber goods, pottery, slabs and tiles, distempers, paints, insulators, etc. It produces bricks which are at the same time dense, strong, and hard, and which should show a considerable saving in manufacturing cost. The silica content also ensures that they are capable of withstanding a very high temperature. Excellent samples of common glass bottles, pottery, and tiles made from the slate waste are on exhibition, and for green and amber glass it appears eminently suitable.

We are assured that firms who have already used the powdered slate waste as a filler in the manufacture of such rubber goods as cab tyres, boot soles, and cheap moulded goods, have expressed their entire appreciation of it, as it is entirely inert and has a good binding effect on the rubber. Asphalt is another substance where the slate waste in the form of an impalpable powder has definitely been proved of high value. It will be realised that the

wearing property of an asphalt surface depends largely upon the absence of voids in its composition and surface, so that the finer the filler which forms the admixture with the bitumen, the more likely is perfection to be attained. Much of the "Myrtox" yield is an air-floated dust which is collected by Sturtevant fan dust-collecting plant, in the form of a powder of the very finest nature.

For distempers, fire- and acid-proof paints, etc., the slate waste powder seems admirably adapted, and for many other purposes where an inert fine filler is indicated it should have many advantages over other substances now in use, in view of the fact that its source enables it to be put on the market at competitive prices, and that accurate grading of the powder from 20 up to 200 mesh and over is guaranteed.

FIXATION OF ATMOSPHERIC NITROGEN.

THE Secretary of the Ministry of Munitions announces that the report of the Nitrogen Products Committee of the Munitions Inventions Department will shortly be published.

This committee was appointed by the Minister of Munitions (Mr. Lloyd George) in June, 1916, and the report embodies the results of a full inquiry into the nitrogen problem, extending over two and a half years. Its recommendations include proposals for meeting at home a portion of the growing demand for various nitrogen products; also proposals for conserving and increasing the output of by-product ammonia from gas works, coke-ovens, etc.; for securing the better utilisation of the national resources in coal and for reducing the consumption of raw coal as fuel. The committee also indicate directions in which further research on the nitrogen problem initiated during the war should be continued for the general benefit of the country.

The main interest in the report lies in the direction of the future development in this country of the fixation of atmospheric nitrogen. In connection with this the Ministry of Munitions commenced during the war the erection of a factory at Billingham-on-Tees, covering 271 acres. At the conclusion of hostilities work on the construction of the factory as a war measure was suspended pending further consideration as to the best method of fulfilling the intentions of the scheme. There is now reason to judge that by a modification of the scheme it can be made capable of producing ammonia synthetically on a commercial scale, and the Government have decided that further development should be left to private enterprise.

The Minister of Munitions is accordingly prepared to consider offers for the acquisition of the partly constructed factory at Billingham, with plant and other realisable assets, from persons or firms in a position to develop successfully the fixation of atmospheric nitrogen. The adequate assurance of the production of nitric acid, etc., for service explosives, will be a condition of the transfer.

Those desirous of making offers should communicate direct with Sir Howard Frank, K.C.B., Ministry of Munitions, 4, Whitehall Court, S.W. 1.

NEWCASTLE CHEMICAL CLUB.—The members of Newcastle-on-Tyne Chemical Club held a most successful whist drive on Friday night (October 31) in their rooms at the Drawing Room Cafe, when Mr. H. Dunford Smith, secretary of the Newcastle Section of the Society of Chemical Industry, carried off the first prize.

AMERICAN CHAMBER OF COMMERCE IN LONDON.

DRUGS, CHEMICALS, AND DYESTUFFS COMMITTEE.

AT a recent meeting of the Committee on Drugs, Chemicals, and Dyestuffs of the American Chamber of Commerce in London, Mr. I. A. Keene presiding, discussion took place on several questions relating to the importation of chemicals and allied products.

IMPORTATION OF SALICYLATES.

Mr. R. J. Pugh pointed out that in a resolution proposed by Mr. A. Withy at the previous meeting of the committee it was stated that salicylates, amongst other products, had advanced in price to nearly double, which was not true in the case of his (the speaker's) chief product, sodium salicylates. The supply was also quite equal to the demand for this product—in fact, his own business was 90 per cent. export. Mr. Pugh was asked why, if only 10 per cent. of his sodium salicylate was for home consumption, he required to be protected against the import of foreign sodium salicylate. He replied that though his own business was chiefly for foreign markets, this was not the case of many other manufacturers. Mr. Keene reminded Mr. Pugh that a day or so before the meeting at which the resolution was passed, he (Mr. Pugh) was not able to supply salicylic acid for a month, and was quoting 1s. 6d. a pound, whereas Mr. Keene could have sold the American salicylic acid for 1s. 3d. There was no question of dumping at a lower price here. The acid had been bought in America at a very low figure just before it increased considerably in price, and, therefore, after adding the cost of freight and insurance and leaving a reasonable margin for profit, the American product could be legitimately sold in this market at a lower price than the British. Mr. Pugh then protested that the resolution stated that the import restrictions had raised the price to nearly double. In his opinion that was not correct. It was pointed out, however, that on the average it was so, because some of the chemicals mentioned had risen 300 per cent. After a lengthy discussion the committee decided that sodium salicylate should be excluded from the resolution, though it appeared to be perfectly correct to include all other salicylates and their derivatives.

CUSTOMS STATISTICS.

The following letter, it was announced, had been sent on behalf of the Committee on Drugs, Chemicals, and Dyestuffs to the Board of Trade:—

"The Committee on Drugs, Chemicals, and Dyestuffs of the American Chamber of Commerce in London beg to draw the attention of the Board of Trade to the disadvantages under which the industry of this country suffers by reason of the lack of detailed information as to the quantities of specific drugs and chemicals imported into and exported from the United Kingdom.

"It is impossible to ascertain of which drugs the present returns consist, and without such detailed information it is impossible for any industry to ascertain—(a) What the country's requirements are for any particular product; (b) the demand abroad for the same products.

"We are confident you will realise that the present position of industry and the unsatisfactory rate of exchange require that all available information should be forthcoming to enable manufacturers and merchants to concentrate upon the goods most urgently needed abroad, and to avoid unnecessary importation. Information upon these two essential points would be provided by the compilation of the statistics suggested below. An added advantage is that the American authorities are arranging for the provision of improved trade statistics throughout the United States, and an exchange of

these particulars between the two countries would, we believe, afford a profitable opportunity for co-operation.

"The particulars of exports and imports which occur to this committee as most urgently needed may be summarised under the following headings:—

1. The name of the chemical, drug, or dyestuff, raw or manufactured.
2. The total weight of each separate article.
3. The total value, f.o.b. and c.i.f., of each separate article.
4. Countries of origin arranged in order of their participation, and showing the percentage of such participation.

"The publication of such statistics monthly would serve, in the opinion of this committee, not only as a valuable guide to merchants, but would permit of intelligent guidance of domestic chemical industries through the dangers of foreign competition."

DYESTUFF LICENSING SYSTEM.

Reference was made to the fact that the British Chemical Trade Association was drawing up a petition for presentation to the Premier, protesting against the present constitution of the Licensing Sub-Committee and also against the appointment of Messrs. Fairclough, Dodd, and Jones (under the name of the "Central Importing Agency") as the Government's agents in connection with the importation of dyestuffs from the United States.

Mr. S. J. C. Mason, hon. secretary of the British Chemical Trade Association, asked that the Chamber should obtain as many signatures as possible on the petition forms. Good support already had been received, and in this connection Mr. Keene read one of the resolutions of the Association of British Chambers of Commerce to be considered at their next meeting, which "demanded the immediate removal of all restrictions on the importation of dyestuffs and the abolition of the Licensing Sub-Committee appointed by the Board of Trade to control such imports, or the representation on such a committee of the smaller manufacturers, of merchants, and of the independent consumers."

In regard to the combined sub-committee appointed by the American Chamber of Commerce and the British Chemical Trade Association, Mr. Mason stated it was hoped that the Government would grant an interview to the deputation, and suggested that it might be considered essential for, at any rate, a proportion of the representatives of such a deputation to have technical knowledge. It seemed likely that if the deputation took place the Government's representatives would have extensive technical experience, and it would be necessary for the delegates to meet them on their own ground.

Mr. Keene pointed out that nearly all the members of the Chamber interested in the subject of dyes were merchants. He was of the opinion that the merchants knew better than anyone where the present system of licensing dyes and chemicals was at fault, and it would not need any technical knowledge to put their case to the Government.

IMPORTATION OF LACTIC ACID.

At the close of the meeting Mr. J. Hilborn asked whether the committee could help him to import lactic acid from America. He understood it was prohibited. It was not a key industry, as only a very small amount of commercial lactic acid was manufactured in this country, and he believed that no edible lactic acid was made at all.

The committee agreed that it would be quite permissible for them to take action in the matter if full details were put before them.

RESEARCH IN THE NON-FERROUS METAL INDUSTRIES.

CO-OPERATIVE SCHEME AT BIRMINGHAM.

AN interesting co-operative scheme, within the domain of science and technology, in relation, primarily, to the non-ferrous metal industries, has recently been inaugurated in Birmingham. It is an example of what may be accomplished by groups of firms in association. The aim of the movement, known as the Midland Laboratory Guild, is to provide facilities by which small manufacturing firms, who cannot afford the cost of laboratory practice, may invoke the aid of science. By means of co-operation on the part of ten firms engaged in different branches of trade, but all interested in, and using, non-ferrous metals and alloys, a system of scientific control has been organised to meet their requirements without attempting to instal separate laboratories in each individual works. The work is entirely on a non-profit basis, and is restricted in a large measure to the firms concerned; in other words, outside work is not sought, though from time to time applications for analyses, determinations, etc., are dealt with. The organisation is in the form of a company registered under the Board of Trade and limited by guarantee. The objects are as follows:—

"To promote, maintain, and control scientific work in connection with the non-ferrous trade or industry, and also any other metal trade or industry carried on by any one or more members of the Guild for the time being; to establish, equip, and maintain chemical, metallurgical, physical, and mechanical laboratories to carry on the work of analytical and metallurgical chemists; as also the physical and mechanical examination of metals and metallic alloys, and of all substances and processes carried on by any member of the Guild in his trade or manufacture."

The equipment in King Alfred's Place provides for: (1) A complete chemical laboratory fitted with every necessary appliance, and affording special facilities for electro-chemical methods of analysis, as also for the examination of fuels and refractory materials, to which subjects considerable attention will be paid; (2) a metallographic laboratory fitted with one of the latest and most complete types of photomicrographic apparatus, together with photographic dark-room; (3) a physical testing laboratory, the plant of which consists, *inter alia*, of a 25-ton Olsen testing machine, Brinell hardness-testing machine, Sankey bend-testing apparatus, a 5-inch Drummond lathe, drilling machines, etc.; (4) a pyrometric laboratory equipped for calibrating and testing thermo-electric pyrometers, effecting repairs and adjustments. One room has been set apart as a scientific library.

The administration of the laboratory is carried on by a committee or a board of directors, consisting of one member approved by each firm constituting the membership. This committee is responsible for the financial and commercial administration of the scheme, but not for the scientific control. This latter is provided for by means of a small consultative board of three metallurgists, who are jointly responsible for the scientific equipment and methods, and to whom special technical problems which may crop up can be referred. The immediate management of the laboratory and staff is in the hands of Mr. Seymour Pile, M.A. (Camb.). This pioneer movement will be, it is hoped, an important factor in paving the way for research associations.

FRENCH CUSTOMS DUTIES ON CHEMICAL PRODUCTS.

THE French Senate on October 18 adopted a Bill, which had already been adopted by the Chamber of Deputies, to revise the existing French Customs Tariff in so far as concerns chemical products, which deals also with the customs regime of German dyestuffs, etc., to be imported into France under the reparation clauses of the Peace Treaty. The Bill, as passed by the Senate, provides as follows:—

Article 1.—Under reserve of the provisions of Article 2 below, the Law of the 11th January, 1892, establishing the French Customs Tariff (as modified by the Laws of the 3rd March, 1892, 4th April, 1898, 10th July, 1899, 30th April, 1903, 21st November, 1906, 29th March, 1910, 7th June, 1911, 5th February, 1912, and 4th January, 1913), is completed and modified in conformity with the schedule attached to the present measure.

Article 2.—Colouring materials, chemical products, pharmaceutical products, and other products coming into France as the result of the levy imposed on Germany by the Peace Treaty (Annex XI. of the clauses relating to reparations) shall be admitted into France free of all customs duties. These products shall be distributed under Government control.

Until otherwise decided, licences must be obtained before any such colouring materials, chemical products, pharmaceutical products, etc., from Germany *in excess* of the levy imposed by the above-mentioned provisions of the Treaty of Peace, can be imported. With this reservation their importation shall be effected under the conditions laid down in the tariff.

Article 3.—All previous legal provisions contrary to the present Law are thereby repealed.

For the most part the provisions consist of a rearrangement and elaboration of the provisions of Section XVIII. of the existing Customs Tariff (Tariff Nos. 234-282—"Chemical Products"), but affect also certain other sections—*e.g.*, colours. The changes proposed under the Schedule are too numerous and complicated to be summarised. In some cases the duties are reduced, in others (and these appear to be the majority) they are increased. In some cases only the "general" rates of duty are amended, the "minimum" tariff rates (to which, of course, United Kingdom goods are subject) remaining unchanged. The existing tariff provision imposing *ad valorem* duties (7½ per cent. in the general tariff, and 5 per cent. in the minimum) on "chemical products not specified in the tariff" is superseded in respect of a large number of chemical products not enumerated in the present Tariff by specific rates.

From the official report of the proceedings in the Senate on October 18 it appears that the present measure is largely based on proposals made in 1915 by the "Syndicat des Produits Chimiques." Prices having increased considerably since that date, proposals were made that the new duties should be brought within the scope of the "co-efficient of increase" system (chemicals have hitherto been exempted from the co-officients of increase), and M. Clementel, the Minister of Commerce, intimated that the Inter-Departmental Commission established to revise the co-efficients of increase would immediately examine and give satisfaction to these proposals.—*Board of Trade Journal*.

ITEMS OF INTEREST.

SPANISH IMPORT DUTY ON SULPHUR BLACK.—Customs duty on thiocarbon (sulphur black) imported into Spain is now leviable at the rate of 25 centavos per kilogramme, under Tariff No. 204.

OIL AND COLOUR CHEMISTS' ASSOCIATION.—The November meeting of the Association will be held on the 13th inst. at the Food Reform Club, 2, Fumival Street, Holborn, London, E.C., at 7 p.m. At 7.30 p.m. a paper entitled "Monazo-dystuffs Suitable for the Production of Lake and Pigment Colours" will be given by Mr. W. Allsebrook.

ZINC AND ZINC DUST PRICES.—Australian high-grade zinc dust (88/92 per cent. metallic zinc) continues in exceptionally strong demand at £75. per ton, with practically very little offering for prompt supply. Australian electrolytic zinc (99.95 per cent. purity) is unchanged at £42. per ton, f.o.b., Australia, for direct shipment to New Zealand, India, South Africa, and the Far East.

GERMAN EXPLOSIVES WORKS' INCREASED CAPITAL.—After the announcement of the enormous increase in the capital of the German chemical companies, there follows an analogous announcement respecting the explosives factories, the whole group of which is about to double its capital. Thus the Köln-Rottweil Co. is increasing its present 33,000,000 marks capital to 66,000,000; the Rhine-Westphalian Explosives Company increases its capital from 13,000,000 to 26,000,000 marks; the Siegerner dynamite factory in Cologne from 600,000 to 1,200,000 marks. These three concerns belong to the so-called explosives group. The Dynamite Company, in Hamburg, which is in agreement with the group named, is also to double its capital—namely, from 36,000,000 to 72,000,000 marks.

FIRE.—A destructive fire occurred on Tuesday evening at the stores of Messrs. James A. Kemp and Co., varnish manufacturers, Birkenhead Road, Seacombe, near Liverpool. The Birkenhead and Wallasey brigades were quickly in attendance, and were confronted by a terrific blaze, a large number of barrels and drums of turpentine, linseed, and other oils and varnish having been ignited. The fire blazed furiously for an hour and a half, by which time the inflammable material involved had burned itself out. The damage is estimated at between £7,000, and £8,000., and is stated to be covered by insurance. It is believed that the fire was caused by the overflowing of a glue-pot on a stove in the varnish factory.—From an unknown cause a fire broke out last week on the premises of Messrs. Stafford Allen and Sons, Ltd., chemical manufacturers and drug grinders, of 7, Cowper Street, Finsbury, E.C. The fire was fortunately confined to the laboratory, where the contents were slightly damaged. George Harris, aged 58 years, was burned on the back, and had to be removed to hospital.—A disastrous fire broke out on Wednesday at the works of the Scottish Fish-oil and Guano Company, Ltd., near Falkirk. The damage is estimated at £50,000.

DISTILLATION OF HARD PITCH.—Hert A. Fischer, of Weinböhla, narrates in the *Journal für Gasbeleuchtung* that during the war the requirements of munition works enormously increased the demand for electrolytically deposited metals. For these, carbon electrodes must be provided; and in order to supply these they had to resuscitate the process of distillation of hard pitch, which had been abandoned. The material softens at from 140° to 167° F., so that any coking plant suitable for coal is not suitable for it. For distillation any form of brickwork or stonework is too porous. Large iron retorts are therefore used for the preliminary distillation, with a diameter from 5ft. to 9ft. Iron is not an ideal material, since it is attacked and wears away; but it is the best available. Still, the most careful handling is required in order to prevent overheating of the iron, which may even lead to collapse of the metal under the interior vacuum. The process is continued until some 30 to 40 per cent. has come over as oil, 4 to 6 per cent. as resin, with traces of ammonia and a certain quantity of uncondensed gases; and the residue is coked by continued heating. The difficulty is to extract the product; the retort is taken apart and the residue dug into. It is found to vary considerably from one part of the charge to another. The best parts contain 96 to 97 per cent. of carbon and $\frac{1}{2}$ to 1 per cent. soluble in benzole; and they are very porous. The ash rarely exceeds 1 per cent.—*Gas World*.

PERSONAL.—Mr. C. F. Chance was this week elected a member of the Birmingham City Council. He was managing director of Chance and Hunt Ltd., chemical manufacturers, Oldbury, and is a son of the late Mr. Alexander Chance.

LINSEED CROPS.—The production of linseed in Canada, the United States, British India, Italy, Japan, and Tunis for 1919 is estimated at 13,965,000 cwt., or 34.3 per cent. less than the previous year's production, and 35.5 per cent. less than the average production of the five years 1913-17.

EDIBLE OILS FREED FOR EXPORT.—Under a proclamation dated October 31 all edible oils and fats may now be exported freely without licence except coconut, groundnut, and palm kernel oil. Imitation (compound) lard, neutral lard, and mustard seed are also freed for export.

OBITUARY.—The death has occurred at his residence, 50, Armitage Road, Milnsbridge, near Huddersfield, of Mr. James Watson Leitch. He was 47 years of age, and was associated with his brother in the firm of Messrs. J. W. Leitch and Co. Ltd., chemical manufacturers, of Milnsbridge.

TURPENTINE SUBSTITUTE.—The operation of the Turpentine, etc., Control Order, 1918, is, by an Order of the Ministry of Munitions, suspended until further notice in so far as it relates to turpentine substitute as defined in the Order—namely, mineral turpentine, white spirit, white oil, or any product of petroleum (except motor spirit and benzine) capable of being used as a substitute for spirits of turpentine.

BUSINESS NOTICE.—Arrangements have been completed for the amalgamation of the business carried on by Mr. Robert W. Paul at New Southgate, London, with the Cambridge Scientific Instrument Company, Ltd. Mr. Paul will join the board of directors, and the manufacture of instruments will be continued both at Cambridge and at New Southgate. Until the end of the year the selling and manufacturing arrangements will be unchanged, but on January 1, 1920, the name of the company will be altered to the Cambridge and Paul Instrument Company Ltd., and as soon as possible the head office and showrooms transferred to London.

POLISH IMPORT RESTRICTIONS.—As a consequence of the exemption of so many classes of goods from the necessity of obtaining licences, the issue of licences by the Polish Commercial and Financial Agency in London has been suspended, and applications for permission to import into Poland goods not specified in the subjoined list must be addressed to the Polish Government Import and Export Commission, Elektoralna, 2, Warsaw. The importation of such goods also requires the authorisation of the Central Foreign Exchange Committee recently established by the Polish Government. Raw materials: Coal; coke; chalk, ordinary and purified; china clay (kaolin); potash and minerals for manufacture of glass; borax; raw celluloid; indiarubber; caoutchouc; silica sand; and cork bark. Metals, raw and semi-manufactured: Copper; aluminium; nickel; lead; tin; wolfram; mercury; metallic bismuth; ferro-manganese; ferro-silicon; iron ores; and tool steel. Chemicals: Acetate of lead; aniline dyes; printing inks; lithographic colours; formaline; phosphorus; lactic acid; oxalic acid; red arsenic; borax chloride; ferric-chloride; acetone; benzole; naphthaline; bisulphide of carbon; and aniline.

PROPOSED GERMAN-AUSTRIAN CARBIDE MONOPOLY.—Until now, water-power installations have been adapted to the supply of water available with certainty during nine months of the year; but it would be better if they were enlarged so that the greatest quantity of water available at any time could be utilised. A steady supply of energy should then be delivered at a high price during the whole year to the consumers of light and power, whilst the excess, available only from time to time, would serve for selected chemical factories using only cheap current and making a product easy to be stored and not requiring further treatment. The manufacture of calcium carbide, which could be carried on intermittently, fulfils these conditions, and it would be possible to make 6,500,000 tons of this material from the 500,000 metric tons of gas-coke annually produced in Germany and Austria. The necessary electrical energy (5.76 million kilowatt-hours) could be provided by the excess energy of the enlarged water-power stations, and the cost of electrical power would be reduced to all consumers. Carbide, to the value of 910 million kroner per year, could be produced, and at a much lower cost than obtains in most other countries. This industry is well suited to be a State monopoly.—*Zeit. für ange. Chem.*, through *Tech. Rev.*

CANADIAN CHEMICAL INDUSTRY.

THE enormous impetus given to the Canadian chemical industry, due to exceptional demands during the war, is shown in a report issued by the Dominion Bureau of Statistics, prepared for the Honorary Advisory Council of Scientific and Industrial Research. This report contains a directory of Canadian chemical industries, with names, addresses, and products of firms. The number of plants operated is given as 634, 161 of which are situated in the Province of Quebec.

The outstanding progress made during the war was probably the construction of the world's largest glacial acetic acid plant at Shawinigan, Quebec. An entirely new process beginning with acetylene was developed, while acetone, paraldehyde, crotonaldehyde, mercuric oxide, and manganese acetate are now also produced, and magnesium of a purity ranging from 99 per cent. to 99.9 per cent. is made electrolytically from its fused salts.

The following figures show the increase in value of exports of Canadian drugs, dyes, and chemicals during the fiscal years March 31, 1912-19: 1912, \$1,677,216; 1913, \$1,800,437; 1914, \$1,730,203; 1915, \$3,543,701; 1916, \$6,449,145; 1917, \$9,218,415; 1918, \$14,207,609; 1919, \$17,053,074. The imports for consumption of drugs, dyes, and chemicals into Canada in the last fiscal year amounted to \$32,788,704, of which \$28,785,191 represents the value of chemical products imported from foreign countries, and \$4,003,513 the value of such products imported from British markets.

PARLIAMENTARY NEWS.

Quality of British Dyes.

In the House of Commons on Monday, Major McKenzie Wood asked the President of the Board of Trade whether he is aware that the subsidised dye manufacturers are supplying to woollen manufacturers dyes which are not fast to milling; whether, in consequence, large quantities of good material are being spoiled weekly; and whether he will take steps to enable woollen manufacturers to obtain dyes which can be guaranteed?

Sir A. Geddes: No, Sir. I have no information of the kind suggested, but if the hon. and gallant member will furnish me with any concrete evidence on the subject I shall be glad to receive it.

Major Wood: Have not certain manufacturers already communicated with the Board of Trade on this subject?

Sir A. Geddes: Yes, Sir, I have frequent communication from manufacturers, but I have had none on this specific question.

Major Wood: I will send the right hon. Gentleman particulars.

Cement.

Captain R. Terrell asked the President of the Board of Trade if he is aware that the short supply of cement in this country is hampering building operations in the home counties; whether he is aware that quantities are being sent abroad, presumably at a higher price; and whether the Government will take steps to secure that an adequate amount of cement is available for home needs before overseas demands are supplied?

Mr. Kellaway: I have been asked to answer this question. There are considerable stocks of cement in manufacturers' works, but delivery of orders is being seriously delayed by lack of railway transport facilities. I am advised that it is this lack of transport, and not the export trade, which is prejudicially affecting building operations in certain parts of the country.

Patent Rights and Renewal Fees.

Colonel Wedgwood asked the President of the Board of Trade whether his attention has been called to the case of holders of patents taken out before the war; whether he is aware that these holders have had to pay renewal fees during the war although they have not been allowed during the war

to manufacture the goods in respect of which the patents were granted; and whether it is proposed to extend the patent rights for a period to correspond with that during which they have been debarred from using them?

Sir A. Geddes: The proposals of the Government dealing with this matter are embodied in Clauses 6 and 7 of the Patents and Designs Bill, which is at present awaiting second reading in another place.

Quinine.

Mr. Spoor asked the President of the Board of Trade whether he is aware that the whole of the quinine (chinchona) production of the world, apart from the small quantity produced by the Government of India for local use, has lately been made the subject of a monopoly of the Dutch and British producers; whether he is aware that this monopoly is fortified, so far as this country is concerned, by an equally firm monopoly of the wholesale chemists of the United Kingdom; whether he realises that the consumer is now being charged 3s. 6d. per ounce, as compared with 1s., or even less, pre-war; and what steps he proposes to take to enable this commodity to be obtained without profiteering?

Mr. Bridgeman: The answer to the first part of the question is in the affirmative. The whole question of the prices and supply of quinine sulphate to this country is being investigated under Section 3 of the Profiteering Act, and I hope that the findings of the investigators will be ready for publication shortly.

Workmen's Compensation.

Major Baird, replying to Mr. Rose, said: My right hon. friend the Home Secretary hopes to be able to introduce very shortly a Bill to increase the amount payable under the Workmen's Compensation (War Addition) Act, 1917. The question of the permanent revision of the scales of compensation both in fatal and non-fatal cases must await the Report of the Departmental Committee on Workmen's Compensation, which is conducting a careful and thorough inquiry into the whole subject.

Importation of Matches.

Mr. A. Shaw asked the President of the Board of Trade whether any restrictions are in operation against the importation of Swedish or Belgian matches; and, if so, for what reason?

Sir A. Geddes: The importation of matches is not subject to any restriction.

Tinplate Prices.

Mr. Bridgeman, replying to Lieut.-Commander Chilcott on Tuesday, said: I am informed that the maximum price of tinplates when control ceased was 33s. 10½d. per box of 112 sheets (108lb.), f.o.r. at makers' works, and that the corresponding price at the present time is 41s. The desirability of instituting an inquiry into the price of tinplates is under consideration.

CORRESPONDENCE.

***We do not hold ourselves responsible for the opinions expressed by our correspondents.*

Ammonia and Alumina.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—In your last week's article, "Aluminium from Labradorite," I was delighted to note the research work accomplished by Professor V. M. Goldschmidt on the extraction of alumina from home raw materials—a subject which I, in common with others, have studied. The enforced abandonment by him of the method of extraction by sulphuric acid, then precipitation by ammonia, due to the great cost of the ammonia, reveals once more the great obstacle to scientific progress and cheap production that dear ammonia presents. The parent of all chemicals, we have been promised it at 2d. per lb.; it is still 1s. 10d.! Why? I may be wrong, but your article leads me to infer that the alumina obtained from labradorite is not free from soda, lime, and iron; and in Mr. J. T. Pattison's excellent little work on "Aluminium" I find the alumina obtained from bauxite is likewise contaminated with silica in addition. I know of no method for producing pure alumina from ferruginous materials, like fireclay, other than the one discarded by Professor Goldschmidt, and when Norwegian chemists succeed, as I believe they will, in producing "twopenny ammonia," the outcome will be impossible to realise.—Yours, etc.,

Burton-on-Trent, November 3, 1919.

A. E. TANNER.

LEGAL INTELLIGENCE.

Chemical Merchants' Bankruptcy Examination

Under the failure of Perry Mills and Co., export chemical merchants and agents, Capel House, 54, New Broad Street, E.C., and 67, Hanging Ditch, Manchester, Joseph A. H. Duke and Henry Slater, the partners at the date of the receiving order, attended before Mr. Registrar Mellor on Tuesday at the London Bankruptcy Court for public examination upon accounts showing gross liabilities £30,919. 17s. 4d. (unsecured £14,139. 18s. 11d.); assets estimated to produce £3,137. 7s. 10d.; and a deficiency reported at £11,002. 11s. 1d. The receiving order was made last August at the instance of the Nippon Shoko Company, Ltd., who claim £4,600. under a judgment in respect of an unfulfilled contract.

The debtor Duke was first examined, and in reply to Mr. Walter Boyle, Official Receiver, stated that prior to 1908 he acted as a clerk and half-commission man on the Stock Exchange. In that year he borrowed £2,000. from a friend to invest in the shares of a margarine company which he had assisted to promote, and of which he acted as director at a fee of £350. per annum. He had not reported that friend as a creditor under this bankruptcy, because he was his cousin, and had told him to regard the debt as forgiven. Witness knew nothing about the manufacture of margarine, and when the company went into compulsory liquidation in April, 1910, he found that he had lost £2,300. over the concern. In 1912 he assisted in the promotion of Oil Refiners, Ltd., which carried on business at Hammersmith as margarine manufacturers and oil refiners. He acted as joint manager and director at a fee of £700. per annum until July 31 last. That company was still carrying on a successful business. Whilst acting as director of the company, witness entered into partnership with Mr. R. D. Petty in the business of chemical agents at 29, Gracechurch Street, under the style of Perry Mills and Co. Neither partner put in any capital. They acted as manufacturers' agents for several German and other firms, who sent their accounts directly to and received payments from the customers. In 1913 they also became buying agents for home firms, and continued to act as selling agents for foreign firms. Witness and Mr. Petty continued the trade with considerable success. At the end of June, 1917, the accounts showed a surplus of £2,043. The partnership with Mr. Petty was dissolved in November, 1917, by mutual consent, the business being then solvent. The only partnership debt now outstanding was £600. due to Messrs. Schlinck and Co., of Hamburg, for goods supplied, and he had returned himself a debtor to that firm for his share of £300. He had notified the Public Trustee of the existence of that debt, and he agreed that it would have been better had they handed over the £600. to that official, and thus got rid of the liability some time ago.

On the retirement of Mr. Petty, witness was joined in partnership by Mr. Slater, who had acted as their manager for two years and three months. That gentleman brought in £700., and was given a half share of the business. During the whole time the business was carried on it was largely left to the management first of Mr. Petty, and subsequently of Mr. Slater, for the reason that witness's time was chiefly devoted to the affairs of Oil Refiners, Ltd. In November, 1918, witness joined the Department of the Ministry of Food, and was engaged in research work, for which services he received £300. per annum until he resigned the appointment in March, 1919.

The Manchester branch was opened in August, 1918. They employed a manager, expended £1,000. per annum on that branch, and in the result made heavy losses owing to mismanagement. The business was chiefly the export of chemicals (drugs, dyes, etc.) to the Continent, and as a rule they only purchased against orders received. The trading showed a profit down to the declaration of the Armistice in November, 1918. At the date of the Armistice they had paid for and shipped goods to the value of £13,654. to three Italian firms who had previously ordered the goods. They obtained an advance of £6,400. on the bills of lading from the Banca Commerciale Italiana, who informed them in January, 1919, that the bills had not been taken up, and upon their wiring to their customers they received replies to the effect that the Armistice had cancelled existing contracts. The real reason, however, doubtless was that in the meantime the markets had fallen, and the firms were waiting to see whether they would rise again. A portion of the goods had since been

realised by the Bank, who were returned by witness as creditors for £6,400., but hold three securities to the value of £4,770., leaving an unsecured balance of £1,630. They (debtors) instructed a solicitor at Genoa to take proceedings against the three customers, and a settlement was in course of negotiation.

The signing of the Armistice brought down prices all round, which placed them in a very awkward position, as they had entered into several large contracts with which to execute orders already obtained. After the end of May, when these bankruptcy proceedings were instituted, they did no business except for cash. The claim of the petitioning creditors was in respect of breach of contract for not taking up 50 tons of Japanese farina which witness ordered in October, 1918, to supply to a firm at Marseilles. The latter did not carry out the contract. The petitioning creditors, who invoiced the goods to witness's firm at £118. per ton, sold them at £29. 10s., and obtained a judgment for £4,600. last May. In consequence of these proceedings, witness severed his connection with Oil Refiners, Ltd. He attributed the failure of the firm to the default of the Italian customers to take delivery of the goods ordered by them and to the heavy fall in prices after the beginning of the Armistice.

The debtor Slater, having corroborated the evidence given by his partner, the sitting was adjourned till December 9 for the debtors to amend the statement of affairs by inserting certain claims which they disputed on the grounds that they were unjust and immoral.

T.N.T. Factory Explosion.

The case of the Holley Hill Rabb. and Chemical Company, Ltd., and the Royal Insurance Company, Ltd., and three other insurance companies, was mentioned in the Court of Appeal on Monday.

The case came before the court last month upon the appeal of the plaintiffs from a judgment of Mr. Justice Bailhache. The plaintiffs had erected premises at Ashton-under-Lyne in which they manufactured T.N.T., and the question in the arbitration which took place between the parties arose out of fire insurance policies effected on these premises with defendants. On June 13, 1917, a fire broke out on the premises which burnt fiercely for 20 minutes, and did great damage. Later an explosion took place which shattered the premises. A quantity of T.N.T. in closed receptacles was exposed to the intense heat of the conflagration, and this caused the explosion. The loss suffered by the assured up to the time of the explosion was assessed by the arbitrator at £12,740. The loss suffered by the assured through the fire and the explosion together amounted to a sum far in excess of the aggregate amount of the sum insured under the policies which had been issued to the assured by the insurance companies. The insurance companies admitted that they were liable to indemnify the assured for the loss suffered by them through the fire, but they contended that they were not liable under the policies for the loss which followed the explosion, on the ground that the conditions of the policies exempted them from that liability. Plaintiffs contended they were entitled under the policies to be indemnified not only for the loss caused by the fire, but also for the loss caused by the explosion, upon the ground that the explosion was an incident in the course of the fire, and that the proximate cause of the whole loss was the fire. The arbitrator and Mr. Justice Bailhache upheld the contention of the insurance companies, and the Court of Appeal on October 20 affirmed their decision, but directed that a further question affecting the Royal should be considered as to whether that company was estopped from relying on the true meaning of the policies legally construed by reason of certain statements by the agent of the Royal in two letters during the negotiations of the policies, and their lordships then decided that the appeal should stand over for a week for this point to be argued, unless the parties, in the meantime, could come to an agreement.

Mr. Douglas Hogg, K.C., now stated, on behalf of the plaintiffs, that the parties had now come to terms upon the point which had been reserved, and it had been decided that the order of Mr. Justice Bailhache as to costs against the plaintiffs and in favour of the Royal should be discharged, and, save to that extent, the appeal to be dismissed without costs to either side.

Mr. Keogh, for the Royal, agreed. He said that order only applied to the order as to costs against the Royal. Their lordships had already disposed of the appeal against the other respondents.

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Soap Contract.

A claim for damages for alleged breach of contract to supply soap came before Mr. Justice Roche in the Commercial Court of the King's Bench Division on Monday. The action was brought by Mr. Robert Otto Wiener (trading as R. O. Wiener and Co.), of Water Lane, London, against G. A. Green (a partnership firm), of Commercial Street, London.

Plaintiff's case was that on May 15, 1919, defendants sold to him 4,350 cases of Sunlight soap, 72 x 12oz., delivery as to 350 on the following day, May 16, and as to 4,000 cases delivery before the end of the following week, at 60s. 6d. less 2½ per cent. gross, free delivered, wharf, London. Defendants delivered 350 cases, but had wholly failed and neglected, it was alleged, to deliver the balance of the cases. Plaintiff had suffered damage.

Defendants said that plaintiff bought 350 cases only of Sunlight soap, and they duly delivered the goods. By a separate verbal agreement on May 15, 1919, it was agreed that defendants would endeavour to obtain further supplies of the soap from Messrs. Lever Bros., and that provided they should be able to obtain delivery from Messrs. Lever Bros. the defendants would sell up to 4,000 further cases of the soap. Defendants denied that the delivery of the 350 cases was a delivery of part of a larger contract, as alleged. They were unable to obtain delivery from Messrs. Lever Bros. of any further cases of the soap, and were therefore under no obligation to make any further delivery to the plaintiff.

Evidence in support of the plaintiff's case was given by Mr. Robert Pintas, manager to the plaintiff.

Mr. John Dean, defendants' buyer and sales manager, denied that the defendants agreed to sell to the plaintiff 4,350 cases of Sunlight soap. Defendants' warehouse would not hold them; they would have to come from Port Sunlight. Witness had no authority on May 15 to make a future sale of Sunlight soap at a fixed price for delivery in a stated time.

Mr. J. A. Compston, K.C., on behalf of the defendants, said there was a conflict of testimony, but the balance of probabilities was absolutely against the plaintiff's case. What man in his senses on May 15 would have agreed to sell a large quantity of Sunlight soap at a fixed price for delivery on a fixed day, well knowing that when he got the soap from Lever Brothers it might be at a very largely increased price, because they knew the price did go up very appreciably in a short space of time, and well knowing that Lever Brothers reserved the right to cancel if there was a shortage of raw materials?

Mr. Justice Roche, in giving judgment, said he had come to a conclusion in favour of the defendants, and gave judgment for the defendants with the costs of the action.

Insurance of Nitrate Cargoes.

At the Liverpool Assizes on Friday, October 31, before Mr. Justice McCardie, an action was brought by Thomas Cheshire and Co. against Vaughan Brothers and Co. for negligence and breach of contract.

The action turned upon a dispute with regard to certain cargoes of nitrate of soda shipped from South America to this country, and intended to be stored in warehouses at Liverpool, Birkenhead, and Newport belonging to the plaintiffs. But owing to the war it was liable to be diverted by the Government to other ports on the Continent; and against this risk of diversion, by which the plaintiffs would lose on storage, as well as marine and war risks, the plaintiffs maintained that they instructed the defendants to effect certain insurances. When some of the vessels were diverted to Italy, and the underwriters refused to pay, the plaintiffs in the present action sued them and failed both in the High Court and on appeal. The plaintiffs now sued the defendants, contending that they had been guilty of negligence and breach of duty in not carrying out their instructions as to effecting an insurance which would have covered the risk of loss due to the diversion of the ships.

For the defence, it was claimed that the onus was upon the plaintiffs to prove that there was insurable interest in the adventure. This, it was held, had not been proved.

Giving judgment on Monday, his Lordship said that on the evidence of the plaintiffs he was satisfied that the defendants must be held guilty of negligence and breach of duty in not disclosing the actual risks and in not procuring a policy worded with the appropriate breadth *prima facie*, therefore judgment would be against the defendants; but two serious points were raised by defendants against that, the first being that the policy which they were requested to obtain was a

P.P.I. policy, which was void under Section 4 of the Marine Insurance Act of 1906, and therefore the plaintiffs could not recover thereunder; the second point was that plaintiffs had no insurable interest in the cargo or profits. These points were of a grave and general importance. His lordship held that plaintiffs were not entitled to recover the amount claimed, £1,800., or even nominal damages, and gave judgment for the defendants.

Libel Action by Director of Petroleum Executive.

In the King's Bench Division on October 30, before the Lord Chief Justice, a settlement was announced of a libel action brought by Sir John Cadman (director of the Petroleum Executive) against Mr. Lloyd Eastlake and his wife, Mrs. Evelyn Eastlake.

Mr. E. F. Spence, for plaintiff, said Sir John Cadman had, since about January, 1917, been a member of several Government Departments, formed for the purpose of obtaining oil. During this period there existed in these Departments two sharply opposed theories as to the best means of obtaining oil for the nation, plaintiff being the chief exponent for the one theory. The adherents of these respective theories became exceedingly bitter, and the result of this bitterness was that several newspaper attacks were made on plaintiff. Mrs. Eastlake, who during part of the period in question was a member of the staff of the Petroleum Executive, took at the time a very strong view of the conduct of plaintiff and his assistants, and the result was that she wrote three signed letters to him, containing serious charges against him. Between March 29, 1918, and January 20, 1918, eight anonymous letters were addressed respectively to the Secretary of the Admiralty (Mr. Walter Long), the editor of the *Oil News*, Sir Marcus Samuel, and Sir Charles Greenaway, in all of which serious and untruthful charges of misconduct and incompetence were made against plaintiff. Plaintiff and his advisers came to the conclusion that defendant was the author of these letters, and consequently brought this action for libel, in which the only defence was denial of authorship. The parties had come to terms. Plaintiff accepted defendant's assurance that she did not write the letters complained of, and defendants, in turn, recognised that plaintiff was not acting unreasonably in instituting proceedings. The terms included a full indemnity to plaintiff for his costs and the signing of an apology by defendant. Counsel therefore asked his lordship to stay the action upon these terms.

His lordship consented to the action standing out of the list on the terms agreed.

Damages for Non-delivery of Soda Ash.

In the Bow County Court, on Friday of last week, an action arising out of the non-delivery of 40 tons of soda ash was decided before Judge Graham, K.C. The plaintiffs were Messrs. V. L. North and Co., of 76, Finsbury Pavement, E.C., dealers in chemicals; and the defendants, Messrs. Senior Crozier and Company, Union Works, Union Street, Stratford, chemical manufacturers, the claim being for £63. 18s. 6d.

Mr. Medcalf, who appeared as counsel for the plaintiffs, said that the action had been remitted from the High Court. He understood that overtures had been made by the other side for settlement, and a figure having been arrived at, they were agreeable for judgment to be entered for that amount. Of the sum claimed £33. 18s. 6d. represented the balance due for goods sold and delivered, and £30. was a sum agreed upon as damages for the defendants failing to deliver 40 tons of soda ash at the docks by an agreed date, causing the plaintiffs to have to go into the open market and purchase at a higher figure. The order was placed on March 12 for delivery on March 25, but it was not carried out. A sum of £18. 18s. 6d. had been paid into court, and the agreed balance was £45. He might say these transactions had been going on for years and years between the parties, and this was simply an unfortunate happening.

Judge Graham entered judgment for the plaintiffs for £45. and costs.

Customs Seizure of Pyrogallic Acid.

In the King's Bench Division on Tuesday, before Mr. Justice Sankey, Mr. R. A. Wright, K.C., applied in the case of the Attorney-General v. Brown and Forth, chemical merchants and importers of Farringdon-street, London, and Manchester, to fix a date for the hearing of an information on the Revenue side of the King's Bench Division.

His Lordship said he would fix the hearing for November 18.

REPORTS OF COMPANIES.

Alby United Carbide Factories, Ltd.

The report for the period ended December 31, 1918, states that the net profit (after writing off over £34,000 for depreciation of buildings, plant, ships, etc.), amounts to £26,596, and £14,132, was brought in, making £39,728. Dividend on 5½ per cent. preference shares, less tax, £1,959; dividend of 6 per cent. on ordinary shares, less tax, paid February 3, 1919, £27,381; carried forward, £6,837. During the period covered by the accounts the adverse exchange was again a serious factor; owing to continued war conditions great difficulty was also again experienced in keeping the works supplied with the necessary raw materials and in maintaining adequate labour. From North Western Cyanamide Co., Ltd., a dividend of 15 per cent. and from Nitrogen Products and Carbide Co., Ltd., a dividend of 9 per cent. have been received. The dividend received from A/S Meraker is somewhat lower than that for the previous twelve months.

At an extraordinary meeting of the Alby United Carbide Factories, to be held in London on Tuesday next, the scheme for the amalgamation of the company and Nitrogen Products and Carbide Company, Ltd., will be submitted to the shareholders for approval. In the circular calling the meeting it is stated that: "Nitrogen Products, through shareholdings, is the proprietor of the cyanamide works at Odda (Norway), to which, under contract, the Alby Company supplies a very large proportion of its output of carbide. In normal times such an assured annual sale was a very valuable factor in relation to the cost of production, but the conditions brought about by the war have so altered circumstances that certain clauses of the contract have become not only harsh and unjust, but also, the directors are advised, practically unenforceable. As a consequence, difficulties have been created that would disappear under the proposed scheme, and the Alby directors are, therefore, of opinion that interests would be best served by an amalgamation with the company owning the cyanamide factory. By adopting this course it is stated that the company should be able to take immediate advantage of any variation in the demand for its products, and so divert its output to whatever channel promises the more remunerative return. The directors feel confident that by the amalgamation the position of both companies will be greatly strengthened, and the dividend earning capacity of the combined enterprises materially increased."

"In the event of the shareholders approving the amalgamation, it is proposed to capitalise and distribute a portion of Alby United's accumulated reserve by allotting to each shareholder of Alby United, and paying up on his behalf, one additional ordinary £1. share for every eight ordinary shares held. For that purpose, and for the purpose of providing the shares to be received by the shareholders of Nitrogen Products, it is proposed to increase the capital of Alby United to £2,332,916 by the creation of 1,607,916 new ordinary shares of £1. each, ranking *pari passu* with the existing ordinary shares. In the event of the shareholders of both companies passing the necessary resolutions, Nitrogen Products will go into voluntary liquidation and its assets and liabilities will be taken over by Alby United, which will give in exchange one fully-paid new ordinary £1. share in Alby United for every similar share held in Nitrogen Products. Alby United, as the holder of 500,035 fully-paid shares of Nitrogen Products, will not claim any allotment of shares. As a result of the amalgamation, the boards of the two companies will be combined, but, as the shareholders know, six of the present directors of Alby United are members of the board of Nitrogen Products."

Nitrogen Products and Carbide Company, Ltd.

The report to December 31, 1918, states that the profit for the year, subject to excess profit duty (if any), amounts to £188,814., and £24,049. was brought in, making £142,863. A dividend of 9 per cent., less tax, was paid on February 3 last, absorbing £118,467., and there has been transferred to reserve for contingencies £10,000., leaving to be carried forward £14,396. The factory at Odda worked continuously, but the maximum output was not reached, as it was impossible to maintain supplies of raw materials, owing to the conditions incidental to the war. A ready market was assured for all the cyanamide manufactured, the bulk of which was utilised in the manufacture of explosives for the Allies. Work on the Aura water power scheme was continued on a limited scale, and will be proceeded with more energetically as soon as con-

ditions are again normal. Whilst hostilities continued, large quantities of nitric acid were produced at the works in France, where the company's catalytic process was employed, and £50,000 has accrued by way of royalty.

Production of ammonium nitrate at Dagenham was rendered unprofitable, owing to the fact that the plant was intended to deal with cyanamide as the base of the ammonia supply, and that on account of the conditions brought about by the war the importation of cyanamide became impracticable. In order to discharge the contract and carry out the contract and provide the Government with such a vital product as ammonium nitrate, recourse was had to gas liquor. The latter was found not to lend itself to satisfactory treatment by the plant as then installed; but we continued working, although at a great disadvantage. The Toker water rights have been sold to the Norwegian Government for a sum of £29,518 in excess of the figure at which that asset stood in the balance-sheet.

Oilfields of England, Ltd.

The statutory general meeting was held on October 30, in London, Mr. William Ivey, presiding. The Chairman said that the statement of accounts presented was quite satisfactory. Theirs was the first British company formed in Great Britain to bore for oil in Great Britain itself, though millions of money had been raised in Great Britain for the development of oilfields abroad. The company had the honour of holding the first British licence granted by the British Government for that purpose, and he trusted they would also be the first to prove that oil existed in commercial quantities. With regard to the prospects of the company, he saw nothing to alter the views held out in the prospectus. The company's future was speculative, but only as regarded the amount of oil they would get. They knew beyond the shadow of a doubt that oil existed on the Kelham estate, and the only thing they had to prove was whether there was sufficient oil to pay a dividend, and by sufficient oil he meant whether it was a commercial proposition. On that point he could not tell the shareholders anything more than they were told three months ago. With regard to the subject of oil generally, his opinion was that oil had not been appreciated at its true value. He would take the responsibility of saying that he did not think even oilmen appreciated the potential value of a barrel of oil. They had heard much about the misuse and waste of coal, but worse than the misuse and waste of coal were the waste and misuse of oil. He believed the day would come when it would be proved beyond a doubt that the essential component parts of a barrel of crude oil contained more power, more wealth, than any other commodity of commercial value in the world. He thought the Government should assist in the matter of laboratory research to prove the real value of a barrel of oil. The Germans proved years ago beyond a doubt that hundreds of thousands of pounds could be usefully and beneficially spent in the laboratory. In this country we late in life had discovered that too, and in the matter of aniline dyes and other products we were trying to make up for lost ground. He believed that contained in a barrel of oil were such properties, such powers, medicinal, economical, and mechanical, as would absolutely bar it from ever being used as crude oil in its present condition.

Langdale's Chemical Manure Company, Ltd.

The directors, in their report for the year to September 30 last, state that the forward outlook for the manure trade is hopeful in the immediate future, and they only wait for a more plentiful supply of raw material to enable the trade to develop again. The Irish trade has been given up, and the Government forbid any export trade abroad. The profit for the year is £6,918., and £3,643. was brought in, making £10,561. The directors propose to pay a dividend of 5 per cent., free of tax, for the year 1919, and a final dividend of 2 per cent., free of tax, for the year 1918, leaving to be carried forward £2,931., subject to excess profits duty and income-tax.

Alexander Fergusson and Company, Ltd.

Report to September 30 last states that the year's trading has resulted in the profit—after providing for all charges, including managing directors' salaries, directors' fees and provision for excess-profits duty and contingencies of £16,173., which, with £6,636 brought in, makes £22,809. There has been applied in depreciation of property, plant, machinery, etc., £4,000., and transferred to reserve fund £3,500. The directors recommend a final dividend on preference at rate of 5

per cent. p.a., less tax, and dividend on "A" and "B" ordinary at rate of 12½ per cent p.a., less tax, leaving to be carried forward £6,134.

Loders and Nucoline, Ltd.

A proposal has been received for the acquisition of the holdings of the shareholders in Loders and Nucoline, Ltd., on terms which the directors consider are advantageous to the shareholders. So soon as terms are definitely arranged a further communication will be issued.

DIVIDENDS.

BRITISH OXYGEN COMPANY.—Interim dividend of 5 per cent. (1s. per share), free of income-tax, on the ordinary shares.

BORAX CONSOLIDATED LTD.—Interim dividend of 1s. per share, less tax, on deferred ordinary in respect of year ending September 30, 1919.

BRUNNER, MOND AND CO., LTD.—Interim dividend for the six months ended September 30 at the rate of 10 per cent. per annum, less tax. The dividend is the same as that of the corresponding period last year.

NEW COMPANIES.

British Sugar Refiners' Association.—Registered as a company limited by guarantee, without share capital, having an initial number of members not exceeding 100, each liable for one guinea in the event of winding up. Objects: To promote and protect the commercial interests of British sugar refiners, to define trade usages and customers, etc. Registered office: 5, London Wall Buildings, E.C.

Lewis and Peat, Ltd.—Capital £500,000., £1. shares. Object: To take over the business of produce brokers carried on as "Lewis and Peat." Registered office: 6, Mincing Lane, E.C.

Turner's Glass Works Company, Ltd.—Capital £50,000., £1. shares (30,000 7 per cent. preference). Registered office: Carlton Road, Worktop.

Albert Dumont and Co., Ltd.—Private company. Capital £1,000., £10. shares. Tallow merchants, tanners, drysalers, importers, and manufacturers of and dealers in oils, fats, paints, varnishes, etc., in Great Britain, Russia, or elsewhere. Registered office: 14, Copthall Avenue, E.C.

Canbee, Ltd.—Private company. Capital £1,000., £1. shares. Sheet-metal and tinplate workers, manufacturers of and dealers in tin, iron, copper, and enamelled wire, etc. Registered office: 584A, High Road, Leytonstone

Cattle Cake Company, Ltd.—Private company. Capital £25,000., 1s. shares. As title Agreement with the Tregaron Peat Company, Ltd. Solicitor: G. H. Barchard, 22, College Hill, E.C.

Chemical and Commercial Trust, Ltd.—Private company. Capital £25,000., in 20,000 ordinary shares of £1. each and 100,000 deferred shares of 1s. each. Manufacturing and analytical chemists, etc. Registered office: 41, Finsbury Square, E.C.

General Mining Company, Cornwall, Ltd.—Private company. Capital £25,000., £1. shares (10,000 preferred). Copper, zinc, lead, tin, wolfram, and general miners, etc. Registered office: 7-8, Lilypot Lane, E.C. 2.

Holder and Son, Ltd.—Private company. Capital £3,000., £1. shares. Pharmaceutical, analytical, manufacturing, or consulting chemists, etc. Registered office: Wellington Chambers, 46, Cannon Street, E.C. 4.

John C. Van der Taelen, Ltd.—Private company. Capital £25,000., £1. shares. Object: To take over the business of a rubber merchant formerly carried on by J. C. Van der Taelen as "John C. van der Taelen," at 37, Mincing Lane, E.C.

John J. Bowater, Ltd.—Private company. Capital £20,000., £1. shares. Object: To take over the business carried on by J. J. Bowater at West Bromwich. Oil and colourmen, merchants, importers and manufacturers of and dealers in oils, paints, etc.

P.E.T. Syndicate, Ltd.—Private company. Capital £20,000., £1. shares. Extractors, purifiers of and dealers in petroleum and other mineral oils, etc. Solicitors: Wreford Brown, Hewel and Co., 38, Old Jewry, E.C. 2.

Scientific Instrument Makers, Ltd.—Private company. Capital £6,000., £1. shares (3,000 12 per cent. preference). Wholesale or retail scientific glass instrument makers, metal workers, coppersmiths, glass blowers, etc. Registered office: 47-8, Langburn Chambers, Fenchurch Street, E.C.

Q-Ozone Processes, Ltd.—Private company. Capital £10,000., £1. shares. Object: To acquire and deal with certain patents and rights relating to the use of ozone and chemical processes for various electrical, chemical, metallurgical, and commercial applications, etc. Solicitor: F. A. C. Redden, 17, Victoria Street, S.W.

Mersey Paint Works, Ltd.—Private company. Capital £100,000., £1. shares (40,000 preference). Object: To take over the business of paint, colour, ships' composition and varnish manufacturers, oil boilers and refiners, etc., carried on by J. and W. Wilson, Ltd., at Liverpool. Registered office: 31, Wapping, Liverpool.

Parry Pure Drug Company, Ltd.—Private company. Capital £5,000., £1. shares. Registered office: 10, Adam Street, Adelphi, W.C. 2.

Organic Research Company, Ltd.—Private company. Capital £21,000., in 20,000 ordinary shares of £1. each and 20,000 founders' shares of 1s. each. Research work for the purpose of proving and developing certain patents referred to in an agreement between C. Weizmann, W. A. Bromwich, and the company, and for the discovery and development of new inventions and processes relating to organic solvents, etc. Office: 10A, Featherstone Buildings, Holborn, W.C.

Technogor Mining and Engineering Trading Company (England), Ltd.—Private company. Capital £25,000., £1. shares. Object: To acquire any mines, rights, oil wells, oil-producing and metalliferous land in the U.K. or elsewhere. Office: 98, Gt. Tower Street, E.C.

Townmead Oil Works, Ltd.—Private company. Capital £100,000., £1. shares. Seed importers, exporters, crushers, extractors, and merchants, oil merchants, refiners, and hardeners, etc. Office: Townmead Road, Fulham, S.W.

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 4, Queen Anne's Gate Buildings, London, S.W. 1, whence further information may be obtained:—

Australia.

A manufacturers' agent in Sydney desires to secure the representation, in Australia, of United Kingdom manufacturers of chemicals in bulk. (Reference No. 912.)

British India.

A manufacturers' travelling representative desires to represent British manufacturers of soap and candles. (Reference No. 915.)

New Zealand.

A Dunedin firm of general merchants desire to secure the representation, for the Dominion, of United Kingdom manufacturers of linseed oil and white lead, and lubricating oils and greases. (Reference No. 941.)

South Africa.

A member of a Johannesburg firm, who is at present in this country, desires to get into touch with United Kingdom suppliers of superphosphates and heavy chemicals for industrial purposes. (Reference No. 944.)

Spain.

H.M. Consul, Malaga, reports that a Spanish firm in that town desire to secure an agency, for the whole of Spain, for chemical fertilisers, for which the applicant states there is a great demand. (Reference No. 969.)

The Acting Consul-General, Seville, reports that a Spanish doctor of that town desires to obtain an agency for a British firm dealing in chemicals. (Reference No. 970.)

Greece.

A general commission agent established in Athens is desirous of representing in that city United Kingdom firms dealing in chemicals. (Reference No. 959.)

Netherlands.

A Dutch importer at Tilburg wishes to be put into touch with a United Kingdom manufacturer of tanning extracts. (Reference No. 961.)

Norway.

A Stavanger firm desires to represent British manufacturers and exporters of paints and oils. (Reference No. 962.)

Algeria.

A business man in Oran, Algeria, wishes to act as agent for British manufacturers of soap and mineral and vegetable oils. (Reference No. 972.)

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

October 27th to November 1st (inclusive).

- Phenolic Condensation Products. Alger, H. P. 26,403.
 Treating Coal Tar, etc. Anderson, W. 26,759.
 Separating and Powdering Minerals. Ann, A. E. 26,704.
 Production of Aluminium Nitride, etc., by Electrically Generated Heat. Armour Fertiliser Works. 26,332.
 Fertiliser. Baker, W. B.; and Shepherd, M. C. 26,780.
 Drying and Distilling Apparatus. Benton, W. A. 26,462.
 Diethyl Sulphate. Boake, Roberts, and Co., A.; and Plant, S. G. P. 26,700.
 Manufacture of Mercuric Oxide, etc., by Decomposition of Nitrates. Borelli and Co., Dr. V.; and Brusa, G. 26,740.
 Dyeing or Colouring Fibres, Threads, or Fabrics. British Cellulose and Chemical Manufacturing Co.; Briggs, J. F.; and Palmer, C. W. 26,801.
 Automatic and Continuous Analysis and Recording of Gases. Brown, W. D. R.; and Pickston, W. T. 26,640.
 Recovery of Selenium and Noble Metals from Electrolytic Slimes, etc. Chikashige, M.; and Uno, D. 26,470.
 Rotating Colour Mixing or Blending Devices. Clifton, W. E.; and Ewart, J. S. 26,888.
 Obtaining Copper from Lyes Resulting from Treatment of Cupriferosus Pyrites. Cottineau, H. P. Soulié 26,819.
 Vapour-condensation Plant. Crush, E. H. 26,453.
 Manufacture of Rubber. Davidson, S. C. 26,735.
 Heat-insulating Composition. Dyring, I. T. 26,504.
 Phenolic Condensation Products. Froom H. 26,403.
 Composition Impervious to Oils, Spirits, Water, etc. Ivinston, C. H.; and Roberts, G. S. 26,426.
 Anti-corrosive Paint or Composition. Ivinston, C. H.; and Roberts, G. S. 26,427.
 Paint-distemper. Leach, P. 26,293.
 Carbonisation and Distillation of Moist Carbonaceous Materials. McLeod, H. N. 26,833.
 Igniting-composition for Matches. Mellgren, O. J. 26,827.
 Leaching and Separation of Ore. Middlemiss, E. T. 26,530.
 Extraction of Ammonia from Gases, etc. Pease, E. L. 26,589.
 Electric Furnaces. Redmayne, W. 26,663.
 Apparatus for Mixing Pigments or Colours. Smith, E. 26,782.
 Apparatus for Slaking Lime. Spoerri and Co. 26,354.
 Refining Arsenious Acid. Uchino, M. 26,317.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 6d. in stamps to the Comptroller, Patent Office Sales Branch, 25 Southampton Buildings, Chancery Lane, W.C.

1914.

- Manufacture of Salts or Compounds of Choline and of Its Higher Homologues. Johnson (Vereingte Chemische Werke Akt.-Ges.). 8,031.
 Apparatus for Use in Obtaining China Clay. Nalder. 14,788.

1918.

- Ferro-tungsten and Other Tungsten Alloys. Blackwell, H. A. 12,363.
 133,981
 Production of Paraffin Waxes, Oils, or Fats from Peat, and the Like. Porat, K. H. V. von. 15,357.
 133,989
 Manufacture of Glue and Similar Materials. Mumford, R. W. 17,185.
 134,011
 Apparatus for Producing Sulphuric Acid. Welch, H. V. 17,226.
 134,015
 Dry Distillation with Strong Bases in the Presence of Steam of the Waste Liquors of the Cellulose Manufacture or Other Similar Waste Liquors. Rinman, E. L. 17,718.
 120,724
 Apparatus with Horizontal Diaphragm for Electrolysis of Alkaline Chlorides. Norsk Alkali Aktieselskabet. 18,702.
 125,935
 Heat Treatment of Chemical Compounds. Covers, F. X. 19,271.
 129,962

1919

- Manufacture of Acetone and Carbonic Acid. Soc. Anon. des Acieries and Forges de Firminy. 4,019.
 134,144
 Treating Spathic Iron Ore to Render it Suitable for Use in the Manufacture of Hydrogen. Bates, W. J.; and Bates, W. R. 6,051.
 134,155
 Centrifugal Separating-machines. Sturgeon, R. A. 6,611.
 134,158
 Connecting of New, or Repairing of Broken, Lead or Other Soft Metal Pipes. Sprague, W. 11,281.
 134,171
 Bhalogenethylaminobenzoic esters. Soc. Chimique des Usines du Rhone. 13,761.
 128,553
 Balkylaminoethylaminobenzoic alkyl esters. Soc. Chimique des Usines du Rhone. 13,762.
 128,554
 New Substituted Benzoic Acid Esters. Soc. Chimique des Usines du Rhone. 14,550.
 128,912

COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

1919.

- Manufacture of Alkaloids. Chimische Fabrik vorm. Sandoz. 20,223.
 134,197
 Effecting Crystallisation from Solution. Norsk Hydro-Elektrisk Kvaestofaktieselskab. 25,013.
 134,207
 Process of Making Sodium Salts. Salzwerk Heilbronn. 25,676.
 134,214

Water-soluble and Water-emulsible Substances. Melamid, M.; and Grotzinger, L. 25,932.
 134,223
 Filters. De Haen Chemische Fabrik List, E. 26,045.
 134,228
 Synthesis of Nitric Acid. Mage, L. A. 26,135.
 134,229

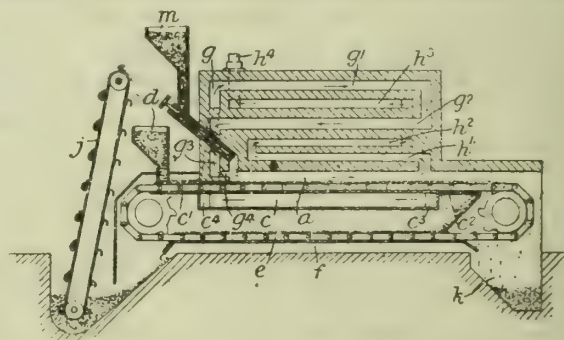
ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Pigments. J. F. Duke, Shortlands, Kent. British Patent, 131,769, of 1918.

A black pigment suitable for printers' ink, boot polish, etc., is prepared by treating starch, cornflour, dextrine, or other carbohydrate with tannic or other acid and perchloride or other salt of iron. For example, to 80 parts by volume of boiling water 20 parts by volume of the carbohydrate are added, the carbohydrate being previously mixed with part of the water. With 1,000 volumes of the solution thus obtained are thoroughly mixed five volumes of tannic acid, and finally two volumes of iron perchloride solution of 50 per cent. strength, whereupon the black pigment is immediately produced. The above proportions may be varied in different purposes, but the proportion of carbohydrate should not be varied by more than 10 per cent.

Cyanides. N. Testrup and Techno-Chemical Laboratories, Ltd., London. British Patent, 131,964, of 1918.

In the production of cyanides such as barium cyanide, by spraying a mixture of powdered carbon and a metal compound into a heated atmosphere containing nitrogen and enough oxygen to burn the excess of carbon to carbon monoxide, the reaction product is received upon a layer of finely-divided material forming a moving bottom to the reaction chamber. The apparatus is of the type described in Specifications 115,087, 129,758, and 129,771. A shallow reaction chamber *a* has a hollow box-like bottom *c* with extensions *c*¹ and *c*², the latter being perforated to act as a sieve. A layer of reaction substance, or inert material covered by reaction substance, or inert material alone is spread



by scrapers on an endless conveyer *e*, the lower portion of which passes over the surface *f* at the bottom of the apparatus. The air enters the box *c* at *c*¹ and passes out at *c*² and thence through passages *g*, *g*¹, *g*², *g*³ to the inlet *g*¹ of the reaction chamber, where it meets a stream of powdered barium carbonate and carbon from a hopper *m*. The gaseous products escape by a path *h*¹, *h*², *h*³, *h*⁴ so as to heat the incoming air. The powdered material forming the moving bottom is supplied from a hopper *d* and falls through the sieve *c*² and is returned to the hopper *d* by the lower portion of the conveyer *e* and by the conveyer *j*, while the barium cyanide passes over the sieve *c*² and is received in a hopper *k*.

Organic Acid Anhydrides and Chlorides. T. H. Durrans, Oxford; and A. Boake, Roberts and Co., Stratford, London. British Patent, 131,379, of 1918.

Organic acid anhydrides other than acetic anhydride are prepared by mixing anhydrous organic salts of the alkali or alkaline earth metals with phosphorus and treating the mixture with chlorine, the materials being used in the proportions of 6 to 8 molecular parts of alkali salt (or 3 to 4 of alkaline earth salt) to 1 atomic part of phosphorus and 3 to 5 atomic parts of chlorine; the products are isolated by distillation or by extraction with a solvent such as carbon tetrachloride. The preparation of phenylacetic anhydride is described in an example; butyric anhydride is also specified. Organic acid chlorides other than acetyl chloride are prepared similarly, but using the reagents in the proportions of 3 to 4 molecular parts of alkali salt (or 1½ to 2 molecular parts of

alkaline earth salt) to 1 atomic part of phosphorus and 3 to 5 atomic parts of chlorine; the products are isolated by distillation or by extraction with a solvent. The preparation of benzoyl chloride is described in an example; propionyl chloride also is specified.

Chromium Salts. J. R. Blockey and W. Walker and Sons, Bolton. British Patent, 131,772, of 1918.

Chrome liquors and salts for use in tanning are made by acidulating bichromate with sulphuric or hydrochloric acid, and reducing the compound so as to obtain trivalent salts by the addition of waste tannery products such as spent tanning materials, waste chrome or vegetable leather, waste sludge from tan pits, either wet or dry, or the dust from tanning material extraction plant.

Removing Paint. Q. Marino, Hendon, London. British Patent, 131,709, of 1918.

Rust, paint, varnish, or grease is removed from iron and steel and paint, varnish, grease, oxide, or sulphide from copper by an electrolytic process, the electrolyte being a solution of caustic soda or potash of 12°-20° Bé. to which is added crystallised oxalic acid and sulphate of soda, potash, or magnesium. The electrolysis is carried out in iron vats at 90 to 100° C., the anode being iron or carbon and the cathode the article to be cleared. The current employed is 80-100 amperes per sq. foot at a voltage of 4-5 volts. The paint, varnish, or grease may be partly removed before carrying out the process by dipping the article in caustic soda.

Electrolytic Pickling of Metals. I. Jascowitz and J. Rosenbaum, London. British Patent, 131,455, of 1918.

An electrolyte consists of a solution of spent caustic melt, obtained in the manufacture of β -naphthol, phenol, alizarine, resorcin, etc., and consisting of caustic soda, sodium sulphite, sulphate, and carbonate, and a little phenolate or the like. Alternately, a prepared solution of similar composition may be used. The electrolyte may be heated to 90° C. The articles form cathodes.

Glycols. C. Weizmann, Kensington, London; and E. G. Bainbridge, Ashton-under-Lyne. British Patent, 131,628, of 1918.

Glycols are prepared by heating dichlorparaffins in aqueous suspension under pressure at 100-200° C. with aluminium hydroxide, chalk, lead carbonate, or borax, or by heating the dichlorparaffins with sodium bicarbonate alone under pressure at 100-200° C. Examples are given of the treatment of a mixture of 1 : 3 - and 1 : 2 - dichlorbutane prepared by passing chlorine into butyl chloride vapour and fractionating the product.

Removing Sodium Sulphate from Solutions. F. A. Freeth, Sandiway, Cheshire; and H. E. Cocksedge, Herne Hill, London. British Patent, 131,956, of 1918.

Sodium sulphate is removed from solution by treatment with calcium sulphate or a salt from which calcium sulphate is produced in the solution, such as calcium chloride or nitrate, the double salt $\text{CaSO}_4 \cdot \text{Na}_2\text{SO}_4$ being formed and separated. The double salt may be decomposed into its constituents by digesting with water.

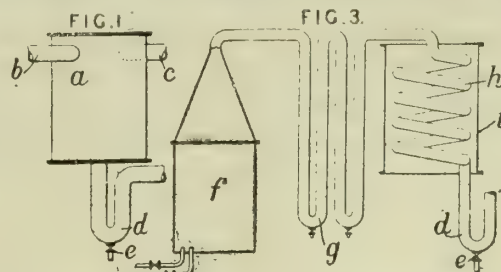
Hydrogen and Nitrogen. J. Harger, Gateacre, Lancashire; and Lever Bros., Port Sunlight, Cheshire. British Patent, 131,684, of 1918.

In the manufacture of hydrogen by passing steam over heated iron, alternated by the reduction of the iron oxide obtained, copper oxide, or other suitable metallic oxide, is used in close proximity to the iron for the purpose of obtaining regenerative heating effects by combustion of the residue of "spent" reducing gas, and also alternately, by oxidation of the reduced copper by air or oxygen. In addition, nitrogen and carbon dioxide are produced by the use of gas mixtures containing air, water gas, producer gas, etc. The iron and the copper oxide may be placed in a number of small tubes which run through a larger pipe containing the iron. Preferably the copper oxide is prepared in a porous condition by mixing the oxide or carbonate or oxalate with kieselguhr, clay, or other binding material, moulding into bricks, with or without perforations, drying, and baking. Soluble salts such as the

nitrate may also be mixed with clay, kieselguhr, etc. In carrying out the main process, a composite mass containing both the iron and the copper material—e.g., in bricks made in two portions—may be interposed between the principal masses of the iron and copper materials.

Nitrogen Oxides. J. R. Partington, Lostock Gralam, Cheshire; and E. K. Rideal, London. British Patent, 131,942, of 1918.

In the catalytic oxidation of ammonia, more oxygen is employed than would be sufficient to produce nitric oxide only, and the product is cooled to 30° C. in not more than 30 seconds to separate water before the nitric oxide has had time to oxidise further. The hot gases may be passed into a tower *a*, Fig. 1, which may be externally cooled by water, the gases

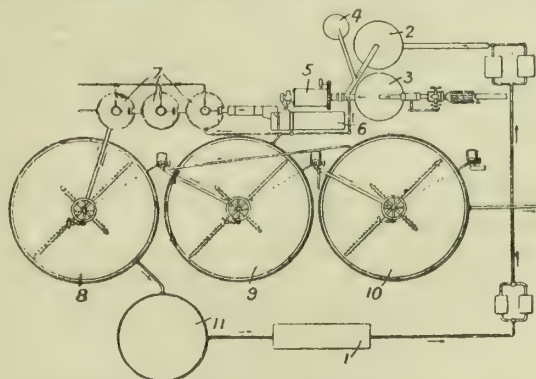


entering by a tangential pipe *b*. Additional air may be admitted by another tangential pipe *c*. Alternatively the gases from the catalytic apparatus *f*, Fig. 3, may be passed through cooling-tubes *g* and a worm *h* in a tank *i*. In either case, condensed water collects in a tube *d* and is drawn off by a valve *e*.

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Sodium Hydrate. Dorr Company, New York, U.S.A. British Patent, 131,272. Convention date, August 16, 1918.

Sodium hydrate is made by treating soda ash—obtained, for example, by evaporating and calcining the spent liquor from pulp digesters—with freshly slaked lime, or unslaked lime and a liquid lime-slaking medium, in a closed circuit grinding system, and separating the resulting solution of sodium hydrate. In the apparatus shown, soda ash, obtained from the spent liquors from pulp digesters 1, is conveyed to a bin 2, and is fed, together with lime from a bin 3 and fresh soda ash, to replace waste, from a bin 4, to a grinding mill 5 supplied with water or other lime-slaking medium—for example, wash-water or a solution of sodium carbonate or hydrate. The dis-

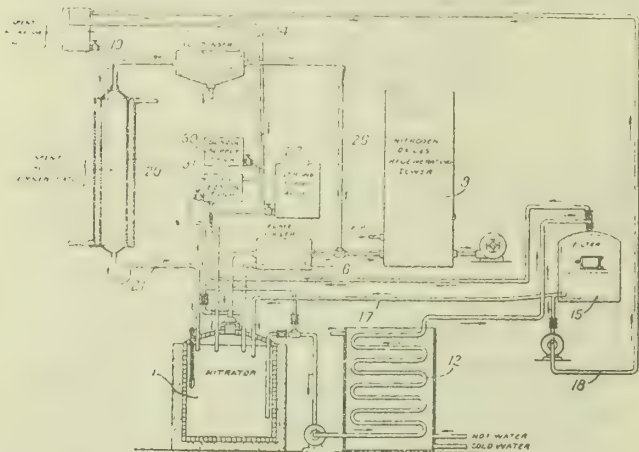


charge from the mill passes to a classifier 6, which returns the insufficiently ground material to the mill 5, the sufficiently ground material accumulating as a slime in a sump from which it is conveyed to a series of reaction vessels 7 heated to about 95° C. and provided with agitating means. The resulting solution of sodium hydrate is separated from the calcium carbonate mud by decantation in vessels 8, 9, 10. The sodium hydrate solution overflowing from the vessel 8 is conveyed to a storage vessel 11 connected to the digesters 1. The residue from the vessel 8, after being mixed with the wash-water from the vessel 10, is pumped into the second vessel 9, the overflow from which may be used as the lime-

slaking medium or as a diluent for the material discharged from the classifier into the reaction vessels. The residue from the vessels 9 is pumped into the vessel 10 after mixing with fresh water, and the residual mud is conveyed away for further treatment. More than three decantation vessels may be employed.

Dinitrophenol. T. J. Brewster, Perth Amboy, New Jersey, U.S.A. British Patent, 131,403. Convention date, November 20, 1917.

Dinitrophenol is prepared by treating benzene at 50-60° C. with nitric acid of 45-55 per cent. strength in the presence of a mercury compound, further nitration to picric acid being avoided by continuously or intermittently withdrawing the liquid reaction mixture, cooling it to crystallise out the dinitrophenol, filtering off the crystals, and returning the filtrate to the reaction chamber. Silver nitrate may be used in conjunction with the mercury. Using the apparatus shown, the nitrator 1 is charged with nitric acid of 50 per cent. strength containing dissolved mercury, the charge is brought to 70° C. and a proportion of benzene is run in from tank 31. The hot acid liquor is pumped through a cooler 12, the crystallised dinitrophenol is separated in the filter 15, and the filtered



liquor passes back to the nitrator by pipe 17. A portion of the acid is diverted by pipe 18 through tank 19 to a concentrator 20, and the concentrated acid then passes back to the nitrator by pipe 21. The benzene vapours and nitrogen oxides evolved in the nitration pass to a cooler 6, where the benzene condenses and flows back to vessel 1, while the nitrogen oxides pass on to a tower 9 where they are reoxidised by air to nitric acid. Fumes from the concentrator 20 similarly pass to a cooler 24 where weak acid condenses, while uncondensed fumes pass on by pipe 26 to the tower 9. Fresh nitric acid and benzene are supplied as required from tanks 27, 30. Any dinitrophenol collecting in the cooler 12 may be removed by circulating benzene from tank 31 therethrough at intervals, such benzene containing dissolved dinitrophenol being then sent into the nitrator.

Nitro-compounds. F. Gros and Bouchardy and L. J. J. Perruche, Paris. British Patent, 131,982. Convention date, September 24, 1917.

Aromatic compounds are nitrated by passing oxygen or ozonised air, or air under pressure, into a well-cooled mixture of the compound with liquid nitrogen peroxide and traces of water. The product may be worked up by distilling off the excess nitrogen peroxide and separating the nitro-body from nitric acid, or the mixture of nitro-body and nitric acid may be heated with sulphuric acid to give polynitro-bodies. The body treated may be dissolved in an inert solvent—e.g., carbon tetrachloride. Examples are given of the nitration of benzene and anisol.

Electrolytic Production of Zinc Salts. Electrolytic Zinc Co. of Australasia Proprietary, Melbourne. British Patent, 131,702. Convention date, August 17, 1917.

Before electro-deposition of zinc, the electrolyte, which may be obtained by leaching ores with sulphuric acid, is freed from cobalt by addition of arsenic and treatment with zinc dust. Arsenious acid or sodium arsenite may, for instance, be added

to the solution, or arsenic ores or calcines to the unroasted or roasted zinc ore. A copper compound such as the sulphate is also added if sufficient copper is not already present. The treatment is best effected with the solution slightly acid, and at 60° C. Addition of the zinc dust is preferably made in stages, the first addition being sufficient to precipitate copper, cadmium, and arsenic; the second to remove most of the cobalt; and the third to complete and preserve the purification. After each addition, the solution is agitated with as little access of air as possible. Before treatment, iron is precipitated by limestone.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

(SPECIALLY CONTRIBUTED.)

The condition of the hematite pig-iron trade is not such as to offer any hope at present of an improvement in the Cumberland coking and by-product trade. It is due, of course, to the dulness of the demand for ordinary iron that the Cumberland by-product ovens, with the exception of two of the plants, are not working at more than a third of their capacity. Even requirements of low phosphorus iron are now falling off, and when that takes place the ordinary iron trade is not as a rule in a healthy condition. Makers are resigned, however, to a continuance of the existing unsatisfactory position so long as there is no settlement of the iron moulders' strike. But for the persistency with which some people who believe in a boom in the iron trade in the spring, and have accordingly been stocking, the situation now confronting makers would have been reached some weeks ago. It is evident that things may have to grow worse before they become better. The make of by-products is being fairly well disposed of. Benzole and sulphate of ammonia find a ready market, and pitch is moving away freely, a good deal of it being exported to Spain. Creosote is also in fair request.

GAZETTE NEWS.

LIMITED COMPANIES.—Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions, Orders, and Official and Other Notices.

China Clay Corporation, Ltd., London, E.C.—F. F. Fuller, 638, Salisbury House, London Wall, E.C., appointed receiver October 17.

New Sulphosa Salt Company, Ltd.—Claims to T. F. Wild, 22-28, Broad Street Avenue, E.C., liquidator.

Surrey Fullers Earth Company, Ltd.—Resolved October 1, confirmed October 21: That the company be wound up. H. Kaye, Hill Crest, Beaumont Park Road, Huddersfield, liquidator. That in winding up the company the liquidator carry out the terms contained in agreement dated September 25 between the company of the first part, the shareholders of such company of the second part, and Fullers Earth Union, Ltd., of the third part. Meeting of creditors at office of liquidator, Aspley Place, Huddersfield, November 10, at 11 a.m.

Wear Portland Cement Company, Ltd.—Meeting of creditors, 26, John Street, Sunderland, November 3. Claims to H. S. Squance, 26, John Street, Sunderland, liquidator, forthwith.

COMING EVENTS.

Society of Chemical Industry: Birmingham and Midland Section.—Meeting will be held jointly with the Birmingham Metallurgical Society in the University Buildings, Edmund Street, Birmingham, at 7 p.m. on **Thursday, November 13.** Paper: "Production of Artificial Abrasives in the Electrical Furnace," by C. J. Brockbank, of Thorold, Ontario.

TRADE CATALOGUES.

Silvertown Association Cables and Wires: List No. 40.—Containing full particulars and prices of the products of the India Rubber, Gutta Percha, and Telegraph Works Company, Ltd.

FERTILISER NEWS.

(SPECIALLY CONTRIBUTED.)

Nitrate of Soda.—Last month's shipments from Chili have not been officially announced at the time of writing, but they will no doubt show a considerable expansion, as steamers have been arriving on the West Coast, and no delay will take place in the loading. A large one has just been despatched to Alexandria (Egypt) after discharging a cargo of bags from Calcutta, and it is to be hoped that a sufficient supply of these will be available for the export of the large quantity of nitrate sold for delivery up to the end of March. The total reported is about 1,600,000 tons, of which six to seven hundred thousand tons went to the United States, Japan, etc., and the remainder to Europe. Considerable mystery still surrounds the disposal of nearly a million tons of the Chilean-fertiliser in the latter direction, considering that Germany and Austria, formerly the largest consumers, are out of the market; while the depreciation of the French, Belgian, and Italian currencies raises the cost in these cases to a fabulous level. The cultivation of sugar-beet will be resumed next spring, but on nothing like the pre-war scale pending the restoration of the factories in the devastated regions. Holland, as shown in our last issue, is overstocked with nitrate of soda. Spain and the Scandinavian countries are small users; and Russia, long trumpeted as a vast potential outlet, is "off the mat." The maximum deliveries (including exports) in the United Kingdom were 120,000 tons per annum when prices were 50 per cent. lower and before sulphate of ammonia had been successfully adopted as a substitute. The nitrate producers, although not obtaining their originally "fixed prices," are to be congratulated on having disposed of so large a proportion of their crushing stocks, and it will be interesting to see the ultimate destination of same. Up to the present there are no signs of a large agricultural demand next spring.

Continental Fertiliser Items.—The director of the Chili Saltpetre Investigation Service at The Hague has written a work on what has been done experimentally with this product in the Dutch Indies, it having been used pretty extensively recently owing to the interrupted supply of ammonia salts. Unfortunately, he does not indicate the results of the experiments, which are yet incomplete; but as they have been done on a considerable scale, light is promised in a subsequent volume.

It is announced that a French basic-slag bureau has been formed in Paris with a capital of 500,000 francs. The object of this combination is to take the place of a similar establishment that existed under German control prior to the war.

The Produits Azotes Company, which held its meeting on October 17, declared a dividend of 20 francs for the old shares and 10 francs for the new ones on the 1918-19 working year. The development of business has determined the board to seek fresh waterfalls in Savoie and to establish hydro-electric stations, and such have been found, so that the company will soon be able to produce itself the raw material for its industry. It is experimenting on the production of a high-class fertiliser, which will soon be offered to agriculturists. Progress has been made also in the production of special cyanamide derivatives.

Sulphate of Ammonia.—This material exhibits a home demand that persists, with something also moving for export. In some quarters complaints about present high prices for sulphate of ammonia continue, but when the whole range of circumstances is taken into account it does not appear that the agriculturist has any very substantial grounds for his alleged grievance. He enjoys the highest possible prices for his own produce, and in many other ways the Government have been looking after him with the utmost care. This, of course, has been good national policy in the war-time and the difficult period following the war. It might, in fact, be said that the fertiliser manufacturer has more to make an honest complaint about than the farmer has. One thing is quite clear, and that is that the prices fixed for sulphate of ammonia are such as to suggest strongly to the British farmer the wisdom of early purchases. For example, what he can get for £20. 15s. per ton now, will cost him £22. next spring. The fact that prices are higher than those of a year ago is accounted for by the withdrawal of the Government subsidy and the substantial increase in wages and costs of coal and other raw materials.

Slag and Superphosphate.—There is no special change to be noted in these markets. Superphosphate for Government delivery is slightly dearer, a guaranteed 30 per cent. soluble material, in bags, being £7. 14s.; with 33 per cent. at £8. 9s.; and 35 per cent. at £8. 19s. Potassic superphosphate, 4 per cent. and 26 per cent. is quoted at £9. 1s. 6d. to £9. 2s. 6d. per ton. Slag prices are unchanged for delivery to February.

Nitrate of Ammonia.—Some interesting business is being offered in this very effective nitrogenous fertiliser. The Ministry of Munitions offers material containing 33½ per cent. nitrogen at £25. per ton. Furthermore, 50 per cent. of this nitrogen is in the form of nitrate, and very active. The fertiliser is packed in barrels, which are supplied free.

Cyanamide and Nitrolim.—Both these manufactured forms of nitrates are again reported to be becoming available for the British market at an early date. Both materials have only a short sea voyage to come, and the special demands for war purposes have now, of course, ceased. A great deal of activity, financial and manufacturing, is reported to have taken place in connection with these products of late, and therefore it is high time that some results should mature.

Potash.—The available supplies of potash are declared to be increasing. The Alsatian potash which is being produced is being offered apparently as 14 per cent. sylvinite, 20.22 per cent. sylvinite, and 50.60 per cent. chloride of potash, the first-mentioned description showing 19.25 per cent. of potassium chloride, 60.66 per cent. sodium chloride, 2.5 per cent. calcium sulphate, and 10.12 per cent. insoluble. Furthermore, increased supplies of German potash are expected. United Kingdom supplies of potash are also regarded more optimistically. Recent investigations appear to suggest that the best home sources from which potash can be obtained would be the blast-furnaces of the country. It has even been declared in a recent address that from these blast-furnaces could be produced more than double our pre-war requirements of potash. A current quotation for kainit, 14 per cent. potash, in bags, is £7. 5s. per ton, ex works.

SOUTH WALES NOTES.

(SPECIALLY CONTRIBUTED.)

There has been an exceptionally large number of inquiries for tinplates and manufacturers have little or no trouble in getting rid of their production. The export trade is rapidly expanding, and the industrial situation in America is having a good effect in South Wales tinplate circles. There is now a good demand for all sizes, and the home packers are very urgently pressing for immediate deliveries. The question of re-starting more mills is to be brought before the Manufacturers' Association.

The patent fuel trade continues brisk, and the outputs are still increasing. The expansion of foreign trade is a hopeful sign in this industry, which is growing rapidly, and providing work for many additional hands. At Cardiff, the workers, who asked for 20 per cent. increase in wages, have been granted 15 per cent. to be consolidated into permanent wages. The exports for the week have been very good, and show great advances on those of a few months ago. The Cardiff makers sent out some large cargoes, including 4,050 tons to Havre, and 5,181 tons to Algiers. The shipments from Swansea were in the aggregate the largest since the war, and included 4,268 tons to Venice, 6,150 tons to Antwerp, 3,254 tons to Bordeaux, 8,000 tons to St. Nazaire, 5,168 tons to Civitavecchia, 4,500 tons to Rouen, besides smaller quantities to Dieppe, St. Brieux, La Rochelle, and Dunkirk.

Mr. Edgar Evans, of the Rhondda Research Laboratories, and formerly head of the Chemistry Department of the South Wales School of Mines, is about to proceed to India in connection with coal carbonisation. His services have been secured by a powerful group of financiers, which includes Messrs. R. G. Shaw and Co., Calcutta (who are best known on this side in connection with the Anglo-Persian Oil Co.), Messrs. Tata, Ltd., Bombay, and Messrs. Kilburn and Co. A syndicate has been formed in order to take over and develop an estate belonging to the Earl of Lisburne for the raising of certain blende and lead ore. The new company will have a capital of £50,000.

The coke ovens are all working, and by-product outputs are slightly on the increase. Sulphate of ammonia is selling well, and there are scarcely any stocks on hand. There is an improvement at the basic slag mills, but deliveries are still far behind what they should be.

MARKET REPORTS.

TAR AND AMMONIA PRODUCTS.

WEDNESDAY.

Benzole: London, 90%, 2s. to 2s. 1d.; North, 1s. 11d. to 2s.; 50%, 1s. 10d. to 1s. 11d.; North, 1s. 9d. to 1s. 10d., naked; pure, 3s., naked, at works. Carboic acid, crude, 60%, East and West Coast, nominally 1s. 7d. to 1s. 8d.; crystals, 39-40%, 3½d. to 9d., f.o.b. Crude tar, London, 45s. to 50s.; Midlands, 44s. to 46s.; North, 45s. per ton, ex works. Refined tar, 32s. 6d. per barrel. Pitch, 80s.; East Coast, 70s. to 75s., f.o.b.; West Coast, 62s. 6d. to 65s., f.a.s. Solvent naphtha, naked, London, 90-190%, 2s. 5d.; North, 2s. 3d. to 2s. 4d.; 90-160%, naked, London, 2s. 5d.; North, 2s. 2d. to 2s. 3d. Crude naphtha, naked, 30%, 9d.; North, 8d. to 8½d. Refined naphthaline, £16. to £18.; salts, £6. to £7. Toluol, naked, London, 2s. 6d.; North, 2s. 5d. Creosote, naked, London, 6½d.; North, 5½d. to 5¾d.; heavy oil, 6½d. Anthracene, 40-45%, 7d. per unit. Cresylic acid, 95%, 2s. 5d. to 2s. 6d.; 97-99%, 2s. 7d. to 2s. 8d., ex works, London, and f.o.b. other ports. Sulphate of ammonia: home trade, October £20. 10s., November £20. 15s., basis 24½%. Nitrate of soda, £22. to £22. 10s.

FERTILISER MATERIALS.

LIVERPOOL, THURSDAY.

Nitrate of soda continues firm, the quotation on spot for 95-96% quality remaining at £20. 2s. 6d. per ton, net cash, f.o.r. Liverpool, prompt delivery. East Indian bone meal for shipment is without alteration, the quotation for November-December shipment being £17. 10s. per ton, net cash, ex ship Liverpool, for 4½% ammonia and 52% phosphates. On spot, Liverpool, holders ask £17. 10s. per ton, net cash, for 4½% and 45% quality. Mineral phosphates are without alteration, and values at present are only nominal. Dried blood scarce, the value being 30s. to 32s. 6d. per unit of ammonia per ton, net cash.

LONDON METAL MARKET.

THURSDAY.

Copper: Standard brands, £100. 12s. 6d. to £100. 17s. 6d., cash; £101. 12s. 6d. to £101. 17s. 6d., three months; electrolytic, £113. to £117. Tin: Standard, £277. to £277. 5s. cash; £277. 5s. to £277. 10s. three months; Straits, £276. 15s.; English, £276. to £277. Lead: Soft foreign, £32. 17s. 6d.; English, £34. Spelter, £44. 15s.; hard, £32. to £33. Antimony, English regulus, 90%, £47. 10s. Aluminium, £150. Nickel, £205., delivered; packages extra. Quicksilver, £17. 5s. to £17. 10s. Bismuth, 12s. 6d. Platinum, 442s. per oz. Wolfram, 32s. 6d. per unit.

MANCHESTER CHEMICAL MARKET.

THURSDAY.

Business generally for all heavy chemicals continues good, and values all round are well maintained. Makers are well engaged with orders for caustic soda, bleaching powder, and bicarbonate of soda, and quotations are firm at recent rates. Roasted saltcake steady at 70s. per ton, in bulk, carriage paid. Chlorate of potash easy at 1s. per lb. Soda in fair request at 6d. per lb. Recovered rock sulphur, £16. 10s., on rails. 58% alkali, £6. 10s., on rails, makers' works. Sulphate of copper continues flat, and price nominal at £40. per ton, f.o.b. Commercial hypo. soda firm at £19. per ton. Phosphate of soda higher at £28. per ton. Concentrated sodium sulphide, casks, easy at £21. 10s. per ton. Nitrate of soda scarce on the spot, and price firm at £60. per ton. Nitrate of soda, £21. per ton. White powdered arsenic continues scarce, and price maintained at £60. per ton for Cornish make. Yellow prussiate of potash unchanged at 1s. 10d. per lb. Soda firm at 1s., with very little offering. Acetate of soda in better inquiry, and price steady at £48. per ton. Acetic acid unaltered. English brown acetate of lime, £12. per ton. Grey, £17. per ton. Lead salts are only moving slowly. English white acetate at £83. per ton. Brown, £66., and nitrate £55. per ton. Bichromates are in short supply, and quotations firm. There is only small inquiry for sulphocyanides. Demand for copperas is improving, but there is no change in price. Oxalic acid is now offering at 1s. 1d. per lb. delivered.

LIVERPOOL CHEMICAL MARKET.

THURSDAY.

The demand for the heavier chemicals continues active, and a fairly brisk inquiry has been made for the lighter products. There is still a scarcity of some chemicals much in demand, and the prices of them continue very firm. Bleaching powder

has been in fair request. The price for the home trade is £17. per ton, free on rail or conveyance, in buyers' packages. For export, £15. to £18. per ton is quoted. Chloride of calcium has been rather more in request, and is £8. to £11. per ton, in casks, f.o.r. Caustic soda has been well inquired for, and stocks are still very small. It is £24. per ton for 76%; £22. per ton for 70 to 72%, and £19. per ton for 60 to 62%. Nitrate of soda has been in fair demand, and is £21. to £22. per ton. Saltcake has again been in good request, and is £6. 10s. per ton, in casks; f.o.b. Soda crystals have met with a brisk inquiry, and are £5. 10s. per ton, in 2cwt. bags, f.o.r. at works. Bicarbonate of soda continues to be well inquired for, and is £8. 5s. to £10. per ton, according to terms of delivery. Borax has been in very fair demand. Ordinary is £39. per ton, and powdered £40. per ton. Ammonia alkali has been in good request, but has been in limited supply for early deliveries. Prices are £6. 10s. to £6. 15s. per ton, f.o.r. at works. Hyposulphite has been quiet, and is £18. 10s. per ton for ordinary, and £22. per ton for pea crystals, in 1cwt. bags. Sulphite of sodium has been in moderate request, and is £10. per ton for ordinary, and £16. to £18. per ton for pea crystals, in 1cwt. kegs. Sulphide of sodium has been rather more inquired for, and is £20. per ton in casks, and £22. per ton, in drums. Prussiate of soda has been in very fair inquiry, and is 11d. to 1s. per lb. Bichromate of soda has been quieter, and is 9d. per lb. Phosphate of soda has been in quietly steady request, and is £25. per ton. Chlorate of potash has been in moderate demand, and is 1s. per lb. Permanganate of potash has been in somewhat freer inquiry, and is 3s. 6d. per lb. Sulphate of potash has moved but slowly, and is £25. per ton. Carbonate of potash has been in steady demand, and is £95. to £100. per ton for 80 to 85%. Caustic potash has been in good request, and is £120. per ton. Nitrate of potash has sold a little more freely, and is £55. to £60. per ton for refined, and £40. per ton for ordinary. Canadian potashes have been but little in request. First quality Montreal are £200. to £220. per ton, and second quality, £190. to £210. per ton. Bichromate of potash has again been in fair demand, and is 1s. 6d. per lb. Yellow prussiate of potash has been steadily called for, and is 1s. 9d. to 1s. 10d. per lb. Sal ammoniac has been more inquired for, and has again been in short supply. First quality lump is £85. per ton; second quality is £80. per ton, and crushed is £5. per ton extra. Sulphate of ammonia has been in quietly steady demand. Prices are: £20. 15s. per ton for November; £21. for December; £21. 7s. 6d. for January, 1920; £21. 15s. for February; and £22. per ton for March to May, 1920. Carbonate of ammonia has sold rather more freely, and is 6½d. per lb. Muriate has been very quiet, and is £48. to £50. per ton. Magnesia has been in fair request. Carbonate is £2. 5s. per cwt., and sulphate, £11. to £16. per ton, according to grade. Alum has been in moderately active demand, and supplies are still small. Prices are £18. 10s. per ton for home uses, and £18. 10s. to £19. 10s. per ton for export. Aluminoferric has been but little called for, and is £8. 10s. to £12. per ton according to quality. Sulphate of alumina has been in slightly better request, and is £12. to £17. per ton according to grade. Sulphur has been steadily called for, and supplies are still very light. English flowers are £32. per ton; roll is £28. per ton, and rock £22. per ton, in bags, f.o.r. Sicilian grades are, flowers, £28. per ton; roll, £22. 10s. per ton, and rock, £17. 15s. per ton. Cream of tartar has again been in very fair request, and is £12. 10s. to £13. per cwt. Tartaric acid continues to meet with a steady inquiry, and is 3s. 2d. to 3s. 3d. per lb. Boracic acid has been steadily called for, and supplies have been light. Crystals are £72. per ton, and powdered, £74. per ton. From £2. to £3. per ton extra is charged, for delivery in casks. Oxalic acid has been in fair request, and is 1s. to 1s. 1d. per lb. Citric acid has had a quietly steady sale, and is 4s. 3d. per lb. White acetate of lead has been quiet, and is £83. per ton. Arsenic has been in fair, but irregular demand. From £58. to £60. per ton is quoted for white powdered. Sulphate of copper has again been very lethargic. For home trade lots, £40. per ton is asked, and for export, £40. to £41. per ton, less 5%, f.o.b.

TYNE CHEMICAL REPORT.

TUESDAY.

Inquiry continues active, and caustic soda and bleaching powder are in strong request both for home consumption and export. Soda crystals locally are scarce and firm at £5. 10s. per ton, 2cwt. bags. Sulphur very firm.

The following prices are per ton, net: Bleaching powder, softs, £17.; caustic soda, 76-77%, £24.; do., 74-76%, £23. 10s.; do., 70%, £22. 5s.; do., 60%, £21. 10s.; recovered sulphur, 2cwt. bags, £22.; hyposulphite of soda, 5-7cwt. casks, £19.; do., 1cwt. kegs, £25.; sulphite of soda, 5-7cwt. casks, £12.; do., 1cwt. kegs, £20.; silicate of soda, 75° Tw., £9. 12s. 6d.; do., 100° Tw., £10.; do., 140° Tw., £10. 10s.; soda crystals, 2cwt. bags, £5. 10s.; sulphate of soda (saltcake), in bulk, £4.; pure white sulphate of alumina, £19. 10s.; blanc fixe, £22.; sulphide of sodium, crystals, £18.; do., refined concentrated solid, 60-62%, £25.; hydrate of barium, crystals, £56.

COALS.—Market very firm and with better shipping facilities. All prompt coals are practically cleared off the market. Forward the position is very firm, and the results of the American strike are being carefully watched. To-day's quotations: Best Northumbrian steam, 95s. to 100s. per ton; do., second qualities, 90s. to 95s.; Northumberland small coals, 75s. to 80s.; do., seconds, 70s. to 75s.; best Durham gas coals, 80s. to 85s.; do., seconds, 65s. to 75s.; Durham bunkers, 70s. to 80s.; do., seconds, 65s. to 67s. 6d.; foundry coke, 100s.; gas coke, 95s. to 100s.

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Wednesday.

During the past week there was a continued steady and firm demand for all classes of chemicals, and the run of business altogether has compared well with several weeks past. Prices have been to some extent on an up and down level, and noticeable changes are cream of tartar, which is £11. 15s. per cwt., as against £11. 10s. previously, and tartaric acid at 3s. 3d.,

as against 3s. 6d. per lb. previously. The salammoniac group has also changed in value to the prices quoted below, and current quotations at the moment of writing rule as follows:—Arsenic, £62. per ton, net, Glasgow; bicarbonate of soda, £9. 15s., and £10. 10s. per ton for 6-8 casks and 1cwt. kegs, net, Liverpool; boracic acid crystals, English refined, £72. for 2cwt. bags; and borax crystals, £39. for 2cwt. bags, carriage paid; caustic soda, white, 70-72%, £25. per ton net, Glasgow; chlorate of potash, 1s. 1d. per lb., net, Glasgow; chlorate of soda, 8d. per lb., net, Glasgow; citric acid, 4s. 4d. per lb., 5%, Glasgow; cream of tartar, 98%, £11. 15s. per cwt., net, Glasgow; paraffin wax, U.K. deliveries, 125°, 6½d. to 6¾d.; 121-3°, 5½d. to 5¾d.; 118-20°, 5d.; 110-12°, 4d. to 4½d.; and 98-102°, 4d. to 4½d.; salammoniac, £90. and £85. per ton, net, any port, for first and second lump respectively; salammoniac crystals, £70. per ton, net, Glasgow; saltpetre, £3. net, Glasgow; tartaric acid, 3s. 3d. per lb., 5%, Glasgow.

There has been a good volume of business passing among the different sea oils, but there are no price variations to be recorded on this occasion. Whale oils have been well in the forefront at the old figures of 92s. for pale, 76s. for brown, and 74s. for black; and, as for several weeks past, no yellow has been obtainable by inquirers. Newfoundland cod keeps to the steady level of 80s., and is in good all-round demand; while pale seal at 96s., and Menhaden at 80s., continue to go into consumption with whatever quantities are on the market.

In the coal trade the position of affairs is unaltered, and demand keeps steady with supplies still to the short side. Both from the industrial and domestic standpoint inquiries are on the increase, and prices on the basis fixed by the Coal Controller.

IMPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LIST OF CONTRACTIONS USED IN THE IMPORT AND EXPORT LIST.

Bls.	Balloons.	Chys.	Carboys.	Gals., Gls.	Qnty.	Quantity (otherwise undeclared).	qr.	Quarters.
Bls.	Bales.	Css. or Cs.	Cases.	or Glns.			lb.	Pounds.
Brls.	Barrels.	Cks.	Casks.	Hf. pps.				
Bgs.	Bags.	Chts.	Chests.	Hhds.	Rults.	Runlets.		
Btls.	Bottles.	Cylds.	Cylinders.	Kgs.	Sks.	Sacks.		
Bdls.	Bundles.	Dms. Drs.	Drums.	Ozs.	Slbs.	Slabs.		
Bskts.	Baskets.	Djns.	Demijohns.	Pks.	Tcs.	Tierces.		
Bxs.	Boxes.	Frkns.	Firkins.	Pns. Puns.	t. c.	Tons. Cwts.		

Note.—There is no information available as to the net weights of the various items, nor do we recognise in them any standard.

BRISTOL.

Publication of Official Returns Suspended.

GLASGOW.

Week ending November 1.

BARITES—
New York, 120 brls.
BASIC SLAG—
Antwerp, 2,000 bgs.
CARBON BLACK—
New York, 15 cs.; New Orleans, 156 cs.
CAUSTIC ORE—
Limni, 975 t.
DYESTUFFS—
Chestnut Tanning Extract
Leghorn, 252 cks.; New York, 300 brls.
Cutch
Rangoon, 2,200 bxs.
Sumac
Palermo, 1,080 bgs.
FISH OIL—
New York, 1,000 brls.
LEAD SULPHATE—
New York, 44 brls.
LITHOPONE—
New York, 125 brls.
MAGNESITE ORE—
Limni, 1,000 t.
OCHRE—
Almeria, 100 brls.; New York, 160 brls.
OIL STEARINE—
New York, 82 tcs.
PARAFFIN WAX—
New York, 521 brls.

ROSIN—
New Orleans, 1,515 brls.
SOAP—
New Orleans, 82 brls.
SOAP (COTTONSEED)—
New York, 200 brls.
SULPHUR—
Catania, 3,223 bgs., 264 brls.
WAX—
New York, 66 bgs.
ZINC OXIDE—
New York, 204 brls.

GOOLE.

Week ending November 1.

CARBON—
Amsterdam, 140 bgs.
GLUE—
Antwerp, 195 bgs.
OXALIC ACID—
Amsterdam, 16 cks.; Rotterdam, 16 cks.

GRANGEMOUTH.

Week ending November 1.

NIL.

GRIMSBY.

Week ending November 1.

DYESTUFFS (otherwise undescribed)
Antwerp, 152 cks.
ZINC OXIDE—
Antwerp, 40 cks.

HULL.

Week ending November 1.

ACETIC ACID—
New York, 54 brls.

CARBON (BLACK)—
New York, 1,443 cs.

CRYOLITE—
Copenhagen, 300 bgs.

DYESTUFFS—
Logwood Extract
New York, 150 brls.

Myrabolans
Bombay, 6,024 bgs.

FORMALDEHYDE—
New York, 49 brls.

MANGANESE ORE—
Bombay, 4,200 t.

NITRATE—
Dunkirk, 100 cks.

SILICA—
New York, 3,777 bgs.

STEARINE—
Ghent, 63 bgs.

TAR—
Helsingfors, 100 brls.

TAR PITCH—
Gothenburg, 2 cks., 24 cs.

TURPENTINE—
Gothenburg, 25 cks.

ZINC OXIDE—
Ghent, 40 brls.

LEITH.

Week ending November 1.

NIL.

LIVERPOOL.

Week ending November 1.

BEEWAX—
Valparaiso, 95 sks.

BISMUTH ORE—
Hong Kong, 32 bgs.

BORAX—
Havre, 10 cs.

CAUSTIC POTASH—
Rotterdam, 30 drms.

COPPER PRECIPITATE—
Huelva, 2,128 bgs.

CREAM OF TARTAR—
Barcelona, 62 brls.

DYESTUFFS—
Cochineal
Monte Video, 30 bgs.
Cutch
Manilla, 2,000 bxs.; Singapore 850 cs.

Dyewood Extract
Philadelphia, 89 brls.
Gambier
Manilla, 528 bgs., 2,581 cs.; Singapore, 2,697 pkgs.

Log Dyewood
Santa Marta, a qty.
Logwood Extract
Kingston, Jamaica, 325 cks.

Myrabolans
Bombay, 8,543 bgs.
Quercitron Extract
Philadelphia, 50 brls.
Tanning Extract
Philadelphia, 730 bgs.

FISH OIL—
Yokohama, 200 cs.

HEMATOL—
Havre, 80 cks.

LITHOPONE—
Philadelphia, 2,022 brls.

MANGANESE ORE—
Accra, 417 t.; Bombay, 1,000 t.; Madras, 1,250 t.

PARAFFIN SCALE—
New Orleans, 1,410 brls.

PARAFFIN WAX
New Orleans, 1,091 brls.; Philadelphia, 250 brls.

PHOSPHATE ROCK
Sfax, 6,600 t.

PITCH
Galveston, 2,582 cs.

PITCH (COTTON OIL)
New Orleans, 150 brls.

PYRITES
Huelva, 5,490 t.

ROSIN
Galveston, 700 brls.; Passages, 152 brls.; Valencia, 310 cks.

SOAP
Karachi, 11 cs.; Philadelphia, 2,500 bxs.

SOAP (COTTONSEED)
New Orleans, 550 brls.

SODIUM NITRATE
Tocopilla, 23,488 bgs.

TALLOW
Buenos Ayres, 686 cks.; Hankow, 285 pkgs.; Monte Video, 2,707 cks.; 968 pkgs.; Shanghai, 482 cs., 180 brls.

WAX
Valparaiso, 72 sks.

LONDON.

Week ending November 1.

ALUMINA SULPHATE
Germany, £1,814.

AMMONIUM PEROXIDE
Switzerland, £50.

ANTIPYRINE
Switzerland, £615.

ARSENIC
Japan, 10 t.

BARBITONE
Switzerland, £732.

BEESWAX
Brit. India, 20 cs.; Belgium, 25 cs., 72 bgs.; Holland, 25 cs.; Portugal, 58 pkgs.

BARYTES
Spain, 500 bgs., 250 brls.; U.S., 170 brls.

CREAM OF TARTAR
France, 134 pkgs.

CAMPHOR
China, 85 cs.; H. Kong, 50 cs.; Japan, 170 cs.

CAUSTIC POTASH
Germany, 169 pkgs.

CAUSTIC SODA
U.S., 2 c.

CERESINE WAX
Belgium, 8 bgs.

CHEMICALS (otherwise undescribed)
Switzerland, £1,243.; U.S., £22.

CITRIC ACID
Italy, 105 pkgs.

COAL PRODUCTS
Amidopyrine
Switzerland, £280.

DYESTUFFS
Aniline Dye
Belgium, 4 pkgs.; Switzerland, 716 pkgs.

Argols
Algeria, 418 pkgs.; Italy, 1,922 pkgs.

Cochineal
Canary Islands, 19 pkgs.

Dye Extracts
Switzerland, 1 pkg.

Gambier
Brit. India, 100 pkgs.; Straits, 1,183 pkgs.

Myrabolans
Brit. India, 4,746 pkgs.

Naphthalene
Brit. India, 5,700 pkgs.

Sumac
Italy, 650 pkgs.

Tanner's Bark
Natal, 4 t.

Turmeric
Brit. India, 351 pkgs.

FISH OIL
Azores, 68 brls.; Japan, 1,770 cs.

GELATINE
France, £1,895.; Holland, £6,704.

GLUE
Belgium, £1,215.; France, £1,670.; U.S., £1,995.

HYDROGEN PEROXIDE
U.S., £1,100.

HYDROQUINONE
Belgium, £139.; Switzerland, £140.

IODINE
Japan, £600.

IRON OXIDE
Spain, 46 brls.

LITHOPONE
Holland, 250 cks.

MAGNESITE
Holland, £400.

MAGNESIUM CHLORIDE
Holland, £308.

MINERAL BROWN
Germany, 18 cks.

MOUTAN WAX
Holland, 32 cs., 33 bgs.

OCHRE
U.S., 67 brls.

OXALIC ACID
Norway, £450.

PARAFFIN SCALE
U.S., 73 t. 12 c.

PARAFFIN WAX
Dutch Indies, 125 t.; U.S., 79 t. 16 c.

PHOSPHATE
Egypt, 300 t.

PHOSPHATE OF LIME
U.S., £4,482.

PLUMBAGO
Japan, 150 cks.

POTASSIUM BROMIDE
Holland, 20 cs.; Switzerland, 186 cs.

POTASSIUM IODIDE
Japan, 11 cs.

ROSIN
Brit. India, 101 cks.; France, 53 cks.; Spain, 368 cks.; U.S., 690 brls.

SILVER PROTEINATE
Belgium, £205.

SOAP
Canada, £5,270.; U.S., £350.; Victoria, 249.

SOAP (STOCK)
Holland, £4,527.; U.S., £1,1026.

SPERM WAX
Japan, 490 bgs.

STEARIC ACID
U.S., £207.

STEARINE
Argentine Republic, 121 cks.; Belgium, 268 bgs.; Holland, 541 bgs.; N.S.W., 82 cks.; Victoria, 66 pkgs.; U.S., 250 tes.

TALLOW
Argentine Republic, 120 t. 11 c.; Japan, 2 t. 14 c.; N.S.W., 9 t. 11 c.; N.Z., 20 t. 7 c.; W. Australia, 44 t. 12 c.; Uruguay, 196 t. 16 c.

TALLOW (UNREFINED)
Argentine Republic, 308 t. 8 c.; N.S.W., 76 t.; N.Z., 2 t. 19 c.; Victoria, 72 t. 3 c.

TANNIC ACID
Switzerland, £160.

TAR
U.S., 200 brls.

TARTARIC ACID
Italy, 20 pkgs.; Spain, 210 pkgs.

TARTARS (BROWN)
Italy, £3,297.

THEOBROMINE SODIUM SALICYLATE
Holland, £76.

ULTRAMARINE
Belgium, 20 brls., 20 cks.; France, 3 cks.

WHITE LEAD
Belgium, 48 cks.; U.S., 174 cks.

WOOD OIL
Japan, 17 cks.

ZINC OXIDE
Belgium, 104 cks.; France, 210 cs.

MANCHESTER.

Week ending November 1.

BITUMEN
Tampico, 150 t.

CHROME ACETATE
Antwerp, 16 brls.

DYESTUFFS
Aniline Colour
Antwerp, 81 cks.

Bark Extract
Philadelphia and Halifax, 80 brls., 509 bxs.

Logwood Extract
Philadelphia and Halifax, 118 bxs.

Wood Extract
Antwerp, 11 brls.

GELATINE
Rotterdam, 25 bgs.

OXALIC ACID
Fredrikstad, 20 cs.; Rotterdam, 47 cks.

SCALE WAX
Philadelphia & Halifax, 7500 brls.

SOAP
Philadelphia and Halifax, 2,900 pkgs.

SODIUM ACETATE
Antwerp, 100 brls.

SODIUM NITRATE
Skien, 200 cks.

SODIUM SILICATE
Philadelphia and Halifax, 5 brls.

STEARINE
Antwerp, 172 bgs.

TAR
Norrkoping, 15 brls.

ULTRAMARINE BLUE
Antwerp, 48 cks.

MIDDLESBROUGH.

Week ending November 1.

NIL.

NEWCASTLE-ON-TYNE

Week ending November 1.

CALCIUM CARBIDE
Bergen, 200 drms.

COPPER PRECIPITATE
Huelva, 52 t.

IRON PYRITES
Huelva, 3,104 t.

POTASH
Bergen, 1 cs.

TAR
Gothenburg, 449 brls., 250 cks.

N. & S. SHIELDS.

Week ending November 1.

NIL.

SWANSEA.

Week ending November 1.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

BRISTOL.

Publication of Official Returns Suspended.

GLASGOW.

Week ending November 1.

ALUM (CAKE)
Calcutta, 20 t. 5 c.

CAUSTIC SODA
Genoa, 451 drms.; Gothenburg, 17 drms.

CHEMICALS (otherwise undescribed)
Alexandria, 8 pkgs.; Beira, 65 pkgs.; Cape Town, 5 pkgs.; Calcutta, 3 pkgs.; Genoa, 274 pkgs.; Kilindini, 15 pkgs.; Madras, 150 pkgs.; Piraeus, 16 pkgs.; Rouen, £112.

COAL PRODUCTS (otherwise undes.)
Abo, £170.; Antwerp, £1,400.; Alexandria, £189.; Algoa Bay, £150.; Calcutta, £195.; Colombo, £125.; Gothenburg, £15.; Helsingfors, £1,276.; Kilindini, £16.; Madras, £315.; Natal, £558.; Rangoon, £117.

GLUE, SIZE, AND GELATINE
Alexandria, £60.; Montreal, £331.; Piraeus, £27.

MAGNESIUM SULPHATE
Alexandria, 5 t.; Rouen, 50 t.

PARAFFIN WAX
Abo, 4 t. 18 c.; Genoa, 48 t. 5 c.; Helsingfors, 23 t. 7 c.

POTASSIUM BICHRIMATE
Piraeus, £90.

POTASSIUM CHROMATE
Calcutta, £141.; Helsingfors, £1,133.

SHEEP DIP
Beira, £1,845.; Cape Town, £103.; East London, £813.; Mossel Bay, £163.

SOAP
Genoa, 2 bxs.; Helsingfors, 278 bxs.; Kilindini, 150 bxs.; Montreal, 7 bxs.

SODA ASH
Abo, 4 t.; Gothenburg, 20 t.; Helsingfors, 40 t.

SODIUM CHROMATE
Rouen, £659.

STOCKHOLM PITCH
Calcutta, 12 t. 10 c.

SULPHURIC ACID
Colombo, £56.

GOOLE.

Week ending November 1.

NIL.

GRANGEMOUTH

Week ending November 1.

AMMONIUM CARBONATE
Christiania, 5 t. 10 c.

BORIC ACID
Christiania, 10 c.

COAL PRODUCTS
Creosote Oil
Christiania, 10,000 galls.; Copenhagen, 1,500 galls.

CREAM OF TARTAR
Copenhagen, 1 t. 10 c.

PHOSPHATE OF LIME
Christiania, 5 t.

SODIUM BICARBONATE
Gothenburg, 1 t.

SODIUM BICHRIMATE
Copenhagen, 5 t.

SODIUM PHOSPHATE
Copenhagen, 7 est.

HULL.

Week ending November 1.

ALUMINOFERRIC

Christiania, 1,606 slabs.

BEESWAX—

Wiberg, 222 bgs.

CHEMICALS (otherwise undescribed)

Barcelona, 26 cs., 19 bgs., 24 drms.; Christiania, 3 cs., 35 cks.; Gothenburg, 125 cs., 15 pkgs., 152 bgs.; Lisbon, 1,000 bgs.

COAL PRODUCTSCreosote
Helsingfors, 30 brls.Creosote Oil
Calais, 1,032 brls.**GLUE—**

Copenhagen, 8 cs.; Helsingfors, 200 bgs.; Wilkow, 200 bgs.

MINERAL WHITE—

Gothenburg, 25 bgs.

SALT—

Barcelona, 100 cs.

SOAP—

Copenhagen, 1 cs.; Christiania, 1,100 drms., 28 brls., 800 kgs., 100 bxs.; Gothenburg, 100 sls., 2 cs., 6 brls.

SODA—

Kotka, 115 drms.

TAR—

Christiania, 150 brls.; Helsingfors, 471 brls.

WOOD PRESERVATIVE

Christiania, 250 drms.

LEITH.

Week ending November 1.

COAL PRODUCTSTar
Faroe Islands, 8 t., £2.**SODA—**

Faroe Islands, 7 t., £2.

SODA CRYSTALS

Faroe Islands, 5 t., £2.

SODIUM CARBONATE

Faroe Islands, 4 t., £2.

LIVERPOOL.

Week ending November 1.

ACETIC ACID—

Galatz, 1 t. 2 c., £95.; Genoa, 2 t. 19 c., £337.; Pelotas, 1 c., £16.; Porto Alegre, 19 c., £71.; Rio de Janeiro, 4 t. 12 c., £278.

ALUM—

Callao, 2 t. 19 c., £53.; Desterro, 1 c., £3.; Smyrna, 2 t. 1 c., £39.; Sydney, 1 t. 1 c., £18.

ALUM (AMMONIA)

Maranham, 5 c., £34.

ALUMINA SULPHATE—

Calcutta, 24 t. 12 c., £443.

ALUMINOFERRIC—

Bombay, 15 t. 4 c., £130.

AMMONIA—

Lome, 2 c., £4.; Medellin, 13 c., £11.; Piraeus, 10 c., £125.; Rio de Janeiro, 10 c., £25.; Santos, 4 c., £25.; Secondee, 2 c., £12.

AMMONIA (ANHYDROUS)—

Calabar, 2 c., £3.; Pt. Harcourt, 2 c., £3.

AMMONIUM CARBONATE

Calcutta, 2 t., £161.; Cape Town, 5 c., £18.; Genoa, 1 t., £60.; Guayaquil, 5 c., £35.; Kobe, 4 t. 19 c., £314.; Lisbon, 1 t. 10 c., £91.; Marseilles, 2 t. 10 c., £168.; Naples, £1.; Osaka, 2 t. 10 c., £160.; Pto. Alegre, 1 t., £75.; Pt. Barrios, 1 c., £5.; Perth, 10 c., £35.; Rio de Janeiro, 2 t. 19 c., £112.; Santos, 4 t. 3 c., £283.

AMMONIUM CHLORIDE

Porto Alegre, 1 c., £8.

AMMONIUM MURIATE—

Alexandria, 3 t., £191.; Antwerp, 4 t. 18 c., £270.; Bombay, 7 t. 10 c., £365.; Karachi, 20 t., £1,274.; Kobe, 10 t., £379.

AMMONIUM MURIATE

Marseilles, 1 t., £63.; Montreal, 1 t. 4 c., £70.; Patras, 1 t., £34.; Rouen, 19 t. 16 c., £946.; Sydney, 19 c., £44.; Yokohama, 1 t. 19 c., £891.

AMMONIUM PHOSPHATE

Algiers, 8 c., £18.

ANILINE SALTS—

Alexandria, 5 t., £749.; Smyrna, 1 t. 14 c., £340.; Syria, 2 t. 10 c., £425.

ANTIMONY SULPHIDE

Bahia, 1 t., £15.; Naples, 1 c., £39.

ARSENIC

Bahia, 2 t. 9 c., £400.; Ceara, 10 c., £30.; Lisbon, 15 c., £47.

BARIUM SULPHOCYANIDE

Rio de Janeiro, 1 t. 4 c., £189.

BLEACHING POWDER—

Barcelona, 34 t. 16 c., £570.; Bilbao, 5 t. 5 c., £76.; Brisbane, 1 t., £18.; Buenos Ayres, 9 t. 19 c., £114.; Calcutta, 65 t., £1,036.; Lisbon, 29 t. 12 c., £381.; Nantes, 40 t. 9 c., £476.; Patras, 2 t. 2 c., £32.; Rio de Janeiro, 2 t. 5 c., £36.; Rouen, 2 t. 11 c., £242.; Shanghai, 39 t. 8 c., £616.

BORAX

Antwerp, 8 t., £360.; Desterro, 1 c., £3.; Stockholm, 1 t., £45.

BORIC ACID—

Santos, 2 c., £10.; Teneriffe, 2 c., £11.

CALCIUM CARBIDE—

Opobo, 7 c., £14.

CALCIUM CHLORIDE

Beira, 16 c., £6.; Bombay, 61 t. 16 c., £534.; Calcutta, 20 t. 14 c., £155.; Melbourne, 5 t., £34.; Rio de Janeiro, 1 t. 19 c., £15.; Singapore, 10 t., £69.; Sydney, 10 t. 2 c., £74.

CAUSTIC SODA—

Algoa Bay, 600 drms.; Alexandria, 644 drms.; Buenos Ayres, 155 drms.; Calcutta, 108 drms.; Cape Town, 15 drms.; Ceara, 50 drms.; Constantinople, 1,512 drms.; Durban, 75 drms.; Genoa, 345 drms.; Kobe, 627 drms.; Melbourne, 155 drms.; Moji, 87 pkgs.; Newcastle, 26 cs.; Padang, 54 drms.; Piraeus, 6 drms.; Pto. Alegre, 100 drms.; Rio de Janeiro, 646 drms.; Shanghai, 291 drms.

COAL PRODUCTS—Aniline Dye
Bahia, £51.; Barcelona, 12 c., £213.; Boston, 18 t. 13 c., £9,792.; Bordeaux, 1 c., £24.; Calcutta, 3 c., £15.; Cape Town, 1 c., £21.; Constantinople, 1 t. 6 c., £189.; Copenhagen, 1 c., £54.; Madras, 1 t. 4 c., £384.; Montreal, 5 t. 8 c., £926.; Rio de Janeiro, 2 c., £14.; Santander, 4 c., £7.; Sydney, £10.; Toronto, 3 t. 6 c., £1,720.**Carbolic Acid**

Adelaide, 2 t. 7 c., £81.; Calcutta, 200 galls., £34.; Galatz, 18 c., £25.; Hong Kong, 12 c., £14.; Kobe, 5 t., £326.; Melbourne, 1 c., £2.; Rio de Janeiro, 2 t. 19 c., £112.

Creosote

Monte Video, 86 t. 13 c., £1,719.; Tientsin, 16 t. 11 c., £205.

Creosylic Acid

Monte Video, 5 t. 5 c., £114.

Dye

Tokio, 1 t., £906.

Naphthalene

Accra, 3 c., £6.; Lagos, 3 c., £10.; Rio Grande do Sul, 1 c., £8.

Oil

Lome, 4 c., £4.; Monte Video, 61 t. 3 c., £1,356.

Tar

Accra, 44 t. 7 c., £353.; Antwerp, 13 c., £24.; Cape Town, 2,000 galls., £1,120.; Monrovia, 9 c., £6.; Mossamedes, 40 galls., £15.; Opobo, 8 c., £3.; Pt. Harcourt, 9 c., £6.; Pt. Alexandre, 40 galls., £15.; St. Louis, 3 t., £33.

COAL PRODUCTSTar
Sierra Leone, 3 c., £3.**COPPER SULPHATE—**

Accra, 2 c., £2.; Algoa Bay, 1 t. 5 c., £11.; Cartagena, 10 c., £21.; Melbourne, 5 t., £204.; Nantes, 9 t. 15 c., £340.; Rio de Janeiro, 1 t., £9.

CREAM OF TARTAR—

Adelaide, 3 t., £716.; Rio de Janeiro, 1 c., £14.

CREOLINA—

Amapala, 7 cs., £28.; Bahia, 4 t. 18 c., £416.; Ceara, 12 c., £62.; Maranham, 12 c., £69.; Rio de Janeiro, 1 t., £96.

DISINFECTANTS (otherwise undes.)

Bathurst, 1 c., £7.; Dunedin, 1 t. 9 c.; East London, 10 t., £600.; Galatz, 3 t. 2 c., £75.; Lagos, 2 c., £5.; Las Palmas, 1 t., £47.; Madras, 4 t. 13 c., £250.; Rangoon, 19 c., £55.; Secondee, 1 c., £5.; Tampico, 1 t. 1 c., £50.; Teneriffe, 7 c., £19.; Trinidad, 9 c., £17.

DYESTUFFS (otherwise undescribed)

Geelong, 8 c., £225.

FERRO MANGANESE—

Genoa, 100 t.; New Orleans, 200 t.

FISH OIL

Dunkirk, 25 pkgs.

GLUE—

Norrkoping, 40 bgs.

GLUE, SIZE, AND GELATINE

Alexandria, 36 pkgs.; Antwerp, 12 pkgs.; Shanghai, 120 pkgs.

HYDROFLUORIC ACID—

Bahia, 3 c., £17.

HYDROGEN PEROXIDE—

Lagos, 1 c., £5.; Pelotas, 5 c., £45.; Rio de Janeiro, 59 lbs., £5.

LEAD ACETATE

Marseilles, 1 t., £83.

LITHOCROME

Amsterdam, 2 drms.

MAGNESIUM CHLORIDE

Isin Ito Wharf, 15 c., £14.; Lisbon, 3 t. 1 c., £54.

MAGNESIUM SULPHATE—

Accra, £3.; Alexandria, 2 t., £36.; Calabar, 3 c., £4.; Coomassie, 1 c., £2.; La Guaira, 4 c., £7.; Lome, 1 c., £8.; Maranham, 8 c., £16.; Pelotas, 2 c., £5.; Pt. Harcourt, 5 c., £12.; Pt. Barrios, 4 c., £7.; Rio de Janeiro, 5 t. 6 c., £82.; St. John's, N.F., 10 c., £22.; Smyrna, 10 c., £9.

MURIATIC ACID—

Manaos, 4 c., £8.

NITRIC ACID—

Bahia, 1 c., £11.; Rio de Janeiro, 4 t.

OXALIC ACID

Melbourne, 2 t., £275.

PARAFFIN WAX—

Christiania, 2 t.

PHOSPHORUS

Santos, 8 c., £92.

PHOSPHORUS AMORPHOUS

Parangua, 10 c., £133.; Porto Alegre, 1 t., £297.; Rio de Janeiro, 16 c., £212.; Santos, 8 c., £106.

PHOSPHORUS SESQUISULPHIDE

Buenos Ayres, 5 c., £60.; Melbourne, 1 t., £268.

PITCH

Montreal, 50 lbs., £3.; Rouen, 34 t. 6 c., £919.; Shanghai, 9 c., £36.

POTASSIUM BICARBONATE—

Algoa Bay, 2 c., £16.

POTASSIUM BICROMATE—

Fiume, 4 c., £32.; Patras, 1 t., £180.; Parangua, 12 c., £103.; Smyrna, 7 c., £70.

POTASSIUM CARBONATE

Bahia, £4.; Pto. Alegre, 2 c., £14.

POTASSIUM CHLORIDE

Lisbon, 5 t., £175.; Rio de Janeiro, 17 t. 18 c., £1,348.

POTASSIUM IODIDE

Lome, 1 c., £78.; Pt. Harcourt, 1 q., £40.

POTASSIUM MURIATE

Las Palmas, 1 t., £34.

POTASSIUM NITRATE—

Maranham, 1 c., £8.; Montreal, 6 c., £28.; Rio Grande do Sul, 2 c., £15.

POTASSIUM SULPHATE

Las Palmas, 4 t. 19 c., £125.; Oratava, 10 t., £410.; Teneriffe, 13 t. 7 c., £513.

SALAMMONIAC

Bombay, 5 t. 17 c., £447.; Genoa, 1 t. 1 c., £76.

SALT

Burutu, 10 t.; Lagos, 200 t.

SALTPETRE

Winnchah, 2 c., £7.

SHEEP DIP

Algoa Bay, 1 t. 7 c., £82.; Blen Kuni, 1 t. 15 c., £127.; Buenos Ayres, 22,530 galls., 42 t. 2 c., £1,338.; Cape Town, 1 t. 7 c., £82.; Dunedin, 1 t. 10 c., £103.; East London, 3 t. 15 c., £255.; Gisborne, 2 t., £143.; Mossel, 1 t. 9 c., £93.; Montago Bay, 6 c., £16.; Monte Video, 2 t. 5 c., £52.; Oamaru, 1 t. 18 c., £141.; Pt. Elizabeth, 9 t. 8 c., £350.; The Bluff, 5 t. 8 c., £390.; Wellington, 1 t. 10 c., £103.

SOAP

Accra, 375 bxs.; Algiers, 1,650 cs.; Antwerp, 100 cs.; Antwerp, 9,620 bxs., 3,376 cs.; Bander-massin, 300 bxs.; Barranquilla, 3 bxs.; Bathurst, 856 bxs.; Bathurst, 860 bxs.; Beira, 5 bxs.; Bengasi, 27 cs.; Bermuda, 10 cs.; Calcutta, 1,163 bxs.; Cape Coast, 200 bxs.; Casa-blanca, 100 bxs.; Ceuta, 200 bxs.; Degama, 500 bxs.; Fama-gusta, 400 bxs.; Galatz, 55 bxs.; Gothenburg, 2,125 cs.; Grand Bassam, 200 cs.; Ibikey, 14 drms.; Karachi, 233 cs.; Kingston, Jamaica, 730 cs.; Kobe, 3 cs.; Koko, 50 cs.; Lagos, 72 cs.; Larnaca, 140 bxs.; Las Palmas, 224 cs., 731 bxs.; Larnaca, 296 bxs.; Limassol, 173 bxs.; Lome, 10 cs., 420 bxs.; Libau, 550 cs.; Lima, 200 bxs.; Limassol, 233 bxs.; Livorno, 100 cs.; Macassar, 500 bxs.; Madras, 25 bxs., 1,052 cs.; Malta, 200 bxs.; Maranham, 28 cs.; Mauritius, 3,200 bxs.; Mellilla, 100 bxs.; Monte Video, 4 brls.; Nantes, 750 bxs.; Opobo, 630 bxs.; Oran, 670 pkgs.; Nicosia, 26 bxs.; Palembang, 800 pkgs.; Palma, 25 pkgs.; Paphos, 157 pkgs.; Pt. Elizabeth, 7 pkgs.; Para, 1 bx.; Pt. Harcourt, 1,511 pkgs.; Philippopolis, 250 bxs.; Pt. Sudan, 460 bxs.; Punta Arenas, 15 bxs.; Quittah, 5 bxs.; Rabat, 550 bxs.; Reval, 10 bxs.; Rotterdam, 1 bx.; Rouen, 20 bxs.; Roustchouk, 58 bxs.; Salonica, 1 pkg.; Sassandra, 25 pkgs.; St. John's, N.F., 15 bxs.; Secondee, 50 bxs.; Tangiers, 10 bxs.; Teneriffe, 293 bxs.; Toronto, 5 bxs.; Vienna, 50 bxs.; Wiesbaden, 207 cs.; Warri, 25 bxs.

SODA ASH

Beira, 36 pkgs.; Calcutta, 6,250 pkgs.; Constantinople, 200 pkgs.; Dances, 90 pkgs.; Durban, 567 pkgs.; Hong Kong, 2,216 pkgs.; Kobe, 9,898 pkgs.; Maranham, 265 pkgs.; Monterey, 2,000 pkgs.; Pt. Elizabeth, 20 pkgs.; Rio de Janeiro, 200 pkgs.; Shanghai, 3,450 pkgs.; Sydney, 369 pkgs.

SODA CRYSTALS—

Alexandria, 190 pkgs.; Beira, 40 pkgs.; Calcutta, 25 pkgs.; Constantinople, 30 pkgs.; Piraeus, 10 pkgs.

SODIUM BICARBONATE—

Barcelona, 10 cs.; Beira, 20 cs.; Calcutta, 250 pkgs.; Demerara, 35 pkgs.; Genoa, 131 pkgs.; Kobe, 1,077 pkgs.; Melbourne, 176 pkgs.; Montreal, 186 pkgs.;

SODIUM BICARBONATE—

Rio de Janeiro, 900 pkgs.; Singapore, 250 pkgs.; Toronto, 300 pkgs.

SODIUM SULFATE—

Alexandria, 162 pkgs.; Braila, 31 cks.; Colombo, 33 pkgs.; Funchal, 32 pkgs.; Melbourne, 207 pkgs.; Montreal, 166 pkgs.

SODIUM SULPHIDE—

Lisbon, 3 t. 18 c., £86.; Oporto, 6 t. 18 c., £147.

SULPHUR—

Bahia, 1 c., £11.

SULPHUR (CHLORIDE)—

Havre, 5 t. 5 c., £245.

SULPHUR (PRECIPITATE)—

Santes, 2 qrs., £5.

SULPHURIC ACID—

Bahia, 1 c., £13.; Maranhão, 1 t. 10 c., £70.; Rio de Janeiro, 1 t. 2 c., £70.

TALLOW—

Dunkirk, 98 pkgs.

TANNIC ACID—

Porto Alegre, 10 c., £147.

TAR—

Maranhão, 9 c., £17.

TAR (STOCKHOLM)—

Bahia dos Tigres, 40 galls., £45.

TARTARIC ACID—

Adelaide, 1 t., £319.; Delagoa Bay, 2 c., £39.; Vancouver, 15 c., £105.; Yokohama, 2 t. 10 c., £522.

WOOD PRESERVATIVE—

Bilbao, 4 t. 16 c., £80.; Madeira, 4 c., £5.

ZINC CHLORIDE—

Rangoon, 16 t. 8 c., £800.

LONDON.

Week ending October 29.

ACETANILID—

Bombay, 1 cs., £14.
Genoa, 1 cs., £79.

ACETIC ACID—

Durban, 2 cs., £10.; Genoa, 169 cks., £2,500.; Genoa (F.), 69 cks., £875.

ACETO SALICYLIC ACID—

Calcutta, 1 cs., £34.; Durban, 5 cs., 1 cs. (pt.), £151.; Novorossisk, 2 cs. (pt.), £16.; Piraeus, 1 brl. (pt.), £8.; Sydney, 1 cs. (pt.), £11.; Yokohama, 20 cs., £177.

ACETONE—

Antwerp, 2 drms., £66.

ALUM—

Pt. Elizabeth, 4 c., £7.

AMMONIA—

Accra, 4 cs., £7.; Alexandria, 21 pkgs., £43.; Bombay, 20 cs., £53.; Buenos Ayres, 34 cs., £51.; Calcutta, 10 cs., £41.; Calais, 14 drms., £150.; Cape Town, 10 cs., £19.; Colombo, 4 cs., £8.; Demerara, 4 cs., £6.; Durban, 3 cs. (pt.), £9.; East London, 16 cs., £31.; Galatz, 8 drms., £19.; Karachi, 6 cs., £16.; Madras, 3 cs., £14.; Malta, 4 cs., £7.; Pt. Elizabeth, 10 pkgs., £20.; Santos, 12 cs., £32.; Shanghai, 10 cs., £19.; Rangoon, 9 cs., £32.; Singapore, 10 cs., £20.; Trinidad, 8 cs., £11.

AMMONIA (ANHYDROUS)—

Alexandria, 32 cys., £320.
Santos, 3 cys., £58.

AMMONIUM ACETATE—

Calcutta, 3 cs., £28.

AMMONIUM BROMIDE—

Bombay, 1 cs., £17.

AMMONIUM CARBONATE—

Amoy, 2 c., £19.; Bombay, 2 c., £11.; Boulogne, 4 t. 18 c., £299.; Calcutta, 9 c., £14.; Colombo, 5 c., £48.; Demerara, 1 c., £7.; Durban, 1 c., £5.; Monte Video, 1 t. 1 c., £85.; Paranaguá, 1 c., £5.; Peruambuco, 8 c., £19.; Rio Grande do Sul, 10 c., £51.; Rio de Janeiro, 1 t. 3 c., £122.;

AMMONIUM CARBONATE—

Shanghai, 5 c., £18.; Singapore, 3 c., £17.; Smyrna, 2 c., £11.

AMMONIUM CHLORIDE—

Antwerp, 40 kgs., £122.; Calcutta, 1 cs., £8.; Durban, 1 ck., £8.

AMMONIUM SULPHATE—

Bebice, 50 t., £1,075.; Dunkirk, 6,851 t., £17,170.; Madeira, 60 t. 11 c., £1,788.

ANTIMONY—

Rotterdam, 18 cks., £280.

ANTIMONY (REGULUS)—

Rotterdam, 25 t.

ANTIMONY SULPHIDE—

Rotterdam, 1 ck., £27.

ARSENIC—

Karachi, 1 t., £60.
Santos, 2 t., £94.

BASIC SLAG—

Landerneau, 42 t., £158.
Mellaix, 79 t. 14 c., £279.

BEEWAX—

Amsterdam, 75 t.

BENZOIC ACID—

Melbourne, 1 cs. (pt.), £6.

BISMUTH—

Brussels, 2 cs., £152.; Rio de Janeiro, 1 cs. (pt.), £35.

BISMUTH AND AMMONIUM CITRATE—

Durban, 1 cs. (pt.), £6.

BISMUTH CARBONATE—

Bombay, 10 pkgs. (pt.), £6.; Melbourne, 1 cs. (pt.), £16.

BISMUTH OXYCHLORIDE—

Durban (F.), 1 cs., £11.

BISMUTH SALTS—

Brussels, 1 cs., £77.

BISMUTH SUBNITRATE—

Bombay, 10 pkgs. (pt.), £5.

BISULPHITE OF LIME—

Christchurch, 5 brls., £13.
Dunedin, 10 cks., £20.
Durban, 3 hhds., £11.

BORAX—

Amsterdam, 9 t. 17 c., £390.; Antwerp, 5 t., £201.; Bombay, 2 t. 10 c., £98.; Buenos Ayres, 2 t. 3 c., £85.; Dunedin, 10 c., £20.; Durban, 12 c., £50.; Fremantle, 1 t. 12 c., £68.; Galatz, 10 t., £396.; Genoa, 9 t. 17 c., £390.; Havana, 4 t. 9 c., £173.; Czechoslovakia, via Hamburg, 19 t., £745.; Malta, 6 c., £12.; Rio Grande do Sul, 5 c., £13.; Rangoon, 3 t., £121.; Rotterdam, 10 t. 10 c., £410.; Sydney, 1 t., £40.; Tripoli, 6 c., £17.; Santos, 20 t., £780.

BORIC ACID—

Amoy, 2 c., £10.; Brisbane, 1 c., £5.; Bilbao, 1 t., £74.; Hong Kong, 10 c., £38.; Kilindini, 1 c., £5.; Limon, 2 c. (F.), £9.; Paris, 9 t. 17 c. (F.), £729.; Piraeus, 1 c., £5.; Rotterdam, 1 t. 19 c. (F.), £144.; Smyrna, 1 c., £5.; Santiago, Chile, 5 c., £26.; Talcahuano, 4 c., £23.

CALCIUM CARBIDE—

Pt. Elizabeth, 4 t. 18 c., £123.

CALCIUM CHLORIDE—

Paris, 10 c., £31.

CALCIUM HYPOPHOSPHITE—

Paris, 4 cs., £150.

CALCIUM LACTATE—

Rotterdam (F.), 3 brls., £230.

CALCIUM SULPHOCYANIDE—

Paris, 1 kg., £28.

CARNAUBA WAX—

Antwerp, 2 t. 5 c.

CARNAUBA WAX (RESIDUE)—

Genoa, 1 t.

CAUSTIC POTASH—

Bombay, 4 pkgs. (pt.), £8.

CAUSTIC SODA—

Alexandria, 1 c., £6.; Perth, 4 c., £12.

CERESINE WAX—

Antwerp, 4 t. 2 c.; Christiania, 10 c.; Gothenburg, 10 c.; Sydney, 10 c.

CHEMICALS (otherwise undescribed)

Alleppey, 1 cs., £16.; Bilbao, 2 cs., £38.; Brussels, 15 cs., £80.; East London, 1 cs. (pt.), £17.; Malta, 1 ck., £17.; Montreal, 4 cs. (pt.), £69.; New York, 3 cs., £212.; Pekin, 3 cs., £225.; Sydney, 6 cs., £60.; Shanghai, 1 cs., £7.; Tientsin, 7 cs., £367.; Tokio, 5 cs. (pt.), £309.

CHINA CLAY—

Adelaide, 2 t.

CITRIC ACID—

Adelaide, 10 c., £214.; Bahia, 4 c., £111.; Calcutta, 2 c., £58.; Colombo, 3 c., £75.; Durban, 1 c. (F.), £15.; Hong Kong, 5 c., £113.; Knysna, 2 c. (F.), £40.; Melbourne, 3 t. 10 c., £1,495.; Ostend, 1 c., £14.; Pt. Elizabeth, 1 c., £23.; Pt. Elizabeth, 2 c. (F.), £44.; Santiago, Chile, 1 c., £32.; Singapore, 4 c., £101.; Trinidad, 1 cs. (pt.), (F.), £7.; Valparaíso, 1 cs. (pt.), £17.; Wellington, 1 c. (F.), £15.

COAL PRODUCTS—

Alizarine
Bombay, 2 cks., £43.; Melbourne, 8 kgs., £224.; New York, 10 cks., £279.; Sydney, 2 kgs., £56.

Aniline Colour

Adelaide, 3 cs. (pt.), £54.; Alexandria, 3 pkgs., £179.; Brussels, 4 cks., £60.; Calais, 1 ck., £55.; Danzig, 1 cs. (pt.), £8.; Melbourne, 70 pkgs. (pt.), £2,595.; Newcastle (U.S.A.), 1 cs., £10.; Suva, 1 cs. (pt.), £21.

Aniline Dye

Bombay, 2 cks., £79.; Osaka, 13 cks., £691.; Paris, 35 pkgs., £1,123.; Pt. Elizabeth, 9 pkgs., £206.; Rio Grande do Sul, 1 cs. (pt.), £16.; Sydney, 9 pkgs., £360.

Benzonaphthol

Switzerland, 1 cs., £10.

Carbolic Acid

Channel Islands, 1 ck., £9.

Carbolic Crystals

Antwerp, 8 cs., £22.

Cresosote

Rotterdam, 25 cks., £100.

Naphthalene

Kilindini, 2 cs., £6.; Zanzibar, 1 cs., £7.

Pitch

Galatz, 45 cks., £65.; Lagos, 10 brls., £16.; Rosario, 229 cks., £306.; Rotterdam, 2465 t., £7425.

Tar

Accra, 70 pkgs., £50.; Cape Coast Castle, 5 cks., £10.; Galatz, 48 cks., £81.; Kilindini, 5 cks., £9.; Lagos, 5 rnts., £8.; Penang, 45 cks., £81.; Pt. Sudan, 612 drms., £408.

COPPER ACETATE—

Brussels, 1 cs., £21.

COPPERAS—

Shanghai, 4 cks., £7.

CREAM OF TARTAR—

Barbados, 1 c. (F.), £11.; Colombo, 1 c., £14.; Calcutta, 2 c. (F.), £52.; Calcutta, 2 c., £32.; Delagoa Bay, 1 c. (F.), £18.; Durban, 3 c. (F.), £60.; East London, 2 c. (F.), £29.; Fremantle, 2 c. (F.), £25.; Fremantle, 3 c., £39.; East London, 5 c. (F.), £68.; Hong Kong, 1 c., £14.; Karachi, 1 cs., £8.; Karachi, 1 c. (F.), £12.; Mossel Bay, 4 c. (F.), £60.; Paranaguá, 1 c. (F.), £15.; Pt. Elizabeth, 8 c. (F.), £139.; Wanganni, 1 c., £13.

DISINFECTANTS (otherwise undes.)

Aden, 1 c., £7.; Alexandria, 6 c., £12.; Bangkok, 2 t. 14 c., £133.; Brisbane, 2 t. 14 c., £130.; Buenos Ayres, 96 t. 12 c., £5,159.; Calcutta, 5 t. 4 c., £301.; Canton, 4 t. 7 c., £146.; Colombo, 3 t. 7 c., £147.; Constantinople, 6 c., £20.; Corinto, 2 t. 1 c., £124.; Durban, 3 c., £9.; Fiji Islands, 2 c., £6.; Hong Kong, 3 t. 15 c., £146.; Jamaica, 13 c., £21.; Kilindini, 4 c., £21.; Lyttleton, 3 t. 13 c., £48.; Lagos, 4 c., £22.; Madras, 2 c., £12.; Montreal, 2 c., £16.; Newcastle (N.S.W.), 2 c., £14.; Paris, 9 t. 4 c., £250.;

DISINFECTANTS (otherwise undes.)

Perth, 15 c., £53.; Pt. Elizabeth, 5 c., £14.; Rangoon, 9 c., £14.; St. Kitts, 4 c., £12.; Shanghai, 1 t. 14 c., £93.; Trinidad, 5 c., £28.; Winnebago, 14 c., £18.; Zanzibar, 7 c., £15.

ETHER—

Malta, 2 cs. (pt.), £7.

ETHER (SULPHURIC)—

Alexandria, 1 dr., £9.

ETHYL BROMIDE—

Buenos Ayres, 1 cs., £7.

FORMALDEHYDE—

Durban, 1 cs., £6.; Malta, 2 cs., £8.

FULLER'S EARTH—

Montreal, £357.

GELATINE—

Madras, 2 c.; Melbourne, 5 c.; Newcastle, 1 c.

GLUE—

Perth, 10 c.; Rangoon, 2 t. 10 c.

GLUE, SIZE, AND GELATINE—

Alexandria, 1 t. 10 c.; Antwerp, 8 c.; Bombay, 9 c.; Buenos Ayres, 1 t.; Brisbane, 1 t. 8 c.; Calcutta, 5 c.; Cape Town, 3 t. 2 c.; Constantinople, 4 c.; Durban, 2 c.; Dunedin, 1 c.; Genoa, 1 t. 2 c.; Hong Kong, 1 c.; Kobe, 1 c.; Monte Video, 12 c.; Montreal, 18 c.; Rangoon, 4 t. 10 c.; Rotterdam, 5 t. 9 c.; Tokio, 2 t.; Yokohama, 10 t.

GLYCERINE—

New York, 10 t., £600.

GLYCERINE (DISTILLED)—

Amoy, 3 c., £22.; Alexandria, 2 c., £17.; Bangkok, 3 c., £22.; Bahia, 1 c., £8.; Bombay, 3 c., £31.; Calcutta, 1 c., £14.; Constantinople, 1 cs., £8.; Durban, 1 c., £6.; Galatz, 7 c., £50.; Karachi, 1 cs., £6.; Malta, 1 c., £11.; Oporto, 2 t., £221.; Santiago, Chile, 12 c., £106.; Talcahuano, 4 c., £36.; Tokio, 1 c., £16.

HYDROCHLORIC ACID—

Alexandria, 10 c., £22.; Bombay, 2 c., £11.

HYDROGEN PEROXIDE—

Alexandria, 2 cs., £8.; Bombay, 1 cs., £7.

HYPOPHOSPHATE OF LIME—

Oporto, 47 pkgs. (pt.), £41.

IODINE—

Bombay, 10 pkgs. (pt.), £6.; Genoa (F.), 17 cks., £9,767.; Shanghai, 1 cs. (pt.), £33.

IODINE (RESUBLIMED)—

Barcelona, 2 cs., £220.

IRON AND AMMONIUM CITRATE

Bombay, 10 pkgs. (pt.), £5.; Rotterdam, 1 pkg., £25.

IRON HYPOPHOSPHITE—

New York, 4 cs., £101.

LACTIC ACID—

Buenos, 1 cs. (pt.), £5.; Piraeus, (F.), 5 cs. (pt.), £24.

LEAD ACETATE—

Bombay, 2 t., £138.; Genoa, 14 cks., £164.

MAGNESIUM CARBONATE—

Buenos Ayres, 1 ck., £9.

MAGNESIUM CHLORIDE—

Genoa, 1 ck., £5.

MAGNESIUM CITRATE—

Limon, 4 cs., £48.; Shanghai, 1 cs., 1 cs. (pt.), £22.

MAGNESIUM SULPHATE—

Auckland, 5 t. 1 c., £196.; Bombay, 7 c., £20.; Brisbane, 10 c., £20.; Barbados, 13 c., £28.; Cairns, 1 t., £40.; Cape Town, 5 c., £11.; Durban, 14 c., £34.; East London, 16 c., £34.; Fremantle, 3 c., £6.; Dunedin, 6 c., £12.; Galatz, 1 t., £38.; Ipswich (Queensland), 1 t. 6 c., £50.; Karachi, 3 c., £8.; Lyttleton, 1 t. 6 c., £50.; Maryborough, 5 c., £10.; Napier, 5 c., £10.; Perth, 10 c., £20.; Paranaguá, 10 c., £24.; Pt. Elizabeth, 1 t., £44.; Shanghai, 2 t. 6 c., £50.; Wellington, 1 t. 6 c., £50.

MANGANESE BORATE—
Genoa, 1 t. 9 c., \$92.

MANGANESE HYPOPHOSPHITE—
New York, 8 cs., \$317.

MERCURY PERCHLORIDE—
Buenos Ayres, 2 cs. (pt.), \$26.

METHYL SALICYLATE—
Durban (F.), 1 cs., \$9.; Genoa, 9 cs., 18 drms., \$285.; Piraeus (F.), 5 cs. (pt.), \$5.

MIRBANE OIL—
Barcelona, 6 drms., \$37.

MURIATIC ACID—
Trinidad, 1 t., \$40.

NICKEL SULPHATE—
Cologne, 20 cks., \$260.

PHOSPHORIC ACID—
Durban, 1 cs., \$7.; Shanghai, 1 cs., \$8.; Toronto, 6 cbrys., \$81.

PITCH—
Hong Kong, 4 t.; Lagos, 6 t.

PITCH (MARINE)—
Hong Kong, 4 t.

PITCH (SWEDISH)—
Calcutta, 5 t. 10 c.

PLUMBAGO—
Bilbao, 15 t. 3 c.; Christiania, 1 t. 2 c.

POTASSIUM ACETATE—
Shanghai, 1 cs., \$5.

POTASSIUM BICHROMATE—
Beyrout, 10 c., \$300.; Limon, 1 kg., \$10.

POTASSIUM BISULPHITE—
Auckland, 4 c., \$52.

POTASSIUM BROMIDE—
Bombay, 2 cs., \$44.; Durban (F.), 1 cs., \$9.

POTASSIUM CARBONATE—
Bombay, 48 cs. (pt.), \$3.

POTASSIUM CHLORATE—
Piraeus, 2 c., \$18.

POTASSIUM CITRATE—
Bombay, 3 cs., \$78.; Brisbane, 1 cs., \$9.

POTASSIUM CYANIDE—
Alexandria, 1 cs., \$5.; Bangkok, 1 cs., \$14.; Bombay, 1 cs., \$24.

POTASSIUM FERROCYANIDE—
Alexandria, 1 ck., \$31.

POTASSIUM HYPOPHOSPHITE—
New York, 10 cs., \$373.; Paris, 1 cs., \$35.

POTASSIUM IODIDE—
Bombay, 10 pkgs. (pt.), \$11.; Melbourne, 1 cs. (pt.), \$20.; Shanghai, 1 cs., \$77.

POTASSIUM METABISULPHITE—
Antwerp, 3 c., \$39.; Christchurch, 2 c., \$23.; Colombo, 2 c., \$28.; Piraeus, 2 kgs., \$42.

POTASSIUM PERMANGANATE—
Bombay, 10 pkgs. (pt.), \$28.

POTASSIUM SILICATE—
Alexandria, 2 drms., \$10.

POTASSIUM SULPHATE—
Channel Islands, 20 t., \$460.

QUININE—
Antwerp, 3,488 ozs.; Bombay, 12,228 ozs.; Kilindiini, 4,000 ozs.

RESORCIN—
Piraeus (F.), 1 brl. (pt.), \$6.

ROSIN OIL—
Rotterdam, \$122.

SALAMMONIAC—
Kobe, 5 t., \$362.

SALICYLIC ACID—
Bangkok, 2 cs., \$12.

SALT—
Cape Town, 1 t.; Christchurch, 1 t. 2 c.; Cuba, 4 c.; Smyrna, 4 c.

SALTPETRE—
Antwerp, 16 c., \$58.; Bordeaux, 168 t. 13 c. (F.), \$7,500.; Beira, 2 c., \$6.; Barcelona, 2 t., \$106.; Bilbao, 5 t., \$270.; Bombay, 3 c., \$11.; Calais, 2 c., \$1.; East London, 9 c., \$28.; Colombo 8 c., \$28.; Kilindiini, 2 c., \$9.; Pto. Alegre, 19 c., \$60.; Malta, 4 c., \$13.; Paranagua, 5 c., \$18.;

SALTPETRE—
Rio de Janeiro, 1 t. 19 c., \$117.; Santos, 9 t. 18 c., \$600.

SHEEP DIP—
Durban, 1 t. 16 c., \$73.; Madagascarc, 8 c., \$33.

SOAP—
Acera, 3 c.; Alexandria, 5 t.; Adelaide, 9 c.; Amsterdam, 9 c.; Antwerp, 224 t. 17 c.; Auckland, 1 t. 17 c.; Bangkok, 3 c.; Barbados, 1 t. 3 c.; Barcelona, 4 c.; Bermuda, 3 c.; Beyrout, 4 c.; Bilbao, 11 c.; Buenos Ayres, 5 c. Bombay, 2 t. 17 c. Boulogne, 4 t. 9 c.; Canton, 1 c.; Calais, 16 c.; Calcutta, 2 t. 16 c.; Canaries, 2 t.; Cape Town, 1 c.; Casablanca, 5 t. 3 c.; Christiania, 18 c.; Channel Islands, 2 t. 18 c.; Christchurch, 1 c.; Colombo, 1 t. 1 c.; Cologne, 78 t. 11 c.; Copenhagen, 25 t.; Constantinople, 5 t. 10 c.; Cyprus, 1 c.; Demerara, 9 c.; Dunedin, 7 c.; Durban, 12 c.; East London, 1 c.; Genoa, 7 c.; Gibraltar, 1 t. 5 c.; Gothenburg, 1 c.; Havre, 6 c.; Hong Kong, 3 c.; Italy, 4 c.; Jaffa, 1 c.; Karachi, 16 c.; Kilindiini, 1 c.; Lyttleton, 2 c.; Malta, 10½ c.; Melbourne, 4 c.; Milan, 10 c.; Montreal, 3 c.; Mombasa, 6½ c.; Napier, 2 c.; New York, 4 c.; Odessa, 10 t.; Ostend, 2 c.; Perth, 3 c.; Penang, 2 c.; Piraeus, 9 c.; Rotterdam, 22 t. 5 c.; Rangoon, 17 c.; Restoff, 4 t.; Salonica, 4 t. 12 c.; Saigon, 2 c.; Seychelles, 2 c.; Shanghai, 9 c.; Singapore, 3 c.; Smyrna, 4 t. 12 c.; Trinidad, 13 c.; Valparaiso, 2 c.; Wellington, 2 t. 19 c.

SODA ASH—
Alexandria, 10 c., \$13.

SODIUM ARSENITE—
Durban, 1 t. 18 c., \$125.

SODIUM BENZOATE—
Calcutta, 1 cs., \$17.; Piraeus, 3 cs. (pt.), 1 brl. (pt.), \$22.

SODIUM BICARBONATE—
Canton, 1 t., \$30.; Calcutta, 1 c., \$6.; Cape Town, 5 c., \$13.; Cologne, 10 t., \$110.; Colombo, 10 c., \$25.; East London, 6 c., \$10.; Fremantle, 5 c., \$3.; Montreal, 10 c., \$22.; Paranagua, 15 c., \$31.; Pt. Elizabeth, 16 c., \$26.

SODIUM BISULPHITE—
Pt. Swettenham, 10 t., \$300.

SODIUM BROMIDE—
East London, 1 cs. (pt.), \$6.

SODIUM HYPO—
Alexandria, 10 c., \$13.

SODIUM HYPOCHLORITE—
Auckland, 5 c., \$18.

SODIUM HYPOPHOSPHATE—
Bombay, 3 c., \$100.

SODIUM HYPOPHOSPHITE—
Oporto, 47 pkgs. (pt.), \$22.

SODIUM IODIDE—
Gothenburg, 2 cs., \$185.; Shanghai, 1 cs. (pt.), \$11.

SODIUM SALICYLATE—
Bombay, 2 cs., \$21.; Calcutta, 1 cs., \$22.; East London, 1 cs. (pt.), \$7.; Shanghai, 1 cs., \$11.

SODIUM SILICATE—
Delagoa Bay, 2 c., \$9.

SODIUM SULPHITE—
Dunedin, 5 c., \$13.

SULPHUR—
Delagoa Bay (F.), 3 c., \$7.

SULPHURIC ACID—
Hong Kong, 5 t., \$48.; Singapore, 15 c., \$18.; Smyrna, 10 c., \$18.; Trinidad, 10 t., \$174.

TALLOW—
Alexandria, 1 t. 5 c.; Antwerp, 50 t.; Shanghai, 7 c.

TANNIC ACID—
Buenos Ayres (F.), 1 cs. (pt.), \$35.

TARTARIC ACID—
Bahia, 4 c., \$86.; Barbados, 1 c. (F.), \$10.; Beira, 1 c., \$24.; Bombay, 1 cs. (F.), \$8.

TARTARIC ACID—
C. Town, 5 c., \$96.; Christchurch, 2 c., \$38.; Calcutta, 7 c., \$134.; Callao, 2 c., \$39.; Durban, 2 c. (F.), \$36.; Durban, 6 c., \$126.; Karachi, 13 c. (F.), \$219.; Kobe, 10 c., \$187.; Limon, 1 c. (F.), \$18.; Madras, 1 cs. (pt.), \$5.; Pt. Elizabeth, 1 c. (F.), \$10.; Pt. Elizabeth, 2 c., \$34.; Rio de Janeiro, 1 cs., \$5.; St. John's, N.F., 2 c., \$39.; Singapore, 10 c., \$191.; Santiago, Chile, 2 c., \$34.; Talcahuano, 1 c., \$14.

THEOBROMINE AND SODIUM SALICYLATE—
Piraeus (F.), 1 brl. (pt.), \$7.

WAX—
Amsterdam, 1 t. 8 c.; Alexandria, 10 c.; Barcelona, 7 t. 8 c.; Galatz, 1 t.

WHITE LEAD—
Aden, \$71.; Antwerp, \$619.; Bombay, \$125.; Bordeaux, \$620.; Casablanca, \$137.; Calcutta, \$892.; Channel Islands, \$166.; Karachi, \$7.2.; Mauritius, \$140.; Ostend, \$149.; Penang, \$54.; Pt. Said, \$51.; Restoff, \$2,039.; Singapore, \$340.; Timaru, \$111.

MANCHESTER.

Week ending October 29.

ALUM—
Alexandria, 54 pkgs.; Treport, 31 cs.

BLEACHING POWDER—
Rotterdam, 1 ck.

BORAX—
Rotterdam, 80 bgs.

CITRIC ACID—
Alexandria, 1 kg.

COAL PRODUCTS (otherwise undes.)
Alexandria, \$621.; Bombay, \$5,696.; Malta, \$140.; Rotterdam, \$50.; Tonnay Charente, \$2,535.; Rouen, \$80.; Winneb, \$13.

DISINFECTANTS (otherwise undes.)
Bombay, 190 drms.

DYESTUFFS (otherwise undescribed)
Alexandria, 50 cks.

FATTY ACIDS—
Antwerp, 60 brls.

GLYCERINE—
Alexandria, 20 cs.

GLYCERINE (DISTILLED)—
Malta, 7 cs.

IODIFORM—
Bakana, 3 cs.

LEAD ACETATE—
Antwerp, 8 cks.

POTASSIUM BICHROMATE—
Treport, 11 brls.

POTASSIUM NITRATE—
Alexandria, 6 bgs.

SALT—
Montreal, 6,760 sks.; Opobo, 2,500 bgs.; Pt. Harcourt, 1,000 bgs.; St. John, 4,200 pkgs.

SHEEP DIP—
Alexandria, 25 drms.

SOAP—
Alexandria, 3,900 cs.; Bombay, 433 cs.; Cape Palmas, 5 cs.; Malta, 119 cs.; Rotterdam, 32 cs.

SODA ASH—
Rotterdam, 683 pkgs.

SODIUM BICARBONATE—
Alexandria, 20 bgs.; Treport, 6 brls.

SODIUM BICHROMATE—
Gothenburg, 11 cks.

SODIUM HYDROSULPHITE—
Rotterdam, 10 kgs.

TALLOW—
Treport, 47 cks.

TARTAR EMETIC—
Rotterdam, 1 ck.

TITANIUM SODIUM OXALITE—
Treport, 8 pkgs.

MIDDLESBROUGH.

Week ending November 1.

ALUMINA HYDRATE—
Dieppe, 1 t., \$40.

AMMONIUM SULPHATE—
Kobe, 1,784 t., \$34,132.; Yokohama, 231 t., \$4,240.

BARIUM BINOXIDE—
Dieppe, 20 t., \$2,308.; Yokohama, 1 t., \$127.

BARIUM CHLORIDE—
Rouen, 10 t., \$193.

CAUSTIC SODA—
Madras, 51 t., \$901.

COAL PRODUCTS—
Benzole
Dieppe, 8,417 galls., \$788.
Disinfectant
Natal, 47 t., \$1,383.
Solvent Naphtha
Dieppe, 24 galls., \$701.
Toluene
Dieppe, 8,283 galls., \$244.

DYESTUFFS (otherwise undescribed)
Madras, 5 c., \$295.

MAGNESIUM CARBONATE—
Rouen, 11 t., \$423.

PITCH—
Rotterdam, 883 t., \$2,853.

SODA ASH—
Genoa, 19 t., \$134.

SODIUM SILICATE—
Kobe, 20 t., \$240.; Yokohama, 30 t., \$375.

NEWCASTLE-ON-TYNE

Week ending November 1.

BORAX—
Rotterdam, 2 t.

CAUSTIC SODA—
Genoa, 19 t. 2 c.

CHROME ORE—
Bilbao, 250 t.

FERRO MANGANESE—
Bilbao, 200 t.

PITCH—
Dunkirk, 5 t. 5 c.

RED LEAD—
Rotterdam, 1 t.

SODA CRYSTALS—
Rotterdam, 20 t.

TALLOW—
Genoa, 5 t.

WHITE LEAD—
Rotterdam, 6 t.

N. & S. SHIELDS.

Week ending November 1.

ANTIMONY—
Christiania, 10 c.; Montreal, 10 c.

ANTIMONY OXIDE—
Christiania, 1 t. 10 c.

FERRO MANGANESE—
Montreal, 20 t.

GELATINE (EDIBLE)—
Christiania, 11 c.

MAGNESIA—
Montreal, 7 t.

RED LEAD—
Christiania, 1 t.
Montreal, 1 t. 17 c.

SODIUM SILICATE—
Christiania, 10 t. 2 c.

WHITE LEAD—
Montreal, 4 t.

SWANSEA.

Week ending November 1.

CHEMICALS (otherwise undescribed)
Bordeaux, 499 t., \$25,000.

COBALT OXIDE—
Shanghai, 1 t. 1 c., \$1,187.

NICKEL SULPHATE—
Kobe, 11 t., \$660.

ZINC OXIDE—
Genoa, 30 t., \$1,890.

PRICES CURRENT.

THURSDAY, Nov 6, 1919.

PREPARED BY MESSRS. HIGGINSBOTTOM AND CO., 21, SPRING GARDENS, MANCHESTER.

The values stated are F.O.R. at makers' works, or at usual ports of shipment in U.K., unless otherwise specified
The prices in different localities may vary.

Acids:—

		£	s.	d.
*Acetic 40% and 60%	per cwt.	29/-	&	43/6
" Glacial	per ton	85	0	0
*Arsenic, S.G. 2,000°	per ton	70	0	0
Boric Crystals	"	72	0	0
*Fluoric	per lb.	0	0	7
*Muriatic (Tower Salts), 28° Tw.	per carboy	0	6	6
*Nitric, 80° Tw.	per ton	32	0	0
Oxalic	per lb.	0	1	1½
Phosphoric, 1,750°	"	0	1	9
*Sulphuric (fuming, 70%)	per ton	—	—	—
" (Pyrites, 168°)	"	7	18	9
" (" 140°)	"	4	10	0
" (free from arsenic, 141°)	"	5	7	4
Tannic (commercial)	per lb.	0	2	6
Tartaric crystals	"	0	3	2
*Acetone	per ton	80	0	0
*Alum, loose lump (delivered)	"	17	0	0
Alumina Sulphate (pure)	"	17	0	0
Aluminoterric (in slabs)	"	8	10	0
Aluminium (Ingot Metal, 98/100%)	per ton	150	0	0
*Ammonia, Anhydrous	per lb.	0	2	0
" " 88°	per ton	33	0	0
" " 92°	"	20	0	0
" Carbonate	per lb.	0	0	6½
" Muriate (grey)	per ton	47	10	0
" " (sal ammoniac) 1st & 2nd, per cwt.	80/- & 75/-			
" Nitrate	per ton	60	0	0
" Phosphate	"	110	0	0
" Sulphate (grey), London, net	"	—	—	—
" " " Hull	"	—	—	—
" " " Manchester	"	—	—	—
*Aniline Oil (pure)	per lb.	0	1	2
Aniline Salt	"	0	1	2
Antimony	per ton	45	0	0
" (tartar emetic), 43/44°	per lb.	0	3	1
" (golden sulphide)	"	0	1	3
Arsenic, white powdered	per ton	60	0	0
Barium Chloride (in casks)	"	23	0	0
" Carbonate (native), 92/94°	"	11	10	0
" Sulphate (native levigated)	"	£7 to £14		
Barium Chlorate	per lb.	0	1	3
*Bisulphide of Carbon	per ton	55	0	0
*Bleaching Powder, 35°	"	17	0	0
" " Liquor, 7°	"	6	0	0
*Casein (commercial)	"	85	0	0
Chromium Acetate (crystals)	per lb.	0	1	0
Calcium Chloride	per ton	8	0	0
China Clay (at Runcoin), in bulk	"	70/- to 90/-		

Coal-tar Products and Dyes:—

Alizarine (artificial), 20%	per lb.	0	2	0
Magenta	"	18/- to 35/-		
Anthracene, 40/50° A, f.o.b., London, per unit,	"	0	0	7
Benzol, 90's (naked)	per gal.	0	2	0½
" 50/90's	"	0	1	10½
Carbolic Acid (crude, 60°)	"	0	1	7½
" " (crystallised, 40°)	per lb.	0	0	9½
" " Acid (pale liquid, 97/98°)	per gal.	0	2	9
*Crocoate (ordinary), naked	"	0	0	6½
*Crude Naphtha, 30° at 120°C.	"	0	0	9
*Grease Oils, 18° Tw. (naked)	per ton	6	10	0
Pitch, f.o.b., Liverpool or Garston	per gal.	3	2	9
*Solvent Naphtha, 90% at 160°	per gal.	0	2	5
Copper	per ton	100	12	6
" Sulphate	"	40	0	0
Dross Salts	"	39	0	0
*Glycerine (crude), 80%	"	72	0	0
" (industrial, S.G. 1,260)	"	110	0	0
*Iodine	per oz.	0	1	0
*Iron Nitrate, 80° Tw.	per ton	12	0	0
" Sulphate (copperas), delivered	"	4	5	0
" Sulphide	"	9	0	0
Lea " Foreign Pig	"	33	5	0
" Litharge (lake)	"	46	0	0
" Acetate (white)	"	83	0	0
" " (brown)	"	66	0	0

Lead, Carbonate (White lead), pure	per ton	50	0	0
" Nitrate	"	55	0	0
Lime, Acetate (brown)	"	12	0	0
" " (grey), 80°	"	17	0	0
Magnesium Chloride	"	15	10	0
" Carbonate (light)	per cwt.	2	7	6
" Calcined Magnesite	per ton	21	10	0
" Sulphate (Epsom Salts) (coml)	"	12	0	0
" " (druggists)	"	16	0	0
Manganese, Sulphate	"	75	0	0
" Borate	"	95	0	0
*Methylated Spirit, 64° (industrial)	per gal.	0	5	7
*Naphtha (Wood), Solvent	"	0	10	0
" " Miscible, 60° p.	"	0	10	5

Oils:—

*Cottonseed	per ton	95	0	0
*Linseed, Raw	"	95	0	0
Stearine, 115-120° M.P.	"	95	0	0
Potassium, Bichromate	per lb.	0	1	6
" Carbonate, 85%	per ton	160	0	0
" Chlorate	per lb.	0	1	0
" Hydrate (Caus. Pot.) 88/100°	per ton	105	0	0
" " 75/80°	"	95	0	0
" Potash Hydrate Liquid, 50° B.	"	65	0	0
" Nitrate (refined)	"	55	0	0
" Permanganate (commercial)	per lb.	0	3	3
" Prussiate (yellow)	"	0	1	9
" " (red)	"	0	5	6
" Sulphate, 90% (ex ship)	per ton	25	0	0
" Muriate, 80°	"	25	0	0
Silver (metal)	per oz.	0	5	6½
Sodium (metal)	per lb.	0	1	3
" Acetate	per ton	48	10	0
" Arseniate, 45%	"	60	0	0
" Borate (Borax), Crystals	"	39	0	0
" Bicarbonate (2 cwt. bags)	"	8	5	0
" Bichromate	per lb.	0	0	11
" Carb. (Caustic Soda-ash), 48%	per ton	12	10	0
" " (Alkali), 58% (bags)	f.o.r. wks	6	10	0
" " (Soda Crystals), (bags) car. pd.	"	5	10	6
" Chlorate	per lb.	0	0	6
" Cyanide (100% basis) for export	"	0	0	11
" Hydrate (76% C. Soda) (f.o.r.)	per ton	24	0	0
" " (74% C. Soda)	"	23	5	0
" " (70% C. Soda)	"	22	0	0
" " (60% C. Soda)	"	21	0	0
" " (pure liquid, 90° Tw.)	"	10	2	6
" 77/78° Powdered (99%) Hydrate	"	24	10	0
" Hyposulphite (commercial)	"	19	0	0
" Manganate, 25%	"	65	0	0
" Nitrate, 96%, retd., f.o.r., L'pool	"	21	0	0
" Nitrite, 100%	"	60	0	0
" Phosphate	"	28	0	0
" Prussiate	per lb.	0	1	0
" Silicate (glass) Alkaline	per ton	12	5	0
" " (liquid, 100° Tw.)	"	9	10	0
" Sulphate (Saltcake), delivered	"	3	10	0
" " (Glauber's Salt)	"	4	0	0
" Sulphide (conc.), 60/65% casks	"	22	0	0
" Sulphite	"	11	0	0
Sulphocyanide, Ammonium, 95%	per lb.	0	2	0
" Barium, 95%	"	0	1	4
" Potassium	"	0	2	4
" Calcium, 7%	per lb.	0	1	4
Sulphur, (Flowers)	Sicilian per ton	22	10	0
" (Roll Brimstone)	"	22	0	0
" Brimstone (best thirds)	"	13	10	0
Tallow	"	105	0	0
Tin Crystals	per lb.	0	2	0
" English Ingots	per ton	278	0	0
Titanium, Potass. Oxalate	per lb.	0	1	6
Titanous Chloride	per cwt.	1	10	0
Zinc (Spelter)	per ton	45	0	0
" Powder, 88/92%	"	15	0	0
* " Chloride (solution, 102° Tw.)	"	24	0	0
" Sulphate, Crystal	"	22	0	0

* Prices are for the best quality; otherwise, prices usually include charges.

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CURRENT TOPICS

THE INDUSTRIAL COURTS BILL.

IN its present form we are doubtful whether the Industrial Courts Bill will serve any other purpose than place upon a permanent basis the present temporary Court of Arbitration which, since the armistice, has replaced the Committee on Production. That body dealt with industrial disputes during the war, or, to be more accurate, some of them, because even during the war we were not spared strikes and the threats of strikes. Since the armistice we have admittedly been going along in an uncertain manner, probably owing to the fact that the Wages (Temporary Regulation) Act, which extended until November 21, 1919, the rates of wages being paid in November, 1918, might or might not be renewed after that date. The terms of the so-called railway settlement have now determined that point, and we know that the Wages (Temporary Regulation) Act will continue until at least September 30, 1920. It is, indeed, in the knowledge of this, and as a direct result of it, that the Government have introduced the Industrial Courts Bill. This provides that for the settlement of trade disputes there shall be a standing Industrial Court, consisting of persons to be appointed by the Minister of Labour, of which some shall be independent persons, some representatives of employers, and some representatives of workmen. Such a Court, naturally, would be of the greatest possible assistance as a court of final appeal from Whitley Councils, where these exist, or on the application of representatives of employers and workmen when negotiations have broken down in the absence of the existence of a Whitley Council. The weak point, and the one which limits the utility of such an Arbitration Court, however, is that there is no machinery which will make its awards binding. The Government themselves realised this from the beginning, and sought to make awards binding, but we understand that the trade unions take up the illogical position that having agreed to place a case before the Court—the latter cannot act unless both sides make application—they shall not be bound to abide necessarily by any decisions given by the Court. Whilst granting that a Court of Arbitration, limited as this one apparently is to be, is better than that there should be no tribunal to which reasonably minded employers and employed could submit a case, with the full intention of abiding by the result, it does seem that a strong appeal should be made to labour to approach this question in that spirit of broad-mindedness which alone can place the

industrial positions on a sure foundation. The futility of an Arbitration Court without power to enforce its awards compulsorily has recently been seen in the iron-founders' strike, when a body of men, parties to an agreement for dealing with wages questions, withdrew from that agreement the moment an award was given which did not meet their full demands. To the credit of the vast majority of the unions which were parties to that agreement, be it said that they are loyally abiding by it, but that has not prevented them from suffering severely from lack of employment due to the strike of the iron-founders. If the large trade unions of the country will only come to the decision to enforce upon their members willing adherence to the awards of the Arbitration Court

with, of course, a similar pledge on the part of the employers, which will be forthcoming at once,—we shall have gone a long way towards settling the present disturbed conditions due to the uncertainty caused by constantly recurring labour upheavals. All industries throughout the country are naturally affected by this matter. There seems no logical reason why labour should not trust its destinies to a properly constituted Arbitration Court, upon which its own representatives would sit. No other course seems humanly possible; the alternative is the constant rattling of the strike weapon, and a perpetuation of industrial uncertainty which breeds unemployment. It is to be hoped that the result of the consideration in Parliament of the Industrial Courts Bill will effect this very necessary modification to make that measure as effective as it should be.

TRADE RETURNS.

THE Board of Trade returns for October are of a more favourable character than at any time during the past few years, notwithstanding the fact that imports continue to increase. Exports, valued at £79,061,000., were approximately £12,500,000. higher than in the preceding month, and £36,240,000. more than in October, 1918. As before, shipments of manufactured articles were responsible for the major share of the increase. It must not be forgotten that the railway strike, which practically paralysed the transport of merchandise, would have its major effect upon the October returns, and for that reason the figure cited is the more encouraging. On the import side, the month's trade was valued at £153,486,000., an increase of about £4,860,000. compared with September, and of £35,856,000. over the corresponding period of last year. In both branches of the chemical trade the respective tendencies were in a favourable direction, decidedly so in the case of exports. Shipments of chemicals, drugs, dyes, and colours during the month were valued at £2,546,853., compared with £2,076,000. in the previous month, and £2,002,000. in October of last year. Exports of bleaching powder increased from 1,845cwt. in October, 1918, to 23,633cwt. in the month under review; dyestuffs, from 9,816cwt. to 22,168cwt.; sulphate of ammonia, from 2,806 tons to 13,596 tons, chiefly to France, the Dutch East Indies, and Japan; basic slag, from 137 tons to 2,585 tons;

chemical manures, unenumerated, from 2,780 tons to 4,855 tons; muriate of ammonia, from 1,737cwt. to 9,572cwt.; white lead, from 778cwt. to 14,293cwt.; zinc oxide, from 540cwt. to 2,875cwt.; painters' colours and materials, unenumerated, from 33,278cwt. to 105,882cwt.; saltpetre, from 1,212cwt. to 9,245cwt.; chromate and bichromate of potash, from 1,457cwt. to 2,070cwt.; potash compounds, other sorts, an increase in value from £5,639. to £18,523.; sodium bicarbonate, from 31,345cwt. to 46,617cwt.; caustic soda, from 54,312cwt. to 118,193cwt.; chromate and bichromate of soda, from 10,147cwt. to 12,327cwt.; soda crystals, from 311cwt. to 12,043cwt.; tartaric acid, from 114cwt. to 1,226cwt.; and chemicals, other sorts, an increase in value from £465,916. to £481,682. Declines were therefore few in number, and with the exception of copper sulphate (from 2,846 tons to 708 tons) and soda ash (from 341,713cwt. to 233,578cwt.) were insignificant. The imports of chemicals and allied products were valued at £1,967,034., compared with £2,125,000. in September, and £2,696,000 in the corresponding month of 1918. The arrivals of boracite, borate of lime, etc., coal products (not dyes), potash compounds (other sorts), tartaric acid, barytes, nickel oxide, white lead, and painters' colours and pigments (unenumerated), were on a larger scale; while declines were shown in the imports of acetic acid, sulphur (from 257,220cwt. to 12,256cwt.), carbide of calcium (from 51,298cwt. to 1,519cwt.), cream of tartar, crude and distilled glycerine, soda compounds, zinc oxide, phosphate of lime and rock phosphate, and chemicals, unenumerated (from £1,131,328. to £262,528.).

THE HABER PROCESS.

AT the annual meeting on Tuesday of the Nitrogen Products and Carbide Co. Ltd., details of which appear on another page, the Chairman, Major C. H. Campbell, said:—In the past few months a great deal has been written in the Press as to the merits of the Haber process for the fixation of atmospheric nitrogen in the form of ammonia, but it is evident that a great deal of misunderstanding exists as to the possibilities of this process as compared with the cyanamide method. It is common knowledge that the Haber process was extensively employed in Germany during the war, but according to reliable information, its use is not likely to extend far beyond the district in which it has been developed. Although extremely ingenious, it involves a vast number of operations and intricate processes, besides the employment of very expensive and complicated plant and technical skill of the highest order. According to a recent statement published in the Press, the Germans admit that successful operation depends upon the special skill which they alone have acquired. The intricate nature of the process is perhaps better illustrated by their own words when agreeing to the French Commission visiting the works of Badische Aniline, namely:—"If they, the French, saw the works, they would not be able to duplicate them, and, even when erected, they could not operate them." Moreover, it is a process which is entirely dependent upon coal, and, as such, comes directly under the influence of the high prices now ruling.

TECHNICAL RECORDS OF ACID MANUFACTURE.*

NITRIC ACID.

IN all factories under the control of the Factories Branch, nitric acid is manufactured from crude sodium nitrate and sulphuric acid.

The factory records show in each case the number of retorts working, the amount of crude nitrate charged, whether the latter is wet or dry, and the equivalent amount of NaNO_3 ; the amounts and strength of sulphuric acid used and of strong and weak nitric acid obtained (including lower nitrogen acids reckoned as HNO_3); the nitre cake produced and despatched and the acidity thereof; the efficiency of working, etc. In checking these figures the following numerical relationships were employed:—

NaNO_3	...	...	...	HNO_3
85	...	...	...	63
1.35	...	...	...	1.00

Hence, to obtain 1 ton of HNO_3 requires by theory the decomposition of 1.35 tons of NaNO_3 ; and since crude nitrate contains 94 to 98 per cent. of NaNO_3 , the purity of this material must be considered in calculating the efficiency.

At factories where the nitrate was dried, the records show the amounts of wet crude nitrate charged to the drier, its percentage of NaNO_3 and water, and also the dried nitrate produced and its composition. If bag-washing plants were in operation, the records show the number of unwashed bags charged, the number of dried bags, and the amount of sodium nitrate produced.

MIXTURES OF NITRIC AND SULPHURIC ACIDS.

The mixed acid used for nitration is made from calculated quantities of various constituent acids—viz., oleum, sulphuric acid, nitric acid, and also spent acids, the latter being used especially in the production of nitrocellulose, mononitrotoluene (MNT), and dinitrotoluene (DNT). The mixing records, therefore, give the consumption of certain quantities of these acids, together with the production of corresponding quantities of mixed acids of definite compositions. Considerable difficulties were experienced on all factories in reconciling quantities of mixed acids produced with the quantities of oleum, sulphuric and nitric acids employed. In more than one case, a complete re-calibration of all vessels employed for acid measurement and storage was found necessary, and errors amounting to 2 per cent. were discovered.

SULPHUR TRIOXIDE (SO_3).

Practically all the sulphuric-acid producing plant in operation at H.M. Factories falls into the class known as oleum plant—that is, it is capable of producing sulphur trioxide, which can be delivered, in combination with greater or smaller quantities of water, as oleum or as sulphuric acid of any required strength. Usually the water required to combine with the sulphur trioxide is supplied in the form of a more or less dilute sulphuric acid, the reason being that direct reaction between sulphur trioxide and water alone is not practicable, for various reasons which need not be discussed here.

The records for the oleum plant indicate:—

(1) The amount of sulphur burnt, either as crude sulphur or in the form of pyrites, and the sulphur tri-

oxide which should theoretically be obtained from the equivalent amount of pure sulphur.

(2) The amount of sulphur trioxide put into the plant in the form of feed acid—i.e., acid for drying and absorption towers.

(3) The amount of sulphur trioxide obtained from the plant, partly as weak acid from the drying towers, partly in the form of the desired product—i.e., as strong sulphuric acid or oleum.

The efficiency of the plant is then deduced from these data in the following manner:—

From the total sulphur trioxide delivered by the plant, both in the form of weak acid and as the desired product, is subtracted the amount of sulphur trioxide delivered to the plant in the form of feed acid. The difference obtained represents the amount of sulphur trioxide produced from the sulphur or other material burnt. This amount, divided by the sulphur trioxide theoretically equivalent to the sulphur in the material burnt, gives the efficiency of working. The sulphur trioxide theoretically equivalent to the sulphur burnt is obtained from the following equation:—

$$\begin{array}{rcl} 2 \text{ S} & + & 3 \text{ O}_2 & = & 2 \text{ SO}_3 \\ \hline 2 \times 32 & + & 3 \times (2 \times 16) & = & 2 \times 80 \\ \hline 64 & + & 96 & = & 160 \\ \text{or } 100 & & & & 250 \end{array}$$

from which, for each part of sulphur consumed, 2.5 parts of sulphur trioxide should be obtained at 100 per cent. efficiency.

WASTE ACID TREATMENT.

The waste acid from the nitration process consists of the sulphuric acid originally used for mixed acid, together with the water formed or added during nitration, and any unchanged or reduced nitrogen acids formed from the excess of nitric acid originally used, less a certain loss of both sulphuric acid and nitric acid in some cases—e.g., where the waste acid is displaced by water, due to sending the last acid runnings down the drain. It is obvious that this valuable material cannot be wasted, but must be treated to recover in a usable form the nitric acid and sulphuric acid which it contains. The operation used for this purpose is known as denitration. In the case of nitroglycerine or T.N.T. waste acid, this operation is carried out in columns in which a descending current of the waste acid meets an ascending current of superheated steam. The effect of the steam is to decompose the derivatives of the nitric acid and to drive these off along with any nitric acid present in the form of gas or vapour, which is recovered in absorption towers. The sulphuric acid recovered at the bottom of the denitration column should be entirely free from nitric acid and other nitrogen compounds.

Nitrocellulose waste acid, on the other hand, is treated in stills, which are heated by external firing. The nitric acid, being more volatile than sulphuric acid, is driven off in the form of vapour with relative ease and is collected by means of suitable condensing apparatus. The nitric acid so obtained is, for the most part, in the form of strong acid, but a certain amount of water is invariably driven off as the temperature rises, so that the later fractions of the acid are considerably weaker than the first fractions. Since it may not be possible to use all the weak nitric on the plant—i.e., the weak nitric

* Abstracted from the Report on the statistical work of the Factories Branch issued by the Ministry of Munitions (Department of Explosives Supply).

acid delivered by both the stills and the retorts—for acid mixing in the manufacture of nitrocellulose, it is customary to collect all the weak nitric acid which cannot be utilised for acid mixing purposes, and to mix it with strong sulphuric acid. This mixed acid is then returned to the stills and the nitric acid distilled off, most of the water remaining with the sulphuric acid. Since, however, any distillation of this kind will always yield a certain proportion of the nitric acid in the form of weak acid, it is obvious that there is a continual circulation of nitric acid through the stills in the process of conversion to strong nitric acid.

The same consideration applies, to a certain extent, to the treatment of nitroglycerine waste acid. The denitration of this acid in columns gives rise to a relatively weak nitric acid, which, if it cannot be utilised for acid mixing, is strengthened by being mixed with strong sulphuric acid, the mixture being then distilled in order to drive off the nitric acid as free as possible from water. In this operation a small quantity of weak nitric acid is again formed, which in turn must be mixed with strong sulphuric acid and re-distilled.

The effect of denitration, whether carried out in denitrators or stills, is to leave the sulphuric acid practically free from nitric acid, but associated with so much water that concentration is necessary before it can be effectively re-used. The process of concentration consists in heating the acid by suitable means so that water is driven off, leaving a much stronger sulphuric acid.

Naturally a certain loss occurs both in denitration and in concentration, and this loss is obviously inevitable in the manufacture of each particular explosive. It is the object of the denitration and concentration records to show clearly the amount of this loss at every point. The denitration records, therefore, give the amount and composition of the waste acid treated (reckoning all lower nitrogen acids in terms of equivalent HNO_3), and the amount and strength of the nitric acid and sulphuric acid recovered. From these figures the loss of each material is determined.

Similarly, the concentration records show the amount and strength of the acid charged to the concentrators and the amount and strength of the acid produced. All these losses are expressed in terms of HNO_3 and H_2SO_4 .

As in the case of the acid mixing records, considerable difficulty was experienced in obtaining consistent data. In one factory, after the major losses in the denitration of nitroglycerine waste acid had been eliminated, the efficiency of nitric acid recovery climbed very rapidly, and for a considerable period actually appeared to be slightly over 100 per cent. A careful examination into the accuracy of the measurements at all points was made, and the anomaly was finally traced to faults in the analytical method employed for the determination of the nitrogen acid content of the waste acid. So accurate and complete were the measurements that they sufficed to lead to the discovery of an inaccuracy in analysis of less than 1 per cent.

ECONOMICAL USE OF RAW MATERIALS.

It is seen from the foregoing that the chief materials which are consumed in the acid section of a factory producing explosives are sodium nitrate and sulphuric acid. The quantities of these which are consumed in any factory per ton of explosive produced will constitute the test of the efficiency of manufacture, and the records will enable the points at which losses occur to be determined. It

follows then that the records, if properly utilised, constitute an important factor in the control of the processes involved, and in reducing to an absolute minimum the consumption of materials for any given output.

The sodium nitrate consumed per ton of product must be determined:—

- (1) From the efficiency of the retorts, which produce from it the nitric acid employed in nitration;
- (2) From the amount of this nitric acid which is found to have been consumed for a given production.

The first factor is readily determined from the retort records. To obtain the second factor—namely, the amount of HNO_3 consumed per ton of product, it is necessary to take into consideration several details. The amount of nitric acid made in a given period may bear a very uncertain relation to the amount actually consumed during this period. To determine the latter quantity, stocks of fresh and waste acid must be taken into account, and, where nitration is carried out in more than one stage, the stocks of intermediate nitro-bodies and of the various mixed and spent acids handled at each stage must be also considered.

Broadly speaking, the amount of nitric acid used will be the amount of HNO_3 in the fresh acid or acids used for nitration less the amount of HNO_3 which is recovered by the various denitration processes, always with the reservation that due allowance must be made for variations in stocks, as mentioned above.

When the consumption of nitric acid has been determined, it is a simple matter to deduce from the retort records the amounts of sodium nitrate and sulphuric acid which are equivalent to this consumption. The sulphuric acid consumed in nitration is given by the difference between the amount of H_2SO_4 in the fresh acid used and in the waste acid recovered. In addition, any possible loss of sulphuric acid in the process of denitrating the waste acid must be determined, and finally, the amount which has been lost in the concentration of this denitrated acid and of any other weak acid which has to be dealt with, such as that resulting from sulphur trioxide manufacture, and the weak sulphuric acid obtained from the stills in the process of converting weak nitric acid to strong nitric acid in the manufacture of nitroglycerine and nitrocellulose. With the same reservation as regards variations in stocks at all points, the quantities of H_2SO_4 lost in denitration and in concentration will be deduced from the various plant records, and when this has been done the total loss of H_2SO_4 for a given output is readily determined.

(To be continued.)

INDIA AND DYESTUFF IMPORTS.—Representations made by the American Chamber of Commerce in London have resulted in the Government of India instructing their Customs officers to admit freely into India prohibited dyes and dyestuffs ordered before September 6 from other than ex-enemy countries and shipped before January 1, 1920. On September 9, says the American Chamber in London, a cable was received from the National Aniline and Chemical Company of New York, stating that the Indian Government had, without warning, prohibited the import into India of all dyes and dyestuffs shipped from the United States after September 6. As no previous notice had been given, orders had been booked and dyes and dyestuffs were being specially manufactured, packed, and labelled for the Indian market, and would be unsaleable elsewhere. The American Chamber of Commerce in London put the facts before the India Office, and suggested that special licences should be granted to those firms who had booked orders prior to September 6, in order to allow them to complete their manufacturing and to ship their goods. The result is stated above. The Australian Government, a few months earlier, under similar circumstances, granted a period of grace amounting to three and a half months.

INDUSTRIAL CHEMISTS.

THE first of the winter meetings promoted by the Technical Section of the Newcastle Chemical Industry Club was held last week under the presidency of Mr. O. Smalley. Three papers were delivered, the first being on

"THE WORK AND PROBLEMS OF A GAS CHEMIST," by Mr. G. Weyman, M.Sc., A.I.C., of the Newcastle and Gateshead Gas Company.

Mr. Weyman said that the work of a gas chemist covered a very wide ground; it included both organic and inorganic chemistry, besides a large amount of work which, strictly speaking, belonged to other sciences. Physics and physical chemistry were especially required, while pure mathematics and geology were sometimes called upon. Problems in engineering were usually dealt with by experts in that science; but for the rest, it was the chemist who had to furnish the answer.

Dealing with the analytical section of the work of a gas chemist, Mr. Weyman said that, in the first place, raw materials had to be checked. The chief one—coal—was a problem in itself, not only regarding the obtaining of proper samples made up of many different types of coal, but also regarding examination of the sample for the required quality. To sum up the relative qualities of two coals was not an easy matter. Other raw materials, such as oxide of iron, lime, sulphuric acid (when that was not manufactured at the gasworks), caustic soda, and—quite an important item—water, all required correct sampling and analysis, some of them being bought to specification or on an analytical basis, and special tests had often to be made as to suitability for particular purposes. As regards finished products, a close check was necessary on the chief product—gas. Constant gas analysis, with determination of calorific value, specific gravity, sulphur, naphthaline, ammonia, and cyanogen were needed, though much time and trouble might be saved by the use of recording instruments. The second most important product, coke, also needed examination in much the same way as coal. Many other products, such as sulphur, spent oxide, sulphate of ammonia, and concentrated liquor, were sold on an analytical basis; while others, such as tar and tar products, benzole, toluol, solvent naphtha, motor spirit, naphthaline, and cyanogen compounds, were sold to specification, and therefore needed careful and duplicate analysis.

Speaking of the supervision of the chemical plant, he said that since all the processes in a gasworks were chemical in their nature, it was obvious that the chemist must play the most important part in their control, and be responsible for the methods of working and the results obtained. It was for him to reduce losses to a minimum, report daily as to efficiency, and make suggestions as to improvements. The foreman had to take his instructions from the chemist regarding all details of the method of working. The chemist included in his supervision all the analytical work necessary to keep a careful control and submit his daily figures to the chief chemist. Such supervising chemists were placed in charge of retort-houses, condensers and scrubbers, purifiers, water-gas, sulphate, concentrated ammonia, benzole, and boiler plants. His training tended to become specialised, and involved measurement of high temperatures, losses by radiation, conduction, diffusion, vapour pressures, and gas pressures, etc. In connection with working trials, he mentioned that that section included trials of new plants as well as special tests of established plants. Means of measure-

ment of solids, liquids, and gases had usually to be improvised. A well-balanced judgment of the size of errors was essential. The sources of loss and efficiency had to be indicated, and suggestions made as to further avoidance.

Referring to the work of obtaining data for and the introduction and working up of new and special processes, Mr. Weyman said that section really came under the heading of applied research. Sometimes difficulties were not realised until a process was applied on a large scale; more often a small-scale plant would supply an almost bewildering number of previously unrealised factors, and much time and trouble was wasted in neutralising effects which on a large scale corrected themselves.

"THE WORK OF A PAINT AND COLOUR CHEMIST."

Mr. J. Y. Reed, the author of a paper on this subject, said that it was only in comparatively recent years that the need of extensive research had been fully realised in the paint, colour, and oil industry. America had, perhaps, shown us the way regarding paints; and just prior to the war Germany had made rapid progress in the making of colours, both aniline dyes and finished colours, also in the preparation of other materials for paint making. During the war, however, the colour chemists of this country had shown that they could meet all needs by investigating new sources of supply and utilising fresh methods for obtaining results. A paint-works chemist regarded paint of any description under three heads—namely, pigment, medium, and thinners.

Dry pigments for paint making were chiefly obtained from the following sources: Natural or earth colours, such as oxide of iron, umbers and siennas, various forms of vegetable and lamp blacks, and graphite. All these had to be tested for colouring and strength when reduced with white lead or zinc oxide, and more than a trace of moisture was fatal to success in paint grinding. Matter soluble in oil or turpentine had also to be tested for specific gravity, as a too heavy pigment was not desirable. Mr. Reed described the manufacture of white paint at some length. The materials employed had to be tested as to their behaviour with the mediums and thinners to be used in manufacture. Paint manufacturers who made their own white lead had an advantage in being better able to control the uniformity of the material. He held that a paint chemist required some knowledge of engineering, as so much depended on the physical side of the processes, so much so that some chemists specialised on dry-colour making alone.

The testing and analysis of dry colours required a full knowledge of the chemical and physical qualities and analysis of most metals owing to variety of the requirements. The grinding medium afforded a great deal of work to the chemist: in dealing with thinners nothing could be taken for granted. The chemist usually had the work of checking the drying of the finished product, arranging exposure tests under real conditions, and making records of the tests. In conclusion, Mr. Reed said that a paint-works chemist was of little real value if he confined his energies to turning out a few beautiful analyses per week. Accuracy in analysis was not enough; there was a need for highly cultivated powers of observation and a quick method of arriving at results without sacrificing thoroughness and accuracy.

A third paper, by Mr. C. L. Haddon, M.Sc., dealt with "The Work of a Shipyard Chemist." On each of the papers a brief discussion took place.

PHOTOGRAPHY OF COLOURED OBJECTS.

AT the opening meeting of the newly formed Chemical Section of the Manchester Literary and Philosophical Society, Professor Sir William J. Pope, M.A., D.Sc., LL.D., F.R.S., Professor of Chemistry in the University of Cambridge, gave an address on "The Photography of Coloured Objects." Sir Henry A. Miers, M.A., D.Sc., F.R.S., Vice-Chancellor of the Victoria University of Manchester, presided.

The ordinary photographic plate, said Sir William, is sensitive only to blue and violet light and not to red or yellow. The plate thus receives much the same impression of a parti-coloured scene focussed upon it as we should receive on viewing the scene through deep-blue spectacles. The prime requisite of any photographic process for the representation of parti-coloured objects is obviously that the photographic plate used should be sensitive to light other than the blue and violet; given a plate which is acted upon by light from any part of the visual spectrum many devices become applicable for the production of a satisfactory presentment in monochrome of the coloured object or for the reproduction of the actual component colours. The first truly scientific appreciation of this principle was stated by Clerk Maxwell, the first Cavendish Professor in the University of Cambridge. Maxwell remarked that "by finding photographic materials more sensitive to less refrangible rays the representation of the colours of objects might be greatly improved." Long after Maxwell's day it was discovered that the ordinary photographic plate can be rendered sensitive to green, yellow, and red light by incorporating certain dyestuffs with the material of the sensitive film; previous to the war all the various methods of colour photography—the first of which was devised by Professor Joly, of Dublin,—the modern processes of photographic colour-printing, and the present-day panchromatic photographic methods for obtaining a correct rendering in monochrome of parti-coloured objects, were based upon the success which had been attained in imparting sensitiveness throughout the visual spectrum to the ordinary blue-sensitive photographic plate. By staining the plate with erythrosine it becomes sensitive to green and orange; plates so treated are termed orthochromatic.

A number of dyestuffs belonging to the class of cyanine dyes discovered by Greville Williams, in 1856, are capable, however, of sensitising a photographic plate throughout the whole range of the visible spectrum. These substances are difficult to make, and but little concerning their preparation and chemical behaviour has been published; their photographic applications were carefully studied by several of the large German coal-tar colour firms, and those most suitable for use in colour photography were selected and put on the market under trade names which disguised their chemical identity. At the outbreak of war the Allies were entirely dependent on Germany for these so-called photographic sensitisers; such substances had never been made in this country, and but little information as to the identity of the chief sensitisers and their methods of preparation was available.

The experimental investigation of sensitising dyestuffs was instituted in the chemical laboratories of the University of Cambridge by Dr. W. H. Mills and myself at the end of 1914. Methods for producing the ordinary sensitising dyestuffs on a technical scale were devised, and

all the sensitisers used by the Allies have been prepared in the Cambridge laboratories since the German importation ceased. Our photographic air-service was non-existent at the outbreak of war; it was slowly built up until it ultimately became of great magnitude and attained a high efficiency. It started by using ordinary blue-sensitive plates, but at the date of the Armistice some 80 per cent. of the plates used were red-sensitive or panchromatic plates.

The best panchromatic plate made in pre-war days possessed about one-third the sensitiveness to red as to blue light. At the present time a very rapid panchromatic plate is on the market which is much faster to red than to blue light; the rapidity of the plate to red light has been thus increased about four-fold. The advantages to be gained by the skilful use of the present highly perfected panchromatised plates in our photographic air service, in the circumvention of camouflage colour schemes, and in the photography of distant scenes in spectroscopically pure light, are among the most important studies of the new service. The peace applications of panchromatic plates will undoubtedly multiply rapidly.

The chief processes at present available for the photographic reproduction of the colours of parti-coloured objects were then explained, and examples of each were exhibited.

GERMAN ANILINE DYE SHARES.

THE Geneva correspondent of *The Times*, in a message dated November 3, states that down to last month the share capital of the German aniline dyestuff industries amounted to 371.2 million marks. The average quotation of the shares was 500 per cent., so that an amount of about 1.9 milliard marks, or less than £19,000,000, would have been sufficient for purchasing the whole German aniline dyestuff industry by foreigners. As a matter of fact, Swiss, Dutch, and Allied buyers, since the war, have purchased German aniline dye shares, for which they paid very high prices, of course in German marks, which were very cheap for them. This situation became dangerous from the German point of view, and in order to stop it the six leading aniline dyestuff firms have taken the following action during the last weeks.

First of all, they doubled the share capital by issuing 371.2 million marks of new shares practically at par—namely, 107 per cent.—thus watering the capital. Foreseeing the possibility of a purchase of a majority of the doubled watered capital by foreigners, they created preferential shares, of a nominal amount of 300,000,000 marks, having double the voting power of the ordinary shares. These preferential shares will yield an interest of $3\frac{1}{2}$ per cent. only, and will remain in the portfolios of the aniline dyestuff factories. In this way the majority of the voting power of each German aniline dyestuff factory will be in the portfolio of the other five companies.

The effect of this measure is easily understood; all the foreigners who have purchased German aniline dyestuff shares for the purpose not only of enjoying a dividend, but of controlling this German standard industry, have been out-manœuvred: the real control remains with the German aniline dyestuff combine. The six firms have mutually guaranteed to themselves the national German character.

SOCIETY OF CHEMICAL INDUSTRY.

MANCHESTER SECTION.

A MEETING of the Manchester Section of the Society of Chemical Industry was held at the Grand Hotel on Friday of last week, Mr. John Allen presiding. The chairman said that meetings additional to the usual monthly ones had already been arranged, so as to accommodate further papers that had been promised. Mr. Raymond Curtis had offered a paper on "The Manufacture of Mustard Gas," and Mr. E. L. Rhead had promised one on "The Corrodibility of Metals other than Iron." The dates of these meetings will be announced in due course.

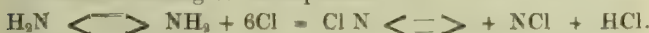
Prior to the usual proceedings an electrical distance thermometer, manufactured by the Cambridge Scientific Instrument Company, was exhibited and explained. A vote of thanks to the exhibitors was moved by the chairman and carried.

A paper by Dr. T. Callan and Dr. J. A. R. Henderson on

"THE ESTIMATION OF *p*-PHENYLENE DIAMINE"

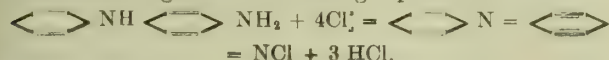
was read by Dr. Callan.

p-Phenylene diamine, said the author, was largely used in the colour and fur-dyeing industries, and as no method had hitherto been available for its exact determination a method of analysis had been devised depending upon the quantitative formation of *p*-benzo-quinone-dichloroimide by the action of an alkaline solution of sodium hypochlorite according to the equation:—



The method employed is to add a solution of the *p*-phenylene diamine to excess of an alkaline solution of sodium hypochlorite previously standardised against N/10 arsenite solution, using starch-iodide paper as external indicator, and, after the formation of the insoluble chloroimide is complete, again determining the amount of available chlorine present in the solution with N/10 arsenite. Under the conditions employed it was found that the precipitated quinone dichloroimide had no reaction on starch-iodide paper. From the difference between the blank and the experiment the amount of *p*-phenylene diamine is calculated, 1 c.c. of N/10 arsenite solution being equivalent to 0.0018gm. of *p*-phenylene diamine.

Naphthylene 1:4 diamine behaves similarly to *p*-phenylene diamine, whilst *p*-amido diphenylamine reacts according to the following equation:—



and can also be estimated by the same method.

The introduction, however, of a sulphonic-acid group into the molecule results in the formation of soluble chloroimides, and in such cases the method fails.

A second paper by Dr. Callan, Dr. Henderson, and Mr. R. Barton, on

"THE ESTIMATION OF SULPHURIC ACID IN PRESENCE OF ORGANIC SULPHONIC ACIDS"

was also communicated.

The estimation of sulphates and sulphuric acid in the presence of organic sulphonics acids, said Dr. Callan, was of considerable interest to those concerned with the analyses of intermediates used in the dyestuff industry. Many such intermediates contained sulphates or sulphuric acid derived from the excess of sulphuric acid used in the sulphonation of hydrocarbons, such as benzene and

naphthalene, etc., and their nitro-, amino-, and hydroxy-derivatives. In the very voluminous literature relating to the determination of sulphuric acid there was no special reference dealing with the effect of organic sulphonics acids, and as these substances might effect the determination in opposite directions—viz., by the contamination of precipitated barium sulphate by co-precipitated barium sulphonate and the possible solubility of barium sulphate in solutions of sulphonics acids—the methods usually employed had been examined from that point of view, a considerable number of organic sulphonics acids of the benzene and naphthalene series containing known amounts of sulphate being analysed by various methods, with the result that neither of those factors had been found to exert a disturbing influence. A modified volumetric method for the rapid determination of sulphuric acid was also described. This consisted in adding excess of N/4 barium chloride to the previously neutralised solution, and after boiling for two or three minutes titrating the excess of barium chloride with N/4 potassium chromate, the end point being ascertained by spotting the solution on to starch-iodide paper and touching the clear rim with a drop of very dilute hydrochloric acid. In the presence of the slightest excess of soluble chromate a blue coloration, due to liberation of iodine, is obtained.

A short discussion ensued, in which the chairman, Dr. Bloch, Mr. L. E. Vlies, Dr. T. J. I. Craig, and Messrs. Heywood, J. R. Hannay, W. F. Gibson, and L. Blundell took part. A vote of thanks to the authors was proposed by Mr. Hannay, seconded by Mr. Blundell, and carried unanimously.

YORKSHIRE SECTION.

"The Origin and Growth of Expert Evidence" was the subject of a paper read at the first meeting of the new session of the Yorkshire Section of the Society of Chemical Industry, held at the Queen's Hotel, Leeds, last week, by Mr. W. McD. Mackey (chairman).

The medical man was, he said, the earliest example of the expert witness in a modern sense, but he was generally a witness in criminal proceedings. Speaking of civil actions, Mr. Mackey said that the best scientific witness was the one who rigidly adhered to the attitude of placing his knowledge unreservedly at the disposal of the court, and who did not allow himself to act in the capacity of advocate. The value of a legal training for scientific men could, however, be over-estimated. Some scientists with a knowledge of law might conceivably prove to be a nuisance; on the other hand, some acquaintance with the main principles underlying the law might be desirable.

Mr. C. Harold Wright, an agricultural chemist of Fiji, also read an interesting paper on "The Change of the Refractive Indices of Fixed Oils with Temperature."

EDINBURGH AND EAST OF SCOTLAND SECTION.

There was a good attendance of members at the opening meeting of the Edinburgh and East of Scotland Section of the Society of Chemical Industry, under the chairmanship of Dr. S. Jordan.

In the course of his address Dr. Jordan dealt with the original recognition of catalytic action by Berzelius, and the general characteristics common to reactions of this class. The discovery of the organic catalysts or enzymes was described in greater detail, showing how they were eventually recognised by Moritz Traube to act in the same way as the inorganic catalysts. The principal

manufacturing processes in which enzymes are made use of were discussed, special attention being paid to processes where the older empirical methods were giving place to methods based on the results of scientific investigation. The influence of enzymes in the tanning industry was referred to, and particularly the modern substitutes for the old puering process. Recent developments in the application of enzymes, or of the bacteria and moulds producing them, were described, among them the preparation of acetone by the action of ferments on starch, and the treatment of distillery waste as devised by Effront and carried out at Nesle, in France, whereby large quantities of organic products are recovered from what was formerly an inconvenient waste product. Lastly, the probable course of future developments in enzyme chemistry was briefly sketched, culminating in the possibility of the synthesis on the large scale of complex organic compounds by taking advantage of the reversibility of the catalytic processes induced by the enzymes, and in the synthesis of the enzymes themselves when their constitution has been fully investigated.

THE SPECTROSCOPE IN SCIENCE.

AN interesting paper was read at the Society of Arts on Friday evening (November 7) before the Technical Inspection Association by Professor Baly, C.B.E., F.R.S. (of the University, Liverpool), on the subject of "The Spectroscope in the Science of To-day," the chair being occupied by the President of the Association, Mr. A. H. Collinson, C.B.E., M.Inst.C.E.

Professor Baly dwelt upon the extreme importance of the spectroscope in all research work, giving instances of its extended use by three independent groups of scientific men—viz., astronomers, chemists, and physicists; but the line of demarcation between these respective groups was so defined that very little information as to the work done by any one group was known to either of the others. Professor Baly urged the importance of the extended use of the spectroscope in all branches of scientific investigation, and he believed the time was approaching when it would be in daily use by the commercial exponents of applied science, as much as by those working in the realms of pure science.

The lecture was illustrated by lantern slides, and was received by the members of the Association with much appreciation, some of them having already made use of the spectroscope for investigations in workshop practice.

The President, in proposing a vote of thanks to the lecturer, pointed out the uses that might be made of this instrument for the detection of impurities in metal—for instance, the presence of lead in brass,—and asked whether it was impossible to use the spectroscope for quantitative analysis.

Mr. Humphry (lately chief analyst to the Government Inspector of Steel at Sheffield), Mr. Perry (chemist to the Inspection Department at the Royal Arsenal, Woolwich), Messrs. Wilson, Wade, and Davey, all congratulated Professor Baly on his paper, and referred to the uses that they had themselves made of the spectroscope in the work of investigation. Mr. Perry, in particular, pointed out that if the facts claimed by Professor Baly as having been definitely ascertained in regard to the composition of the nebulae in space could be relied upon—viz., that all the known so-called "elements" were by natural processes evolved from hydrogen and helium; with possibly a third not yet discovered on the earth and for the present named nebulium—it would appear that an epoch-making

change in thought in regard thereto was at hand, even to the extent of admitting that the dream of the old alchemists of the transmutation of metals was possible of realisation.

Professor Baly, in his reply, admitted that there was this possibility, and, in regard to the President's inquiry, stated that quantitative analyses would be possible if the spectroscope were more generally studied in the schools and laboratories of the country, and he urged that it should be one of the subjects taught to every student intending to graduate in applied science.

THE GERMAN POTASH SITUATION.

THE law passed by the German National Assembly last April for the regulation of the potash industry stipulates that a sales community shall be formed by producers of potash. In accordance with this provision the members of the Potash Syndicate met at Berlin on October 17 and constituted the Deutsche Kali Syndikat, G. m. b. H., for this purpose with a share capital of 1,500,000 marks (£75,000. par value). All the existing members of the Syndicate and the so-called special works have joined the new company, and the agreement entered into by the constituents has to be submitted for approval to the "Imperial" Potash Board created under the above-mentioned law. All the directors of the old syndicate, with the exception of one who has migrated to Holland, have been elected as the board of directors of the new company, and at the next meeting, when the approval of the agreement by the Potash Board is expected, additions to the directors will be made in the form of the election of two representatives of the workmen, one for the officials (staff), and one representing the interests of consumers.

It was mentioned at the meeting that the sales of pure potash (K_2O) in the first nine months of the present year had been less by 300,000 tons than in the corresponding period of 1918, and the prospects for the final quarter are unfavourable in consequence of the scarcity of coal and the inadequacy of the rail transport facilities. German agriculture and industry are suffering from these difficulties, as it is impossible approximately to meet their requirements in potash. Having regard to the importance of supplying domestic agriculture with potash salts it was stated that exports are being kept within very moderate limits. As a consequence the potash industry is neither able to contribute sufficiently towards an increase in agricultural products at home nor to utilise the immeasurable mineral resources, which are in increasing request all over the world, in order to cause the mark currency to appreciate and pay for urgent food products and raw materials. Moreover, the workmen have put forward new demands which cannot be fulfilled, and the prices of coal and other materials have again considerably advanced in the past few weeks.

Since the above meeting it is reported that the Americans, who had been opposed to a potash contract with Germany in expectation of receiving deliveries from France, are now pressing for the conclusion of a contract with the Potash Syndicate. But owing to the difficulties set forth at the Berlin meeting it is only possible for the Syndicate to export a small quantity, and it is even stated that it has so far been impossible to export the tonnage represented by the contract entered into for the delivery of 25,000 tons to England, as no railway rolling-stock is available for the ports of shipment, and no improvement in this respect is expected in the immediate future.

BRITISH OVERSEAS CHEMICAL TRADE IN 1918.

(Concluded from page 478.)

WE give below extracts from the annual statement of the trade of the United Kingdom with foreign countries and British Possessions in 1918, compiled by the Customs and Excise Department. The figures relating to the chemical and allied trades will be found much more useful than those given in the monthly Board of Trade returns, owing to the detailed analysis of the countries of origin of imported, and the destinations of exported, chemical products. Each product is specified separately, together with the extent of the trade done with the more important countries, the corresponding figures for 1917 being in parentheses.

EXPORTS.

Candles.—Netherlands, 2cwt. (45cwt.); Belgium, 652cwt. (974cwt.); France, 7,853cwt. (57,165cwt.); Portugal, 717cwt. (1,334cwt.); Portuguese East Africa, — (293cwt.); Canary Islands, 400cwt. (589cwt.); Spanish North Africa, 580cwt. (7,967cwt.); Morocco, 1,478cwt. (43,510cwt.); Costa Rica, — (32cwt.); Ecuador, 565cwt. (9,714cwt.); Peru, 859cwt. (4,163cwt.); Chili, 51cwt. (849cwt.); Bolivia, 165cwt. (2,453cwt.); Argentine Republic, 1,423cwt. (10,564cwt.); other foreign countries, 2,543cwt. (14,540cwt.); Channel Islands, 1,603cwt. (2,805cwt.); Gibraltar, 328cwt. (729cwt.); British West Africa, 3,327cwt. (10,754cwt.); Cape of Good Hope, 76cwt. (155cwt.); Bombay (including Karachi), 178cwt. (1,329cwt.); Madras, 427cwt. (265cwt.); Bengal, Assam, Bihar, and Orissa, 8cwt. (592cwt.); Burmah, 16cwt. (439cwt.); New Zealand, 208cwt. (2,779cwt.); British West Indies, 146cwt. (778cwt.); other British Possessions, 2,294cwt. (6,520cwt.); total, 25,899cwt. (181,337cwt.).

Glue, Size, and Gelatine.—Sweden, 26cwt. (633cwt.); Norway, 40cwt. (1,086cwt.); Netherlands, — (976cwt.); Belgium, — (1cwt.); France, 2,129cwt. (1,457cwt.); China, 804cwt. (2,870cwt.); Japan, 586cwt. (1,314cwt.); United States, 1,425cwt. (33,639cwt.); other foreign countries, 1,375cwt. (8,515cwt.); Cape of Good Hope, 1,240cwt. (2,933cwt.); British East Indies, 965cwt. (10,552cwt.); Australia, 3,822cwt. (7,611cwt.); New Zealand, 212cwt. (671cwt.); Canada, 2,375cwt. (33,011cwt.); other British Possessions, 3,210cwt. (5,820cwt.); total, 18,209cwt. (111,089cwt.).

Basic Slag.—Channel Islands, 1,065 tons (519 tons); Cape of Good Hope, — (350 tons); Ceylon, — (319 tons); British Guiana, — (380 tons); other British Possessions, — (253 tons); total, 1,065 tons (1,825 tons).

Sulphate of Ammonia.—Sweden, — (300 tons); Norway, — (13,826 tons); Netherlands, — (3,589 tons); Java, — (6,480 tons); Belgium, 343 tons (235 tons); France, 7,693 tons (12,159 tons); French West Indies, — (300 tons); Portugal, 251 tons (697 tons); Spain, — (4,945 tons); Canary Islands, — (85 tons); Italy, 3,351 tons (1,004 tons); Japan, — (4,050 tons); United States, — (1,513 tons); Cuba, — (200 tons); other foreign countries, 10 tons (5 tons); Channel Islands, 974 tons (302 tons); Mauritius, 657 tons (4,208 tons); Ceylon, — (390 tons); Hong Kong, — (244 tons); British West Indies, 2,653 tons (2,470 tons); British Guiana, 2,950 tons (4,258 tons); other British Possessions,

268 tons (1,671 tons); total, 19,150 tons (62,931 tons).

Superphosphates.—Channel Islands, 2,544 tons (2,433); Cape of Good Hope, — (700 tons); Natal, — (71 tons); other British Possessions, 3 tons (—); total, 2,547 tons (3,204 tons).

Manures, Unenumerated.—Norway, — (12 tons); Netherlands, — (2,901 tons); Belgium, 80 tons (—); France, 25,178 tons (5,996 tons); French West Indies, — (886 tons); Portugal, — (1,257 tons); Spain, 2 tons (15 tons); Italy, 1,100 tons (123 tons); United States, 746 tons (5,071 tons); other foreign countries, 100 tons (30 tons); Channel Islands, 8,484 tons (8,020 tons); Natal, 5 tons (63 tons); Mauritius, 150 tons (274 tons); Ceylon, — (406 tons); New Zealand, 1 ton (3 tons); Canada, — (29 tons); British West Indies, 1,338 tons (1,735 tons); British Guiana, 97 tons (135 tons); other British Possessions, 46 tons (433 tons); total, 37,327 tons (27,389 tons).

Methylic Alcohol.—France, — (9,656 gallons); other foreign countries, 5,306 gallons (6,769 gallons); British Possessions, 498 gallons (911 gallons); total, 5,804 gallons (17,336 gallons).

Barytes.—Russia, — (2,170cwt.); France, 22,445cwt. (46,327cwt.); United States, 6,000cwt. (13,600cwt.); other foreign countries, 1,858cwt. (7,864cwt.); British Possessions, 1,066cwt. (5,159cwt.); total, 31,369cwt. (75,120cwt.).

White Lead.—Russia, — (8,446cwt.); Denmark, — (440cwt.); Netherlands, 20cwt. (100cwt.); France, 16,200cwt. (5,294cwt.); Portuguese East Africa, 43cwt. (153cwt.); China, 70cwt. (1,341cwt.); United States, — (185cwt.); Uruguay, 5cwt. (247cwt.); Argentine Republic, 10cwt. (3,995cwt.); other foreign countries, 320cwt. (4,355cwt.); Cape of Good Hope, 854cwt. (3,114cwt.); Natal, 341cwt. (2,307cwt.); Transvaal, 128cwt. (1,909cwt.); Bombay (including Karachi), 2,113cwt. (10,150cwt.); Madras, 4cwt. (217cwt.); Bengal, Assam, Bihar, and Orissa, 743cwt. (9,630cwt.); Burmah, 37cwt. (2,442cwt.); West Australia, — (1,330cwt.); South Australia, — (2,171cwt.); Victoria, 200cwt. (9,548cwt.); New South Wales, 1,031cwt. (14,365cwt.); Queensland, — (5,636cwt.); Tasmania, — (284cwt.); New Zealand, 390cwt. (11,040cwt.); Canada, — (119cwt.); other British Possessions, 1,455cwt. (5,890cwt.); total, 23,964cwt. (104,708cwt.).

Zinc Oxide.—Russia, — (567cwt.); France, 520cwt. (2,720cwt.); Philippine Islands, — (87cwt.); Peru, — (782cwt.); Chili, 78cwt. (1,904cwt.); Brazil, 111cwt. (6,059cwt.); other foreign countries, 982cwt. (2,393cwt.); British India, 328cwt. (2,671cwt.); Straits Settlements, 126cwt. (619cwt.); Australia, 145cwt. (332cwt.); Canada, 11cwt. (23cwt.); other British Possessions, 957cwt. (1,702cwt.); total, 3,258cwt. (19,859cwt.).

Painters' Colours and Materials, Unenumerated.—Russia, — (15,092cwt.); Sweden, 485cwt. (3,927cwt.); Norway, 3,048cwt. (9,304cwt.); Denmark, 574cwt. (8,219cwt.); Netherlands, 272cwt. (8,974cwt.); France, 67,575cwt. (79,408cwt.); Portugal, 12,100cwt. (18,887cwt.); Spain, 6,739cwt. (22,341cwt.); Italy, 3,438cwt. (11,554cwt.); Turkey, 59cwt. (82cwt.); China, 6,870cwt. (25,654cwt.); Japan, 4,537cwt. (19,239cwt.); United States, 23,314cwt. (47,691cwt.); Philippine Islands, 2,252cwt. (6,963cwt.); Cuba, 597cwt. (4,183cwt.); Peru, 3,543cwt. (12,140cwt.); Chili, 8,415cwt. (36,534cwt.); Brazil, 16,442cwt. (34,881cwt.); Uruguay, 1,875cwt. (4,766cwt.); Argentine Republic, 18,923cwt. (41,933cwt.); other foreign countries,

19,588cwt. (41,906cwt.); Egypt, 22,396cwt. (28,363cwt.); Cape of Good Hope, 27,487cwt. (39,674cwt.); Natal, 13,070cwt. (20,790cwt.); Transvaal, 5,866cwt. (11,393cwt.); Bombay (including Karachi), 41,247cwt. (95,879cwt.); Madras, 3,132cwt. (8,480cwt.); Bengal, Assam, Bihar, and Orissa, 23,831cwt. (61,612cwt.); Burmah, 6,216cwt. (15,964cwt.); Straits Settlements, 12,680cwt. (26,294cwt.); Ceylon, 4,714cwt. (14,359cwt.); Hong Kong, 10,198cwt. (20,732cwt.); West Australia, 643cwt. (1,719cwt.); South Australia, 1,596cwt. (4,108cwt.); Victoria, 8,914cwt. (17,461cwt.); New South Wales, 8,818cwt. (26,918cwt.); Queensland, 1,518cwt. (2,583cwt.); Tasmania, 131cwt. (844cwt.); New Zealand, 7,646cwt. (24,850cwt.); Canada, 2,625cwt. (11,036cwt.); British West Indies, 3,414cwt. (7,275cwt.); other British Possessions, 21,848cwt. (46,852cwt.); total, 428,636cwt. (940,864cwt.).

Salt, Rock and White (except Table Salt).—Sweden, — (2,230 tons); Norway, 49,855 tons (58,343 tons); Denmark, 4,819 tons (4,139 tons); Iceland and Greenland, 7,328 tons (9,381 tons); German West Africa, 7,165 tons (3,590 tons); Netherlands, 2,177 tons (14,863 tons); Belgium, 134 tons (—); Belgian Congo, 4,824 tons (6,905 tons); France, 8,264 tons (6,159 tons); French West Africa, 9,053 tons (7,916 tons); United States, 17,743 tons (15,581 tons); Brazil, 8,931 tons (6,677 tons); other foreign countries, 9,270 tons (7,247 tons); British West Africa, 48,059 tons (56,619 tons); Bombay (including Karachi), 280 tons (102 tons); Madras, — (3 tons); Bengal, Assam, Bihar, and Orissa, 18,878 tons (26,839 tons); Burmah, 35 tons (10,982 tons); West Australia, 10 tons (186 tons); South Australia, 41 tons (54 tons); Victoria, 29 tons (75 tons); New South Wales, 430 tons (1,722 tons); Queensland, 24 tons (63 tons); New Zealand, 9,316 tons (9,232 tons); Canada, 29,714 tons (38,484 tons); British West Indies, 6,337 tons (7,607 tons); other British Possessions, 12,556 tons (5,709 tons); total, 255,272 tons (300,708 tons).

Soft Soap.—France, 16,750cwt. (60,419cwt.); other foreign countries, 5,130cwt. (8,552cwt.); British Possessions, 7,476cwt. (12,265cwt.); total, 29,356cwt. (81,236cwt.).

Household and Laundry Soap.—Norway, 1,826cwt. (15,275cwt.); Netherlands, 104cwt. (109,252cwt.); Dutch Indies, 33,930cwt. (135,832cwt.); France, 105,307cwt. (448,634cwt.); Algeria, 18,057cwt. (54,763cwt.); French West Africa, 11,868cwt. (13,199cwt.); Madagascar, 10,791cwt. (7,250cwt.); Spain, 6,371cwt. (4,174cwt.); Canary Islands, 1,312cwt. (5,025cwt.); Spanish North Africa, 10,745cwt. (10,157cwt.); Italy, 87,599cwt. (149,725cwt.); Turkey, 2,088cwt. (1,922cwt.); Tunis, 10,648cwt. (5,446cwt.); Morocco, 41,435cwt. (24,231cwt.); Siam, 15,840cwt. (18,529cwt.); China, 67,119cwt. (156,025cwt.); Philippine Islands, 2,075cwt. (21,226cwt.); Panama, 8,245cwt. (19,482cwt.); Ecuador, 6,208cwt. (4,108cwt.); Peru, 9,962cwt. (13,247cwt.); Chili, 14,894cwt. (20,873cwt.); Brazil, 3,681cwt. (7,044cwt.); Argentine Republic, 17,119cwt. (16,012cwt.); other foreign countries, 96,513cwt. (80,305cwt.); Gibraltar, 19,049cwt. (20,356cwt.); Malta and Gozo, 30,749cwt. (8,315cwt.); Cyprus, 12,220cwt. (5,016cwt.); Egypt, 72,325cwt. (63,097cwt.); Gold Coast, 32,960cwt. (46,739cwt.); Nigeria, 56,345cwt. (81,628cwt.); Cape of Good Hope, 561cwt. (3,686cwt.); Natal, 178cwt. (414cwt.); British East Africa, 25,165cwt. (29,580cwt.); Mauritius, 18,310cwt. (18,929cwt.); Bombay (including Karachi), 109,787cwt. (190,623cwt.);

Madras, 19,206cwt. (36,119cwt.); Bengal, Assam, Bihar, and Orissa, 26,205cwt. (45,509cwt.); Burmah, 23,873cwt. (100,851cwt.); Straits Settlements, 74,515cwt. (82,997cwt.); Hong Kong, 26,485cwt. (38,231cwt.); British West Indies, 74,617cwt. (109,824cwt.); British Guiana, 24,064cwt. (23,406cwt.); other British Possessions, 60,744cwt. (77,878cwt.); total, 1,291,095cwt. (2,324,934cwt.).

Polishing and Scouring Soap.—Foreign countries, 1,512cwt. (4,124cwt.); British Possessions, 3,733cwt. (3,780cwt.); total, 5,245cwt. (7,904cwt.).

Soap Powder.—Foreign countries, 3,324cwt. (7,626cwt.); British South Africa, 4,432cwt. (6,189cwt.); Australia, 11cwt. (23cwt.); New Zealand, 1,673cwt. (4,557cwt.); other British Possessions, 1,355cwt. (2,383cwt.); total, 10,795cwt. (20,778cwt.).

Toilet Soap.—Java, 5,649cwt. (7,823cwt.); Belgium, 255cwt. (379cwt.); France, 5,905cwt. (12,077cwt.); Italy, 738cwt. (1,531cwt.); China, 1,261cwt. (4,254cwt.); Japan, 761cwt. (873cwt.); United States, 519cwt. (1,866cwt.); Brazil, 292cwt. (200cwt.); Argentine Republic, 604cwt. (1,160cwt.); other foreign countries, 7,476cwt. (15,399cwt.); Egypt, 7,911cwt. (4,727cwt.); Cape of Good Hope, 1,189cwt. (1,713cwt.); Natal, 1,884cwt. (2,348cwt.); Transvaal, 432cwt. (696cwt.); Bombay (including Karachi), 13,662cwt. (12,240cwt.); Madras, 1,705cwt. (1,986cwt.); Bengal, Assam, Bihar, and Orissa, 5,088cwt. (4,978cwt.); Burmah, 1,693cwt. (4,089cwt.); Straits Settlements, 1,162cwt. (962cwt.); Ceylon, 1,080cwt. (1,541cwt.); Australia, 1,536cwt. (3,456cwt.); New Zealand, 2,493cwt. (3,104cwt.); Canada, 837cwt. (1,045cwt.); other British Possessions, 7,899cwt. (9,729cwt.); total, 72,031cwt. (98,176cwt.).

Soap, Unenumerated (including Cottonseed Oil Soap).—Foreign countries, 3,076cwt. (1,422cwt.); British Possessions, 1,348cwt. (2,035cwt.); total, 4,424cwt. (3,457cwt.).

Spirits, British and Irish, Methylated.—Foreign countries, 3,468 proof gallons (1,185 gallons); British Possessions, 3,616 gallons (8,312 gallons); total, 7,084 gallons (9,497 gallons).

TURPENTINE CONTROL.

IN reference to the following Order made by the Minister of Munitions, namely:—The Turpentine, etc., Control Order, 1918, dated January 25, 1918, which was by the Turpentine, etc., Control (Partial Suspension) Order, 1919, dated March 18, 1919, suspended until further notice except in so far as related to turpentine substitute as defined in the said Order, the Minister of Munitions hereby orders as follows:—

(1.) The operation of the Turpentine, etc., Control Order, 1918, is hereby suspended on and after November 1, 1919, until further notice in so far as relates to turpentine substitute as defined in the said Order—namely, mineral turpentine, white spirit, white oil, or any product of petroleum under whatever name sold or known (except motor spirit and benzene) capable of being used as a substitute for spirits of turpentine.

(2.) Such suspension shall not affect the previous operation of the said Order or the validity of any action taken thereunder or the liability to any penalty or punishment in respect of any contravention or failure to comply with the said Order prior to such suspension or any proceedings in respect of such penalty or punishment.

(3.) This Order may be cited as the Turpentine, etc., Control (Complete Suspension) Order, 1919.

ITEMS OF INTEREST.

CHINA CLAY DEVELOPMENT WORK.—Dr. Malcolm McLaren has been engaged by Tehidy Minerals, Ltd., to make a detailed examination of their china clay areas and deposits, with a view to their exploitation on a large scale.

NEW CAPITAL ISSUES.—The Board of Trade, acting on behalf of the Treasury, has granted a general licence, under the Defence of the Realm Regulation 30F, permitting issues of capital for which a licence from the Treasury is required under that regulation.

NATIONAL UNION OF SCIENTIFIC WORKERS.—Dr. Evans, F.R.S., Dr. Norman Campbell, and Mr. Eric Campbell were elected president, treasurer, and secretary respectively of the National Union of Scientific Workers at the annual council meeting of that body on Saturday last.

AIRCRAFT SUB-COMMITTEE ON CHEMICALS.—Mr. Hugh Griffiths, B.Sc., A.R.C.Sc., 15, New Bridge Street, London, E.C.4., has been elected as the British Chemical Trade Association's representative to the "Aircraft Sub-Committee on Chemicals" of the British Engineering Standards Association.

ZINC AND ZINC DUST PRICES.—The price of Australian high-grade zinc dust (88.92 per cent. metallic zinc) is maintained at £75. per ton. Australian electrolytic zinc (99.95 per cent. purity) is unchanged at £42. per ton, f.o.b. Australia, for direct shipment to New Zealand, India, South Africa, and the Far East.

NEW ZEALAND IMPORTATION OF SACCHARIN.—Under an Order-in-Council of August 19, the importation is prohibited into the Dominion of New Zealand, except with the consent of the Minister of Customs, of saccharin which has not been manufactured or produced in some part of the British Dominions.

MALAY TIN EXPORTS.—The export of tin from the Federated Malay States in October amounted to 3,221 tons, as against 3,161 tons in September and 2,870 tons in the corresponding month last year. The total for ten months amounted to 31,482 tons, compared with 31,206 tons in 1918 and 33,008 tons in 1917.

BUSINESS NOTICE.—Messrs. Pemberton, Pollard and Co., of St. Bartholomew's House, Fleet Street, E.C., inform us that owing to the increase of their chemical business they have turned the business into a limited liability company under the name of Pemberton, Ansell and Co. Limited, with a nominal capital of £5,000.

GEOLOGICAL SURVEY.—The Geological Survey of Great Britain and Museum of Practical Geology, Jermyn Street, S.W., have been transferred for administrative purposes from the Board of Education to the Department of Scientific and Industrial Research as from November 1. Correspondence with reference to the work of the Survey should be addressed as heretofore to the Director of the Survey and Museum, Jermyn Street, S.W.

ABERDEEN AND THE CHEMICAL TRADE.—Aberdeen Chamber of Commerce have started the issue of a new official monthly organ, and in the first number reference is made to the local chemical industry. It is stated that Aberdeen being the centre for a large and important agricultural district, superphosphates and other chemical fertilisers are manufactured locally to a very considerable extent by several firms; while it is also mentioned that one of these firms manufactures coal-tar products and sulphate of ammonia from the residual products of various gasworks in the districts, while they also make sulphuric acid as well as superphosphates and other fertilisers.

IMPORT AND EXPORT LICENCES.—The Export Licence Department has now removed from 1, Queen Anne's Gate Buildings, S.W.1, and has been amalgamated with the Department of Import Restrictions at 22, Carlisle Place, S.W. 1. The combined Department will be under the charge of the Assistant Secretary, Industries and Manufactures Department, Board of Trade. Applications for licences in respect of all commodities (with the exceptions stated below) and all inquiries relating thereto should be addressed to the Director, Imports and Exports Licensing Section, Board of Trade, 22, Carlisle Place, S.W. 1. Applications for licences for the import of dye-stuffs should be addressed, as hitherto, to the Secretary, Trade and Licensing Sub-committee, Danlee Buildings, Spring Gardens, Manchester; and for licences for the export of coal to the Controller, Coal Mines Department, Holborn Viaduct Hotel, E.C.1.

CONTROLLED ESTABLISHMENTS.—The *London Gazette* publishes an Order of the Ministry of Munitions revoking all Orders made in pursuance of Section 4 of the Munitions of War Act, 1915, and Section 1 of the Munitions of War (Amendment) Act, 1916, declaring that the establishments specified in the said Orders were controlled establishments under the provision of the Acts.

IMPORTATION OF NON-BRITISH DYES INTO STRAITS SETTLEMENTS PROHIBITED.—The Straits Settlements Government *Gazette* of September 16 contains copy of a Government Notification, No. 1406, of that date, stating that the importation into the colony of dyes not manufactured in the British Empire is prohibited, unless a licence has first been obtained from the Governor and the importation is in accordance with the provisions of such licence.

CHEMICAL WORKERS' WAGES.—Further wages advances awarded by the Court of Arbitration were announced on Friday of last week. Salt and chemical trade workers aged eighteen and over are to receive an increase of 5s. a week, based on a week of six days or six shifts. The claim was for 15s. By consent of both parties, claims for the consolidation of all war bonuses and percentages into wages, and the establishment of a forty-four-hour week for all workers, were withdrawn at the hearing.

RADIUM IN CANADA.—*Reuter's* Toronto correspondent states that pitchblende has been found in the township of Butt, in the Nipissing district. An assay made by New York experts showed the pitchblende to be unusually rich in uranium. According to the Provincial Department of Mines, this is the second occurrence of radium bearing mineral reported to the Canadian Bureau of Mines since the Ontario Legislature offered a reward of 25,000 dollars for the discovery of radium in Ontario in commercially useful quantities.

WORKERS' WELFARE IN THE GALVANISING TRADE.—The Home Secretary gives notice that, in pursuance of the powers conferred on him by Section 7 of the Police, Factories, Etc. (Miscellaneous Provisions) Act, 1916, of making orders for securing the welfare of the workers employed in factories or workshops, he proposes to make an order to apply to all factories and workshops in which is carried on the process of galvanising. Copies of the draft order and the notice may be obtained on application to the Home Office, Whitehall, London, S.W. 1.

PHYSICAL CHEMISTRY AT CAMBRIDGE.—The Council of the Senate of Cambridge University, while putting forward on Tuesday a grace for the appointment of a syndicate to consider the allocation and the administration of the benefaction of the British oil companies, gave the opinion, after consultation with Professor Sir W. J. Pope, that it was desirable, in the interests of the Department of Chemistry, to take steps at once for the establishment of a professorship of physical chemistry, the stipend of which would be furnished out of the benefaction. The stipend suggested is £1,000. The Council recommended accordingly.

A NEW FERRO-ALLOY.—The Shawinigan Electro-Products Co., Baltimore, has produced a new ferro-alloy containing silicon and aluminium. The process of manufacture, which is by the electric furnace, allows the relative proportions of silicon and aluminium to be varied to any desirable extent, as long as the silicon content remains near 50 per cent. This alloy is intended for use in steel making, as a deoxidising agent. The combination is said to provide silicon and aluminium at a lower price than they can be obtained separately. A number of steel makers are now experimenting with this alloy.—*Technical Review*.

JAPANESE CELLULOSE INDUSTRY.—According to the Japanese Press, the following developments are taking place in the cellulose industry: Several Japanese business men have been asked to join in promoting a concern for the amalgamation of the 130 small cellulose works in Tokyo, the new concern to be capitalised at yen 2,000,000. A prominent Japanese factory owner has proposed the formation of a concern to be capitalised at yen 12,500,000, which is to amalgamate the present factory owned by him and the Sakai and Aboshi factories, the capital to be increased to yen 15,000,000 if and as necessary. This scheme will be extended to cover all the factories in the country. Another version of the preceding is that eight large concerns are to amalgamate shortly. The capital of the joint concern is to be yen 12,500,000. The joint concern is to be called the "Dai Nippon Seruroido Kabushiki Kaisha" (Great Japan Celluloid Company).

CHINESE INDIGO.—A large production of liquid indigo is expected in China this year. Owing to the very poor 1918 crop greater acreage was devoted to indigo plants. The crop, which is said to be an average good one, was chiefly affected by excessive rain in certain low-lying districts early in the season.

DIRECTOR OF COTTON RESEARCH.—Dr. W. A. Crossley, professor of chemistry at King's College, London, has been appointed director of research by the British Cotton Industry Research Association. Dr. Crossley is a doctor of science of Manchester University, and a doctor of physics of Würzburg. He was at one time professor of chemistry and practical research in the laboratory of the Pharmaceutical Society. He took up the appointment at King's College in 1914, but it was in abeyance during the war and he became commandant and superintendent of experiments at the R.E. experimental station at Porton with the rank of Lieutenant-Colonel.

PARAFFIN WAX DISCOVERY.—Investigations of a deposit of solid paraffin wax found in Lancashire coal have been explained to the Manchester Geological and Mining Society. Captain F. S. Sinnatt and Mr. Barash have conducted the inquiries, and the former, in reading his paper, said that the deposit was one of the most valuable compounds in the world. The substance was found in the Arley mine of the Garswood Hall Colliery Company, Bryn, 33 years ago. At a depth of 440 yards down the No. 2 pit the workings extended in a southerly direction for about seven hundred yards, and amongst several "faults" were some tons of this substance in the coal. It was treated as waste product, except for the sample investigated, which probably survived as a curiosity. Two years ago the tests were started, and the substance was declared to be unchanged. The ordinary paraffin wax melts at about 40° C. The example found in the Lancashire coal pit melts at about 93°, and it is this factor that makes the compound so valuable.

WOOD PRESERVATION.—In a paper on the "Preservation of Mine Timber," read before the Manchester Geological and Mining Society, Mr. N. T. Williams gave the following figures as to the relative costs of various processes:—The open tank treatment with creosote worked out approximately at 2d. per cubic foot; the brush treatment at 3d. per cubic foot; and the cylinder treatment under pressure at 7½d. for 10lb. of creosote per cubic foot. That system of treating timber would, the author said, be very expensive for collieries, and the open tank process would be the most suitable. The treatment with zinc chloride would be much cheaper—about a third of the cost with creosote. Mr. Williams said that he had never known an instance of brittleness being due to the treatment of the timber, unless it is subjected to a high temperature. If care is taken that the oil in the course of boiling does not exceed a temperature of 220° F., the tests for bending and for compression seem to work out fairly well. The treated timber is usually about 10 per cent. weaker than the untreated wood.

THE ROYAL SOCIETY AWARDS.—The King has been pleased to approve of the following awards this year by the President and Council of the Royal Society:—A Royal Medal to Professor J. B. Farmer, F.R.S., for his notable work on plant and animal cytology. A Royal Medal to Mr. J. H. Jeans, F.R.S., for his researches in applied mathematics. The following awards have also been made by the President and Council:—The Copley Medal to Professor W. M. Bayliss, F.R.S., for his contributions to general physiology and to bio-physics. The Davy Medal to Professor P. F. Frankland, F.R.S., for his distinguished work in chemistry, especially that on optical activity and on fermentation. The Sylvester Medal to Major P. A. MacMahon, for his researches in pure mathematics, especially in connection with the partition of numbers and analysis. The Hughes Medal to Dr. C. Chree, F.R.S., for his researches on terrestrial magnetism. The following is a list of those recommended by the President and Council of the Royal Society for election to the Council at the anniversary meeting on December 1:—President: Sir J. J. Thomson, O.M., M.A., D.Sc., LL.D. Treasurer: Sir David Prain, C.M.G., C.I.E. Secretaries: Mr. W. B. Hardy, M.A., and Mr. J. H. Jeans, M.A. Foreign Secretary: Professor W. A. Herdman, D.Sc. Other members of the Council: Mr. J. Barcroft, C.B.E., Mr. C. V. Boys, Sir J. J. Dobbie, LL.D., Sir F. Dyson, M.A., Professor J. B. Farmer, M.A., Sir W. M. Fletcher, K.B.E., Professor F. W. Gamble, D.Sc., Sir R. T. Glazebrook, M.A., C.B., Professor J. W. Gregory, D.Sc., A. C. Haddon, Sc.D., Sir R. A. Hadfield, Bt., Sir A. B. Kempe, M.A., Sir W. J. Pope, M.Sc., K.B.E., S. H. C. Martin, M.D., Professor A. Schuster, Sc.D., Professor W. P. Wynne, D.Sc.

SODIUM CARBONATE MANUFACTURE IN CANADA.—Glass manufacturers in Canada have been largely dependent in the past upon the United States for their supplies of glass sand and sodium carbonate. However, according to the United States Bureau of Mines Report, the new plant at Amherstburg, Ontario, Canada, at which sodium carbonate is to be made by the Solvay process, is expected to supply all of Canada's needs for soda ash. The capacity of this plant is reported to be about 120 tons per day. Some glass sand is being secured from Oneida, Ontario, but it is said to be of an inferior grade, and only suitable for the manufacture of the cheaper grades of glassware.—*Board of Trade Journal.*

A BENEFICIAL ALKALI CONTRACT.—While in its financial aspect the deal for £4,000,000. with Lever Brothers is certainly one of considerable advantage to Brunner, Mond and Company, that company, says *The Financier*, will greatly benefit under a revised agreement relating to the supply of alkali for the soap-making requirements of Lever Brothers. The contract current during the war period under which Brunner, Mond and Company supplied alkali to Lever Brothers fixed a price which, in the abnormal condition then prevailing, was not remunerative, but we learn from unofficial sources, says our contemporary, that the revised agreement is very much more favourable to Brunner, Mond and Company, inasmuch as not only will it ensure satisfactory profit henceforth, but, being made retrospective, will recoup the company for war losses it may have sustained under the prior contract. Thus industrially, as well as financially, the deal with Lever Brothers is a very advantageous one for Brunner, Mond and Company, as will be fully realised once the significance of the agreements is understood.

DENMARK AND BRITISH CHINA CLAY.—H.M. Commercial Secretary at Copenhagen states that, owing to the cessation of export of British china clay during the war, Danish purchasers were subjected to great inconvenience and to considerable losses. One firm had several ships in England at the time of the prohibition, one of which was detained for over a year, although loaded. This represented a considerable pecuniary loss to the firm in question. As substitutes for the British clay, Swedish, Danish, and German clays were used, and, further, synthetic clay was produced by grinding and mixing certain ingredients. It is understood that the synthetic clay was not always reliable, as it was impossible to obtain the same consistency as in the natural clay, and when subjected to the high temperature of the furnaces a greater percentage of breakages occurred. Some firms have already received cargoes of British china clay since the Armistice, and it is considered that for the finest porcelain the British clay will supersede the synthetic product. It is considered, however, that the Swedish, Danish, and German clays (particularly a quality coming from Chemnitz), which are quite good for certain purposes, will find a considerable market in Denmark, unless the price of British clay becomes competitive again.

THIRTY YEARS AGO.

From the "Chemical Trade Journal" of November 16, 1889.

The Alkali Trade.—The zealous endeavour which has lately been made to revive the moribund Bleaching Powder Association in a new form has not been successful. At a meeting held in Liverpool on Thursday this week, the Chairman (Mr. Brock) had to confess with apparent sorrow that the committee had been unable to patch up the differences which had arisen, and that the proposal to unite upon a new basis of 25 per cent. reduction in the decomposition of salt all round had also failed. Therefore the Bleach Association, and with it the Acid Association, have become null and void. Both the manufacture and the market are now unmuzzled, and both combinations are practically at an end.

The Output of Coal.—The *Bulletin*, published by the Ministry of Public Works in France, contains an estimate of the total amount of coal extracted in the principal countries of Europe and in the United States during the year 1887. Great Britain and Ireland, of course, come first, with an output of nearly 165,000,000 tons, the cost price of which, at the pit's mouth, is put at a fraction over 4s. per ton. The United States come next, with an output of 118,000,000 tons, calculated at a cost price of 6s. 6d. per ton. Then follows Germany, with an output of 76,000,000 tons, estimated at a cost price of rather over 5s. a ton; followed by France, with an output of 21,000,000 tons, the cost price of which is no less than 8s. 6d. per ton.

LEGAL INTELLIGENCE.

Sir Alfred Mond's Libel Action.

A series of cases was in the list before Mr. Justice Lush at Glamorgan Assizes, in which Sir Alfred Mond and his brother, Mr. Robert Mond, chairman of the Mond Nickel Company, were concerned. In the first two cases Mr. Robert Mond and Sir Alfred Mond each claimed damages for libel, and an injunction against Mr. W. F. Brooks, a surgeon of Swansea, in respect of a speech made during the election last November. In view of the fact that the defendant had apologised, Sir Edward Carson, for the plaintiffs, intimated that there would be no need to swear in a jury. Sir Edward Carson explained that at a public meeting at Swansea the defendant alleged that Mr. Robert Mond was doing his best to get a German reinstated in a position at the Cape Copper Works, Swansea, from which he had been removed owing to the protests of the workmen. Defendant's comment on this alleged fact was, "Unless we get rid of this German influence in this country, in spite of the fact that thousands of our fellow-countrymen have been sacrificed, we have lost the war." Defendant spoke of the Mond Nickel Company trying to oust a Briton in favour of a "damned German," and concluded, "The leopard cannot change his spots nor the Ethiopian his skin, still less a German." Sir Edward Carson added that the action was brought not for money, but to vindicate character. Defendant had found the allegation was absolutely without foundation, and was prepared to make an apology, which plaintiffs would accept. Defendant would pay the costs of the action. Mr. Robert Mond having given evidence totally denying the truth of the allegation, counsel for the defendant acquiesced in the statement of Sir Edward Carson, adding that his client had spoken the words in good faith, believing them to be true.

In the course of the proceedings, Lord Moulton, head of the High Explosives Department, gave evidence. Examined by Sir Edward Carson, witness said that the first time he came in contact with Sir Alfred Mond was when Sir Alfred visited him at his Department, quite unsolicited, and told him that Brunner, Mond and Co., Ltd., were prepared to do everything they could for the Department, and that he (witness) might consider the whole of the company's resources at his disposal.

Sir Edward Carson: After that, were the whole resources of the company placed at your disposal?

Lord Moulton: Oh, yes. The next thing that happened was that the two technical directors, and I think the chemist and the engineer of the company, came to see me to ascertain what they could do. At the moment I had nothing for them, because the work I was doing was not at all suited to their work. The important moment, as far as high explosives were concerned, was when the War Office were persuaded to abandon the idea of using only T.N.T. and lyddite as high explosives and to accept mixtures with nitrate of ammonia. When I came to work out the resources that I had I found it would have been absolutely impossible to supply high explosives in sufficient quantities for the extent I saw the war was going to be unless this new type of explosive was adopted. Nitrate of ammonia was not being made in England at all. I could get a certain amount of nitrate of lime from Norway, where it was made electrically, and the first thing I asked Brunner, Mond to do was to undertake the conversion of this nitrate of lime into nitrate of ammonia. They did so at their works. Very soon the quantities which had looked so big, and which I could get from Norway, proved too small for the demand, and then Brunner, Mond set to work to find out another method to manufacture it direct. They worked out a most effective and ingenious method along the lines of the ammonia-soda processes which they worked so very largely. That was the great technical difficulty, but it stood by me all through the war. But in a month or two it was evident it must be supplemented. Brunner, Mond then worked out a very ingenious method which we worked on a very large scale, taking one of their works and a considerable part of another, and that for a long time satisfied the big demand. It was a demand which grew to hundreds of tons a day, and hundreds of tons a day is not easy to get manufactured. Throughout the whole of their technical staff worked on every problem that I put before them, and I cannot see how it would have been possible to get the enormous supplies of nitrate of ammonia which we required in any other way than by these methods. They finished at the end by inventing by far the best way of all. So good was it that we erected a very large factory—a factory which, were it completed and worked out to the full, would have given us 2,000 tons a week. It was

a new and direct process that was built under their supervision and from plans drawn up by their engineer. The difficulties were very great, because the salt is a most troublesome one. The solution of it is very strong and has unpleasant properties, and we had to learn that by experience, and it required a great deal of patience and continual work to get these various processes into practical work, because it was not a question of the laboratory—it was the very opposite extreme, it was production wholesale.

Sir Edward Carson: Then, I suppose, I may take it from that, Lord Moulton, that the work done by Brunner, Mond had a great effect on the necessary productions for the war? —Oh, yes; the whole of that side of the manufacture was practically in their hands. I should think they did four-fifths of it. When they manufactured so largely nitrate of lime by their second processes they had to convert it themselves into the nitrate of ammonia, and I was obliged to allow what we had from Norway to go to another firm to be converted. But the bulk of the manufacture always remained in their hands.

During that time was Sir Alfred Mond loyally doing his best for the country in every respect?—Indeed he was, and the whole of the directors. It was so deliberately the policy of the company that the directors had not to be even formally consulted when it was wanted. It was done as a matter of course, and I used to go down myself almost every two weeks. I could not possibly have had a more wholehearted support from any company.

Were you acquainted with Dr. Ludwig Mond?—Oh! yes. He was not only a very good scientific man himself, but he had in almost the largest measure that I ever knew the power of industrial production on scientific lines. The process which has made the fortune of the company, the ammonia-soda process, was thoroughly understood and quite familiar to chemists. But he worked at it for I am afraid to say how many years until he made it a very great practical success, and he had the same strong bent towards industrial chemistry which certainly was lacking in England. He invented a very remarkable nickel process whereby, I should think for the very first time, it was possible to extract a metal from its ore by means of a gas. It excited the greatest interest at the moment. At one time he was on the managing body of the research laboratory which he gave to the nation.

Were those processes that he invented and the businesses he constructed of great advantage to this nation?—Oh! yes. They kept the soda ash trade and developed it enormously. As for the nickel, I should think they had brought it all to England. Then he did a great deal of work also in the use of gases for gas engines.

So far as you can say, was he a loyal citizen to this country? —Oh! yes, indeed, he was. Such a question in his lifetime would have been too absurd.

Poison-gas Manufacture and Workmen's Compensation.

In the Court of Appeal on Monday, before Lord Justices Warrington and Atkin, and Mr. Justice Eve, the Sneyd Bycars Co., Ltd., appealed from an award of the Judge of the Burslem County Court, sitting as arbitrator under the Workmen's Compensation Act. The workman, Henry Dutton, was employed by the Sneyd Bycars Company, whose undertaking was controlled by the Ministry of Munitions during the war, to manufacture poison gas, and he was incapacitated by gas poisoning on July 5, 1916. At first he continued to receive his full wages, but after about eight weeks he was paid £1. 7s. 11d. a week until March or April, 1917, when he sufficiently recovered to do light work for a colliery company, and he received, in addition to his wages in that employment, half the difference between his wages before he was disabled and his then existing wages. In July, 1918, he again became incapacitated as a result of the poisoning, and he was again paid £1. 7s. 11d. a week until January 8, 1919. Since then he had been paid only 10s. a week, and he began these proceedings claiming compensation under the Act. It was admitted that the workman was suffering from a disease resulting from his employment that was not scheduled to the Act as an industrial disease, but the workman contended that the employers were estopped by their conduct from denying that the case came within the Act. This contention was based on the weekly payments made to the workman since his incapacity, which, apart from the first eight weeks when he received full wages, were until January, 1919, exactly equal in amount to the weekly compensation that would have been payable under the Act with the addition of 7s. a week subsistence money. It was also based on the facts that the workman, as he said, had signed receipts (which were not produced) for composition or compensation under the Act, that he had

also been required to sign about every month a declaration form issued by the Ministry of Munitions, called Munitions Finance Form W.C. 3; and that, latterly, he had had to give a receipt on a form issued by the Ministry, called Ministry Finance Form W.C.A. 3; and that, latterly, he had had to give that the estoppel was established, and he made an award in favour of the workman of £1. 1s. 3d. a week.

Lord Justice Warrington, who delivered judgment, said there was a serious question whether an agreement to pay compensation could be enforced unless it was also recorded under the Act. The operation of the Act was confined to a certain class of cases, and the parties could not by any form of estoppel or by agreement so enlarge the operation of the Act as to bring within it other cases, or to extend the limited statutory jurisdiction in those cases. Of course, if some particular fact alleged by either party was in issue, and either in accordance with the practice of the Court, as in the case of admissions on the pleadings, or by the application of some rule of law, it had to be taken to be as alleged, it would be so taken although the result might not be in accordance with the true state of the facts. The appeal must be allowed and an award made in the employers' favour.

Lord Justice Atkin and Mr. Justice Eve concurred.

Alleged Damage by Picric Acid Fumes.

The Official Referee, Mr. Edward Pollock, resumed in the Civil Court at the Leeds Town Hall, on Tuesday, the hearing of the arbitration case adjourned from last July between Richard Kershaw and Sarah E. Young, executors and trustees of the late Mr. Richard Kershaw, Crow Nest, Lightcliffe, near Halifax, and Messrs. Brooke's Chemicals, Limited. The former claimed damages amounting to £13,400 in respect of the alleged permanent depreciation of the Crow Nest estate owing to fumes and effluent emitted from the defendants' picric acid works in the vicinity.

Mrs. Young, in evidence, said that during the period from March, 1916, when the chemical works were started, to October, 1917, when she left Crow Nest, there was a gradual increase in the density of the fumes which swept across the grounds in whitish-yellow and copper-coloured clouds. The trees were very late in bursting into leaf, and the leaves were shrivelled by the fumes. She and others experienced great physical discomfort, their sensations being rather like those experienced in gas attacks during the war. A white fox-terrier was dyed yellow after running through the grass, and the white legs of cows browsing on the estate were also turned yellow. From a man-hole near the north front of the house white steam was sent up which burnt the grass all round. The water in the lake became orange coloured, all the fish were killed, and a white swan on the lake was tinted yellow. The house, added the witness, was not fit to live in at this time.

Miss A. M. Stearn, the nurse in attendance on the late Mr. Kershaw, said the fumes induced a burning sensation on the chest and smarting eyes. The fumes had a very bad effect upon her late patient, to whom it was necessary to administer stimulants at frequent intervals. When she went into the gardens to gather flowers, her hands were stained yellow.

Further evidence was given on Wednesday when the hearing was adjourned.

Shipment of Potato Starch.

A claim for damages for alleged breach of contract for the shipment of 102 tons of potato starch, came before Mr. Justice Roche in the Commercial Court of the King's Bench Division on Tuesday. The plaintiffs were Messrs. Charles Weis and Co., Ltd., of St. Mary Axe, London, E.C., and the action was brought against Northern Traffic, Ltd., Cannon Street, London.

Plaintiff's case, presented by Mr. Frederick Vanden Berg, was that in the month of March, 1919, defendants verbally contracted with them to ship 102 tons of potato starch direct from London to Paris at a freight of 105s. per ton. The freight was paid by plaintiffs in advance. Defendants, it was alleged, in breach of their contract, shipped the goods to Calais and thence forwarded them overland to Paris. The market rate for shipment of the goods from London to Paris via overland was not more than 80s. per ton, and plaintiffs claimed £127. 10s., the difference between the amount of freight they paid defendants, and the market rate.

Evidence was given for the plaintiffs that it was essential the goods should go by water all the way without transshipment.

Defendants admitted that they agreed to ship the potato starch from London to Paris, but denied that they agreed the shipment should be direct. Evidence was given that the

defendants agreed to give a quick service, but not a direct service, and it was stated that the vessel in question, s.s. *Aegir*, could not go direct to Paris. She was not built for the Paris service.

Mr. A. M. Talbot, for defendants, submitted that plaintiffs had suffered no damage. Plaintiffs got the goods in Paris and got them entirely undamaged, and very rapidly indeed.

His Lordship gave judgment for the plaintiff company for £102. with costs.

Chemical Merchant's Failure.

At the London Bankruptcy Court on Wednesday the first meeting of creditors was held of George Edward Newton, chemical merchant, of 74, Great Tower Street, E.C., and lately residing at 203, St. James's Road, Croydon.

The Official Receiver reported that the debtor commenced business in November, 1916, with a capital of £50., which sum he borrowed. The system of the business appeared to be to first obtain orders and then to purchase the goods. All his transactions were on a cash basis, therefore there was no need for capital. The business was quite a success for the first 18 months, and a profit of £3,000. was made. About June, 1918, owing to various restrictions on exports and the control of chemicals by the Government, profits fell off considerably, and the debtor cut down expenses by getting rid of his staff and managing the business himself; but the business continued to decline, and in November of last year it ceased altogether, when he had to go to moneylenders, the profits on his business having been tied up in stocks and his private house. In March last a moneylender began to press, and he sold his house at Croydon, together with his furniture, in order to pay off some of the claims. He also entered into negotiations to sell the business to a company which would have taken over the liabilities, but the moneylender would not wait, and instituted the present bankruptcy proceedings. The debtor was now acting as manager of the company at a weekly salary. He had not filed a statement of affairs, but he estimated his liabilities at £2,000.; and as regards assets, he had 10 tons of powdered arsenic and 313 tons of special vacuum salt—both of these items had been charged to a bank against loans. He attributed his failure to loss of business through shipping restrictions, control by the Government of chemicals, and stagnation of trade following the Armistice.

In reply to the Official Receiver, debtor said it was his intention to pay his creditors in full, because it was possible a friend would come to his rescue and provide a sum not exceeding £2,500, if bankruptcy could be avoided. But for pressure by a creditor, the bankruptcy proceedings would not have arisen. He was unable to submit a definite offer to the creditors at present.

Eventually it was resolved that Mr. David Hart, accountant, of 12, Regent Street, W., should be appointed trustee of the estate to act in conjunction with a committee of inspection consisting of Mr. E. F. Warriner, Mr. F. Phipps, and Mr. C. W. Granville.

Munitions Official's Theft of Lead.

At the Central Criminal Court on Monday, before the Common Serjeant, the trial was concluded of Albert Evan Whatcott, 29, metal worker, on the indictment charging him with stealing 40 tons of lead, the property of the Ministry of Munitions. The jury found the defendant guilty, and the Common Serjeant sentenced him to 12 months' imprisonment in the second division.

The defendant had been employed in the Ministry of Munitions, and in November last was the head of the section which dealt with the allocation of lead. The allegation was that on November 1 he handed in a requisition from a firm called the Premier Metal Foundry, Limited, for 40 tons of lead to be allocated to them. The lead, which was of the value of £1,291, was supplied, and it was alleged that it was subsequently sold by the defendant. The suggestion of the prosecution was that he obtained it from the Ministry by a trick. He denied the charge.

JUBILEE OF "NATURE."—We extend hearty congratulations to our contemporary *Nature* on the completion of its fiftieth year of publication. The occasion has been marked by the issue of a jubilee number, dated November 6, containing exceedingly interesting reviews by eminent scientists on the developments made in the various branches of science during the past fifty years.

FRENCH CUSTOMS DUTIES ON CHEMICALS.

THE following statement, reprinted from the *Board of Trade Journal*, gives particulars regarding the proposed new classification of, and rates of duty on, the principal chemical products contained in Article I. of the Bill referred to in last week's issue, recently passed by the French Chamber of Deputies and the Senate, but not yet promulgated as law. The rates of duty at present leviable on the articles covered by the new proposals are shown for purposes of comparison. Goods of United Kingdom origin and manufacture are entitled to the rates of the "Minimum" Tariff. Italicised and other letters attached to the rates of import duty refer to the explanatory notes which are given at the end.

NOTE. *Ad valorem* duties are indicated by the use of the "percent." sign (%). In all other cases the rates are quoted in francs (and centimes) per 100 kilogrammes. Unless otherwise indicated, duty is levied on gross weight, when the rate of duty is 10 fr. or less per 100 kilogs., and on net weight when the rate exceeds that figure.

Tariff No.	Articles.	Rates of Import Duty under:—			
		"General" Tariff.		"Minimum" Tariff.	
		Present.	Proposed.	Present.	Proposed.
		Per 100 kilogs.	Per 100 kilogs.	Per 100 kilogs.	Per 100 kilogs.
238	Arsenious acid.....	Free	5 00	Free	Free
282	Ar.enate of copper.....	7½%	60 00	5%	20 00
260	Arsenate of potash.....	10 00	25 00	8 75	12 00
260	Arsenate of soda.....	5 00	20 00	4 25	10 00
277	Natural sulphide of arsenic.....		6 00		3 00
277	Pure pharmaceutical sulphide of arsenic.....	b10 00	30%	b3 00	15%
258	Nitric acid:—				
	Less than 81% of monohydrate.....		3 00		1 00
	81% and more of monohydrate.....	2 50	12 00	Free	4 00
	Commercially pure.....		24 00		8 00
282	Sulphonitric acid.....	7½%	12 00	5%	4 00
270	Nitrate of potassium: natural.....	Free	Free	Free	Free
	Nitrate of potassium: transformed.....	3 00	6 00	2 00	2 00
260	Nitrite of soda.....	b5 00	18 00	b4 35	6 00
240	Ordinary ammonia (volatile alkali).....	e3 00	6 00	e2 00	3 00
240	Ammonia commercially pure.....		18 00		6 00
282	Liquid anhydrous ammonia.....	7½%	30 00	5%	15 00
232	Hydrochlorate of ammonia: Crude.....	12 00	16 00	00 8	00 00
	Refined.....	18 00	24 00	12 00	12 00
252	Sulphate of ammonia: crude.....	4 50	8 00	Free	Free
	Refined.....	7 75	12 00	Free	4 00
252	Other ammoniacal salts: crude.....	4 50	16 00	3 00	8 00
	Refined.....	11 75	16 00	7 75	8 00
282	Nitride of aluminium.....	7½%	20%	5%	10%
238	Boric acid: Natural, from Tuscany, containing 15 per cent. or more of impurities.....	Free	Free	Free	Free
	Other.....	18 00	24 00	12 00	12 00
261	Natural borate of lime (crude borax).....	Free	Free	Free	Free
282	Borate of manganese.....	7½%	15%	5%	5%
261	Borate of soda (refined borax).....	10 00	16 00	8 00	8 00
282	Perborate of soda.....	7½%	30 00	5%	10 00
234	Bromine.....	Free	400 00	Free	200 00
234 bis	Bromides of: Ammonium, barium, calcium, potassium, sodium and strontium.....	b75 00	400 00	b50 00	200 00
	Other.....	b75 00	30%	b50 00	15%
262 bis	Carbide of calcium.....	b 9 00	12 00	b 6 00	6 00
238	Liquid carbonic acid.....	9 00	30 00	6 00	d10 00
282	Oxychloride of carbon.....	7½%	50 00	5%	25 00
282	Sulphide of carbon.....	7½%	10%	5%	5%
282	Tetrachloride of carbon.....	7½%	10%	5%	5%
282	Cyanide of potassium.....	7½%	30 00	5%	15 00
282	Cyanide of sodium.....	7½%	30 00	5%	15 00
279	Ferricyanide of potassium (red prussiate).....	b36 00	60 00	b30 00	30 00
279	Ferrocyanide of potassium (yellow prussiate).....	b25 00	40 00	b20 00	20 00
282	Sulphocyanide of potassium.....	7½%	20%	5%	10%
265 bis	Liquefied chlorine.....	6 00	36 00	4 00	12 00
238	Hydrochloric acid:— Ordinary.....	e 0 45	e 1 50	e0 30	e1 50
	Commercially pure.....		e 7 50		e2 50
264	Chlorate of baryta, potash or soda.....	be38 00	e40 00	bc32 00	e20 00

Tariff No.	Articles.	Rates of Import Duty under:—			
		"General" Tariff.		"Minimum" Tariff.	
		Present.	Proposed.	Present.	Proposed.
		per 100 kilogs.	per 100 kilogs.	per 100 kilogs.	per 100 kilogs.
264	Perchlorate of ammonia.....	f 4 50	e40 00	f 3 00	e20 00
	Other perchlorates.....	b38 00	e40 00	be32 00	e20 00
265	Chloride of lime.....	e 5 25	e 8 00	e3 50	e 3 50
250	Hypochlorite of soda.....	b 5 00	6 00	b 4 35	2 00
282	Other hypochlorites.....	7½%	30%	5%	15%
238	Hydrofluoric acid.....	b 9 00	45 00	b 6 00	15 00
234 ter	Fluorides other than of antimony and sodium, of precious metals and of rare earths.....	15 00	60 00	10 00	20 00
282	Compressed hydrogen.....	7½%	60 00	5%	20 00
235	Iodine: crude.....	500 00	500 00	400 00	400 00
	Iodine: refined (sublimated).....	500 00	800 00	400 00	500 00
236	Iodides of: Ammonium, lithium, potassium, sodium, strontium.....	e500 00	800 00	e400 00	400 00
	Other.....	e500 00	30%	e400 00	15%
282	Compressed oxygen.....	7½%	30 00	5%	d10 00
282	Peroxide of hydrogen.....	7½%	30%	5%	15%
282	Peroxide of sodium.....	7½%	30 00	5%	10 00
237	Phosphorus: white.....	60 00	50 00	50 00	25 00
	Red.....	180 00	150 00	150 00	75 00
282	Chlorides of phosphorus (tri, oxy, penta).....	7½%	50 00	5%	25 00
238	Phosphoric acids.....	30 00	60 00	20 00	30 00
282	Phosphoric anhydride.....	7½%	80 00	5%	40 00
250	Phosphate of soda.....	b5 00	10 00	b4 35	4 50
272	Silicates of potash or soda: Anhydrous.....	e5 00	e10 00	e4 25	e4 25
	Crystallised.....	e4 50	e10 00	e3 75	e4 25
	Hydrated.....	e3 00	e 5 00	e2 10	e2 10
282	Fluosilicates, other than of lead and cobalt.....	7½%	10%	5%	5%
282	Precipitated sulphur.....	7½%	15%	5%	5%
282	Chloride of sulphur.....	7½%	15%	5%	5%
238	Sulphuric acid: 65% of SO ₃ and less.....	Free	1 50	Free	Free
	From 65% to 81% of SO ₃	Free	3 00	Free	0 25
	81% and over.....	Free	5 00	Free	1 50
	Commercially pure.....	Free	8 00	Free	4 00
282	Liquefied sulphurous acid.....	7½%	15 00	5%	d5 00
275	Sulphite of soda: Less than 55% of anhydride.....	e 4 60	e 8 00	e 3 60	e 3 60
	55% of anhydride and more.....	e 4 60	e15 00	e 3 60	e 7 20
275	Liquid bisulphite of soda.....	e 4 60	e 8 00	e 3 60	e 3 60
275	Meta-sulphite or pyrosulphite of soda.....	e 4 60	e15 00	e 3 60	e 7 20
275	Sulphite and bisulphite of lime.....	4 60	7 00	3 60	3 50
275 bis	Sulphite, bisulphite, and meta-bisulphite of potash.....	15 00	20 00	10 00	10 00
276	Hyposulphite of soda: Less than 65% of anhydride.....	e 4 60	e 8 00	e 3 60	e 3 60
	65% and more of anhydride.....	e 4 60	e15 00	e 3 60	e 7 20
250	Sulphide of Sodium: Less than 35% of anhydride.....	b 5 00	9 00	b 4 35	b 4 50
	35% and more of anhydride.....	b 5 00	15 00	b 4 35	7 20
282	Persulphates of ammonia of potash, and of sodium.....	7½%	10%	5%	5%
258	Anhydrous alumina.....	b30 00	40 00	b20 00	20 00
259 ter	Hydrate of alumina.....	k15 00	22 00	k10 50	11 00
265	Chloride of aluminium.....	130 00	60 00	120 00	20 00
273	Sulphate of aluminium: at less than 15%.....	5 60	10 00	3 75	3 50
	at 15% and more.....	5 60	18 00	3 75	6 00
259	Alum of ammonia and of potash.....	5 00	8 00	3 75	4 00
268	Fluoride of antimony.....	30 00	50 00	25 00	25 00
234 ter	Fluoride of sodium.....	k15 00	50 00	k10 00	25 00
268	Lactate of antimony.....	30 00	50 00	25 00	25 00
316	Oxide of antimony.....	30 00	50 00	25 00	25 00
	Tartrate of antimony and of potassium (emetic properly so-called).....	20%	90 00	10%	30 00
254	Silver compounds.....	930 00	1800 00	5930 00	930 00
282	Salts of gold and of platinum.....	7½%	20%	5%	10%
9 bis	Peroxide of barium.....	15 00	20 00	10 00	10 00
282	Precipitated carbonate of baryta.....	7½%	2 00	5%	0 50
282	Chloride of barium.....	7½%	6 00	5%	2 00
282	Nitrate of baryta.....	7½%	24 00	5%	8 00
282	Sulphate of baryta: Precipitated.....	7½%	2 00	5%	0 50
	Sulphate of baryta: Pure, dry or gelatinous.....	7½%	30%	5%	15%
282	Sulphide of barium.....	7½%	6 00	5%	2 00

Rates of Import Duty under:—						Rates of Import Duty under:—					
Tariff No.	Articles.	"General" Tariff.		"Minimum" Tariff.		Tariff No.	Articles.	"General" Tariff.		"Minimum" Tariff.	
		Present.	Proposed.	Present.	Proposed.			Present.	Proposed.	Present.	Proposed.
		per 100 kilograms.	per 100 kilograms.	per 100 kilograms.	per 100 kilograms.			per 100 kilograms.	per 100 kilograms.	per 100 kilograms.	per 100 kilograms.
282	Carbonate, sub-gallate, nitrates, salicylates, tribromophenate of bi-muth.....	7½%	600 00	5%	300 00	255 bis	Sulphate of lead ground.....	5% plus 2 40	10% plus 2 40	5% plus 2 00	5% plus 2 00
282	Other bi-muth salts.....	7½%	30%	5%	15%	255 bis	Sulphate of lead artificial.....	2 40	10% plus 2 40	5% plus 2 00	5% plus 2 00
282	Calcium.....	7½%	30%	5%	10%	255 bis	Salts of lead, other.....	Free	2 40	Free	2 50
282	Carbonate of lime precipitated.....	7½%	6 00	5%	2 00	242	Caustic potash.....	Free	8 00	Free	0 70
282	Calcium chloride.....	7½%	10%	5%	5%	242	Carbonate of potash.....	Free	3 00	Free	Free
282	Calcium hydride.....	7½%	30%	5%	10%	243	Chloride of potassium.....	Free	1 50	Free	Free
282	Other calcium salts.....	7½%	20%	5%	10%	273	Sulphate of potash.....	Free	2 00	Free	Free
282	Chromic acid.....	7½%	20%	5%	10%	282	Ashe, vegetable, crude or washed.....	Free	Free	Free	Free
282	Chromate of baryta.....	7½%	40 00	5%	18 00	282	Sodium (metal).....	7½%	30 00	5%	015 00
266	Chromate of lead.....	b25 00	40 00	b18 50	18 50	251	Chloride of sodium: Refined, white.....	p3 30	p3 30	As in the General	Tariff.
304 bis	Chromate of zinc.....	b28 75	40 00	b18 50	18 50	273	Other.....	p2 40	p2 40	General	Tariff.
266	Chromates and bichromates of potash and soda.....	3 00	30 00	2 00	10 00	273	Sulphate of soda: Crystallised or hydrated (Glauber's salts).....	qel 65	e3 00	qel 10	e1 10
282	Chromates and bichromates, other.....	7½%	30%	5%	15%	282	Anhydrous containing, naturally, less than 25% of salt.....	qel 80	e6 00	qel 75	e2 20
239	Oxides of chromium.....	Free	60 00	Free	20 00	282	Oxides and salts of strontium, not specially mentioned.....	7½%	10%	5%	5%
239	Oxides of cobalt, impure, residues from the treatment of silver-bearing ores, containing less than 50% of cobalt.....	Free	Free	Free	Free	282	Tungstic acid and tungstates.....	7½%	15%	5%	5%
239	Other oxides of cobalt (including zaffre and smalt).....	Free	Free	Free	Free	239	Oxides of uranium.....	Free	700 00	Free	350 00
239	Hydrated salts of cobalt (40% of water at the least).....	Free	Free	Free	Free	282	Salts of uranium.....	7½%	700 00	5%	350 00
239	Other salts of cobalt.....	450 00	900 00	350 00	450 00	282	Radium and radium bearing products.....	7½%	10%	5%	5%
305	Carbonate of copper (blue and green cinders).....	6 00	60 00	5 00	20 00	282	Oxide of vanadium (vanadic acid).....	7½%	500 00	5%	200 00
239	Oxide of copper: In flakes.....	Free	Free	Free	Free	282	Carbonate of zinc other than natural.....	7½%	10%	5%	5%
273	Oxide of copper: Other.....	Free	60 00	Free	20 00	282	Chloride of zinc.....	7½%	10%	5%	5%
273	Sulphate of copper.....	3 00	8 00	1 50	1 00	239	Oxide of zinc.....	1 00	10 00	3 00	5 00
273	Double sulphate of iron and of copper.....	0 75	5 00	0 50	2 10	273	Sulphate of zinc.....	b 2 40	6 00	b 1 60	2 00
282	Sulphocyanide of copper.....	7½%	20%	5%	10%	277	Sulphide of zinc.....	b 3 75	25 00	b 2 50	10 00
239	Oxide of tin (metastannic acid).....	50 00	50 00	Free	Free	309 bis	Lithopone.....	b 3 75	25 00	b 2 50	10 00
239	Brown oxide of tin.....	0 50	30%	Free	15%	280	Products obtained directly from the distillation of coal-tar:				
255	Chloride of tin.....	e15 00	60 00	e10 00	30 00	280	Coal oil, coal essence, benzenic carbides, benzene, toluene, xylene, heavy oil, naphthalene, anthracene, crude phenic acid, crude cresols (not giving on distillation any fraction containing more than 60% of one of the isomers).....	Free	5 00	Free	Free
282	Chlorides and perchlorides of iron.....	7½%	30 00	5%	10 00	280	Heavy oils (products distilling below 200° C.)	Free	5 00	Free	Free
239	Oxides of iron: Residues of pyrites in fragments.....	3 00	Free	2 00	Free	280	Benzols (products distilling below 190° C.): For motors and combustion.....	Free	5 00	Free	Free
239	Rendered alkaline for gas purification purposes.....	3 00	4 00	2 00	2 00	234 bis	For industrial manufacture.....	Free	5 00	Free	Free
239	Other.....	3 00	6 00	2 00	3 00	234 bis	Bromoform.....	b75 00	600 00	b50 00	300 00
273	Sulphate of iron.....	1 20	2 00	0 80	0 80	234 bis	Bromides of ethyl, of ethylene and of methyl.....	b75 00	600 00	b50 00	300 00
282	Benzoate, carbonate, citrate, salicylate of lithium.....	7½%	300 00	5%	150 00	266 ter	Chloroform.....	113 00	150 00	175 00	75 00
282	Other salts of lithium.....	7½%	30%	5%	15%	282	Tetrachlorethane.....	7½%	20%	5%	10%
241	Magnesium.....	7½%	30%	5%	15%	282	Chloral hydrate.....	7½%	300 00	5%	125 00
241	Calcined magnesia.....	25 00	75 00	18 50	25 00	282	Other chlorals and derivatives of chloral.....	7½%	30%	5%	15%
262	Carbonate of magnesia.....	8 00	30 00	6 25	10 00	282	Chloride of ethyl.....	7½%	20%	5%	10%
265	Chloride of magnesia.....	e 3 00	e12 00	e 2 00	e 4 00	282	Chloride of methyl.....	7½%	100 00	5%	50 00
282	Citrate of magnesia.....	7½%	100 00	5%	50 00	282	Monochloroacetic acid.....	7½%	70 00	5%	35 00
273	Sulphate of magnesia.....	Free	6 00	Free	3 00	282	Acetyl chloride.....	7½%	100 00	5%	50 00
282	Sulphate of magnesia and potassium.....	7½%	4 00	5%	Free	286	Iodoform.....	cu500 00	1000 00	cu400 00	500 00
231	Peroxide of manganese.....	Free	Free	Free	Free						
282	Peroxide of manganese, pure.....	7½%	30%	5%	15%						
264 bis	Permanganate of potash.....	55 00	70 00	35 00	35 00						
282	Chlorides, nitrates, oxides and sulphate of mercury.....	7½%	15%	5%	5%						
277	Sulphide of mercury: Natural.....	Free	Free	Free	Free						
	Artificial, in lumps.....	b17 00	62 00	b31 00	31 00						
	Artificial pulverised (vermillion).....	b93 00	124 00	b62 00	62 00						
282	Other salts of mercury.....	7½%	20%	5%	10%						
282	Molybdic acid and molybdates.....	7½%	15%	5%	5%						
282	Oxides of nickel.....	7½%	15%	5%	5%						
282	Sulphate of nickel (single and double).....	7½%	10%	5%	5%						
256	Acetate of lead—see below.....										
202	Carbonate of lead (white lead).....	b10 50	18 00	b 7 00	9 00						
266	Chromate of lead—see above.....										
239	Oxides of lead: Red lead (minium).....	7 70	20 00	5 15	8 00						
	Litharge.....	7 95	20 00	5 30	8 00						
	Mine orange and other oxides.....	7 95	30 00	5 30	15 00						
222	Sulphate of lead, in lump: Less than 30% of lead.....	Free	Free	Free	Free						
	30% and more of lead.....	1 50	2 50	1 25	1 25						

- a.—Subject to denaturing at the expense of the importer under prescribed conditions.
- b.—"Coefficient of Increase" (Decree of 8th July) = 3.
- c.—"Coefficient of Increase" (Decree of 8th July) = 1.4.
- d.—Per 100 kilograms, net.
- e.—Including tax to cover the expenses of supervision of soda factories.
- f.—Crude.
- g.—Refined or chemically pure.
- h.—"Coefficient of Increase" (Decree of 8th July) = 2.7.
- i.—"Coefficient of Increase" (Decree of 8th July) = 1.2.
- j.—This duty will be abolished at the end of 5 years from the promulgation of the present measure.
- k.—"Coefficient of Increase" (Decree of 8th July) = 2.6.
- l.—"Coefficient of Increase" (Decree of 8th July) = 2.
- m.—Zaffre, silicious oxide, vitreous oxides: smalt, and azure.
- n.—Pure oxides of cobalt.
- o.—Duty established for a period of 5 years.
- p.—Not including the internal consumption duty.
- q.—Impure.
- r.—Pure.
- s.—A duty of 2 fr. 50 c. will be applied 2 years after the promulgation of the present measure.
- t.—Not including the internal revenue tax.
- u.—Not including the internal revenue tax on alcohol.

(To be continued.)

DYESTUFFS FROM GERMANY.

DISTRIBUTION OF FIRST CONSIGNMENT.

THE Board of Trade desire to notify consumers of dyestuffs that the first instalment of colours which are being obtained from Germany under the Reparation Clauses in the Peace Treaty will shortly be received, and will be followed at intervals by further quantities.

It is proposed that distribution should be effected as soon as possible after the arrival of each consignment. For the purpose of making this distribution, the information already supplied by the Colour Users' Association and the National Federation of Paint, Colour, and Varnish Manufacturers as to the probable requirements of their members for dyestuffs during the next six months will be utilised as a basis.

In order that this information may be extended so as to cover the whole of the requirements of the colour-using industry of the United Kingdom, it is desirable that any actual consumer of colour who is not a member of the Colour Users' Association or the National Federation of Paint, Colour, and Varnish Manufacturers, and consequently has not submitted any return to either of those bodies, should immediately forward to the Board of Trade, Industries and Manufactures Department, Great George-street, S.W. 1, information on the following points:—(a) The quantity of each particular brand of dyestuff estimated to be required during the next six months, and which is not likely to be available in sufficient quantity from either British, allied, or neutral sources of supply; (b) the approximate consumption during the year 1913 of each of these colours.

As it is probable that the quantities which will become available under these arrangements will not be adequate to meet the whole of the requirements of consumers, the Trade and Licensing Sub-Committee will be prepared to consider applications from actual consumers for additional quantities not coming under the Reparation arrangements, it being understood that any permission granted for the import of such additional quantities will be on condition that any arrangements for the purchase and import will be made by the Central Importing Agency.

INSTITUTE OF CHEMISTRY.

AT a recent special meeting of the council of the Institute of Chemistry in London the following matters came under consideration:—

Patents and Designs Bill.—The Conjoint Board of Scientific Societies have transmitted a report of the Patent Laws Committee, of which Mr. Horatio Ballantyne, F.I.C. (the representative of the Institute in this matter) was a member. The report will be sent to the Board of Trade. Mr. Ballantyne advised that the Institute should approve the report as it stands, as it is mainly on the lines already approved in connection with the proposals of the conference of technical societies. The points raised by the conference have been met to a considerable extent in the new Bill, although there is room for improvement. This course was approved of.

Training Ex-Service Men.—A letter has been received from the Rt. Hon. Sir Robert S. Horne, Minister of Labour, asking the council to assist in the national scheme for placing ex-Service men in training vacancies (without premiums).

Appointments Register.—The Registrar was directed to inform a member who had made the suggestion that the

Institute should recommend individual candidates for vacancies notified in the appointments register, that the council did not see their way to approve this proposal.

Representation on Industrial Councils.—The committee have considered the report of the Registrar on his interview with the officials of the Ministry and have authorised him to approach the employers on a number of industrial councils in order to bring the views of the Institute to their notice, and ascertain whether they would agree to the representation of the Institute on their respective councils.

Chemical Reagents.—A report of the Joint Committee of the Institute and the Society of Public Analysts, relating to the list of reagents, came in for discussion. The committee directed the Registrar to ascertain from manufacturers of fine chemicals whether they intend to manufacture "A.R." chemicals, in order that the committee may decide as to the advisability of amending and extending the existing list, produced in 1915.

Chemists in Naval and Military Services.—A Joint Committee of the Institute of Chemistry and the Institute of Metals considered the position of chemists and metallurgists in the naval, military, and air services, and the action which should be taken to secure for them better recognition and status. After discussion the Registrar was instructed to ascertain from the various specialised departments of the Army, Navy, and Air Force the present position with regard to pay and status of chemists who are employed technically in the respective forces. The committee have before them a number of letters from members in the Special Brigade, R.E., R.A.M.C., etc. They are of opinion that the inadequate recognition of chemists and metallurgists in the services is mainly due to the prevailing ignorance in official quarters of the technical nature of their work and the scope and character of the training required for it.

SOCIETY OF PUBLIC ANALYSTS.

AT an ordinary meeting of the Society of Public Analysts, held at the Chemical Society's rooms, Burlington House, on November 5, Dr. Samuel Rideal, president, in the chair, the following papers were read:—

"THE ANALYSIS OF BRAZILIAN ZIRCONIUM ORE,"

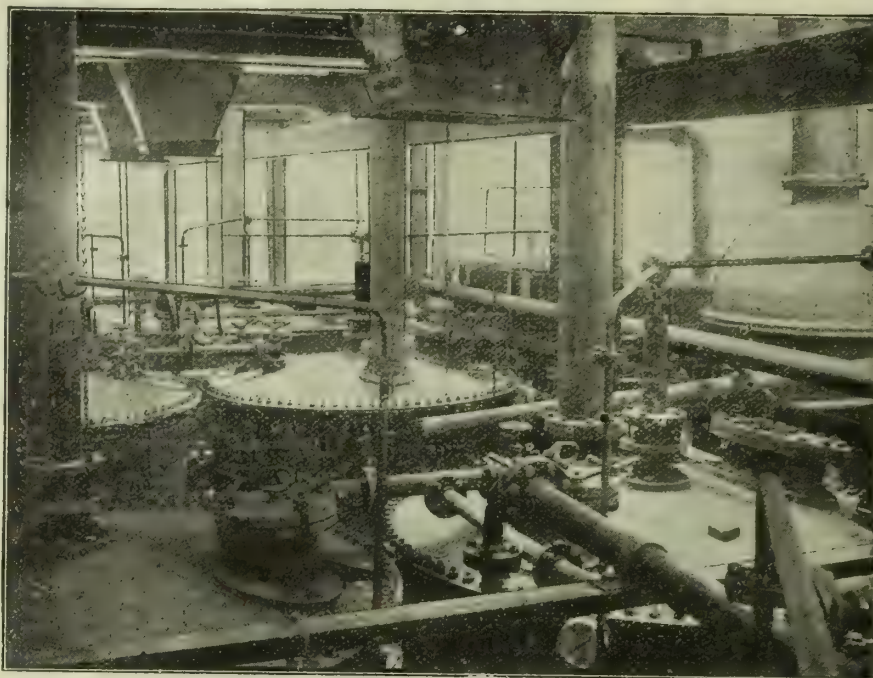
By A. R. POWELL AND W. R. SCHOELLER, Ph.D.

A detailed description of the analysis of the most important ore of zirconium was given. The finely ground material is fused with sodium carbonate, the melt extracted with water, and the insoluble portion fused with bisulphate. This treatment eliminates silica and renders all the other constituents soluble. The solution is precipitated with sodium thiosulphate, and the ignited precipitate weighed as $ZrO_2 + TiO_2 + Al_2O_3$. Titania and alumina are determined in this precipitate, zirconia being obtained by difference. Iron, manganese, lime, and magnesia are determined in the filtrate from the thiosulphate precipitate.

"THE HALOGEN ABSORPTION OF TURPENTINE,"

By ETHEL M. TAYLOR.

In contradistinction to Wijs' solution a solution of IBr_3 in chloroform was found to give a distinct resting stage at a halogen absorption equal to $4Br$ for $C_{10}H_{16}$. This stage was reached practically instantaneously by treating turpentine with a large excess of IBr_3 , and titrating back at once. The secondary reactions leading to further absorption was sufficiently slow not to interfere with the much more rapid main reaction.



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REPORTS OF COMPANIES.

Nitrogen Products and Carbide Company, Ltd.

The fifth annual general meeting was held on Tuesday in London, Major C. H. Campbell presiding.

The Chairman said that the profit for the period of eighteen months under review was £118,814., out of which a dividend of 9 per cent. had been paid, £10,000. transferred to reserve for contingencies—now nearly £110,000.—and £14,396. carried forward. In respect of the undertaking at Vilvorde, which town was occupied by the Germans early in the war, a claim had been lodged with the Foreign Claims Office, and it might be hoped that in the near future this claim would be liquidated, with others due to the affiliated Nitrogen Fertilisers, Limited, the total exceeding £270,000. The right to use in France the company's catalytic process for the production of nitric acid had brought in over £55,000. of royalties, and, notwithstanding the cessation of hostilities, the licence still had value, as it provided for payment of royalties on a minimum tonnage within the next seven years. A considerable loss was incurred in operating the Dagenham works, which were employed on the production, by the catalytic process, of ammonium nitrate for the British Government. The plant was specially designed to produce ammonia from cyanamide manufactured at the company's works in Norway. Owing to submarines, it became impossible to obtain adequate supplies, and the only alternative was to use the ammoniacal liquor from gasworks. The Government authorities were very unsympathetic. Every effort was made to obtain ammoniacal liquor, but without great success. After considerable difficulty the Government placed controlled supplies of ammoniacal liquor at their disposal, but at a price much greater than that of the equivalent ammonia in cyanamide, upon which the contract had been based. Moreover, the use of ammoniacal liquor entailed endless difficulties in treatment, and extra expense. With the restrictions on the purchase of plant, this state of affairs could not be speedily remedied, and they had to make the best of temporary expedients until appropriate appliances were available. The company's process was adopted by the French Government after close investigation of all known systems of fixation of atmospheric nitrogen. The French Government undertook to build a factory, and in September, 1916, the first units were in successful operation, but before this date the Government had voted about £15,000,000. for the establishment of cyanamide, nitric acid, and nitrate works in France, paying the company a royalty on all acid manufactured. Extremely valuable experience had been obtained in the operation of the process on a large scale, leading to numerous improvements. Through Nitrogen Fertilisers, Limited, the company owned the bulk of the shares in Alby Carbidefabriks, Sweden. In the period under review an offer was received and accepted for this interest, and Nitrogen Fertilisers realised a profit of over £345,000. on the investment, and were enabled to pay off the first and second debentures on the cyanamide factory, entirely freeing it from encumbrance. Water power was assuming greater importance, and in this respect they were in a very fortunate position. The Alby Company's works at Odda, Norway, were supplied with about 65,000H.P. The Aura water power had a total capacity of about 250,000H.P., and Dettifoss in Iceland had a capacity of at least 400,000H.P., as yet unharnessed. The total was 700,000H.P., and to generate the same power from coal would require fully 4,500,000 tons per annum. The intention was to concentrate their energies on the development in Norway of processes requiring no coal, or so to perfect the process as to reduce the coal requirements to a minimum. It was intended also to utilise their water power for the production of a fertiliser. Research had shown the possibility with cheap power of producing nitrate of soda without any imported raw material, and this process, if developed successfully, should have a very great future. In recent years considerable progress had been made in the electrical smelting of iron ore, using a much less proportion of coal than in blast furnace practice with coke. Norway contained large deposits of iron ore which had been successfully treated by electrical methods. Other fields under investigation were the manufacture of cyanides used in the extraction of precious metals, and sodium cyanide, the most valuable of all.

The report and accounts were unanimously adopted, and, the usual formal business having been transacted, an extraordinary general meeting was held, at which sanction was given to the proposed amalgamation with Alby United Carbide

Factories (Limited), and the voluntary liquidation of Nitrogen Products and Carbide Company (Limited).

Alby United Carbide Factories, Ltd.

The twelfth annual general meeting was held on Tuesday in London, Major C. H. Campbell presiding.

The Chairman said that the profit for the eighteen months ended on December 31, 1918, was £25,595., after providing £34,246. for depreciation, and with the amount brought forward there was £39,727. available. Dividends of 5½ per cent. on the preference shares, and 6 per cent. on the ordinary shares, left £6,837. to be carried forward. This was probably the only company in this country which was exclusively engaged upon war work and yet made direct loss, which had been incurred through their having, for a considerable time, to pay enormous rates of freight to ship owners to carry their coal to Norway, without receiving any recompense for these huge expenses. When the Government did help them to bear a part of the freight, they would only pay the Company a price for its carbide very much below the price at which the Government sold to consumers, a proceeding which was entirely unjustified. There was no reason why manufacturers should make loss on supplying material to the Government, while the Government were making large profits on re-selling it to firms engaged in munition work. At the end of 1917 they received from Norwegian financiers an offer to purchase the Norwegian assets for several millions sterling, but the Government asked them on patriotic grounds, not to dispose of the works, and the proposed sale was abandoned. Instead, however, of receiving better treatment from the Government, they were forced to accept contracts showing little or no profit. Then, when the war was over, the Board of Trade took a different view of the Company's nationality from that of the Foreign Office. It was as a British company that they were controlled by the latter, but the Coal Mines Department of the Board of Trade compelled them to pay for coal at the same prices as neutrals, so that their coal cost them more than double the price paid by other British buyers, and more than was paid by French, Italian, and other Allied competitors. As a matter of fact, the Company was entirely British. Had it not been for their unjust and unreasonable treatment by the Government, the Company's present position would have been very different. Excellent progress had been made at the electrode works at Hebburn-on-Tyne. At the end of the war there was a temporarily decreased demand for their electrodes. The opportunity was utilised in experimental work with extremely satisfactory results, the quality of the electrodes being enormously improved. The effect should be of great importance to their works in Norway, where they consumed several thousands of tons of electrodes per annum, and there was no doubt of the considerable amount of business for deliveries of electrodes to other electro-chemical factories. From every point of view they were to be congratulated on the erection of the Hebburn works. The development of some of the company's processes had been somewhat retarded by war, but steps were now being taken to demonstrate their practical value. War had brought acetylene into its own, and its use for lighting, and in a compressed form for commercial and industrial purposes, had resulted in many important developments. They could, therefore, confidently look forward to an ever-increasing field of usefulness for compressed acetylene. The directors had looked forward with anxiety to a very lean time immediately after the close of hostilities, and too much must not be expected from the current year's trading. Fortunately, however, they could now look forward with much greater confidence to the future. They had reason to hope that the worst was past.

The report and accounts were unanimously adopted, and the usual formal business having been transacted, an extraordinary general meeting was held, when approval was given to a proposition to effect amalgamation with Nitrogen Products and Carbide Company (Limited), and to increase the capital of Alby United Carbide Factories (Limited) to £2,332,916., by the creation of 1,607,916 new ordinary shares of £1. each. The articles of association were altered so as *inter alia* to make possible the capitalisation of undivided profit, with a view to the capitalisation of £80,261., part of the reserve fund, for distribution among the ordinary shareholders.

St. Austell China Clay Company, Ltd.

The accounts for the year ended, September 30 show a loss of £335., increasing the debit balance brought forward to £5,145.

Langdale's Chemical Manure Company.

Mr. W. B. Van Haansbergen, took the chair at the annual meeting at Newcastle, and, in moving the adoption of the report, said, regarding renewals and repairs, that some had been carried out, but owing to the increased cost of labour and materials, certain needful replacements had had to be postponed. With reference to Labour Unions and Combines, the chairman said that while he did not at all object to the right to strike, he deprecated the coercion attempted when a strike was threatened unless something was granted instantaneously. The right to strike without notice was indefensible. The chief cause of difficulty in the labour world had been irresponsible agitators, who, while in a ridiculous minority, were allowed to dominate their more responsible and more industrious companions. The real labour man, was one for whom he had great admiration; he had always been able to get on with him, and quite expected that sooner or later he would realise the anomaly of the position in which a small minority or any minority should be able to persuade the majority of real workers to follow advice obviously a contradiction of fair dealing, such as striking without notice. In reviewing the accounts, the Chairman said the liabilities were £14,967, this year against £18,026, last year. This was merely caused by the fluctuation in the arrival of raw material. The gross profit for last year was nearly £6,000, greater than this year, but the real figure to consider was the net profit. The difference in the net profit was about £1,800, but that would not make any essential difference to the shareholders. The report was adopted. A dividend of 5 per cent., free of income tax was declared for the present year, and a final dividend of 2s. per share free of tax for the year 1918.

Electro Bleach and By-products, Ltd.

The directors have called a meeting for November 14 to consider an increase of the nominal capital from £180,000. (120,000 preference shares of £1. and 120,000 ordinary of 10s.) to £480,000., to be divided into 320,000 preference shares of £1. and 320,000 ordinary of 10s. It is proposed to issue 80,000 preference shares and 80,000 ordinary shares. The proceeds will be applied to the following purposes: (1) The Government advanced £116,218. for extensions at Middlewich, and under the agreement £35,890. remains to be repaid, when the plant, etc., will become the property of the company. The new plant is now available for the ordinary trade of the company. (2) The company have purchased the whole of the Government plant, etc., on the company's works at Middlewich for £10,000. (3) The company propose to redeem the whole of the outstanding debentures—namely, £50,500. (4) The balance will be available for extensions and development. There will remain in reserve 120,000 preference shares and 120,000 ordinary shares. The money required to pay dividends of 7 per cent. on the 80,000 new preference shares and 12½ per cent. on the 80,000 new ordinary shares is £10,600. The repayment of the debentures will save £6,000. per annum, and the repayment of the loan from the Ministry of Munitions will save approximately £2,150. per annum, leaving only £2,450. to be found out of profits. A report from the auditors justifies the directors in saying that the profits during the first half of the current year are very satisfactory.

Minerals Separation, Ltd.

At an extraordinary general meeting in London on Monday, under the chairmanship of Mr. Francis L. Gibbs, the following resolutions were adopted:—(1) That this meeting hereby sanctions the increase by the directors of the share capital to £500,000., by the creation of 450,000 new shares of £1. each, ranking *pari passu* in all respects with the existing shares. (2) That 50,000 of the said new shares be offered to the registered members of the company, pursuant to Clause 42 of Table "A" in the First Schedule to the Companies (Consolidation) Act, 1908, as amended by Clause 18 of the articles of association of the company, at a premium of £1. per share.

British Oil and Cake Mills Company, Ltd.

The trading profits for 1918 were £369,088., after providing for excess profits duty, and £15,640. was brought forward. Dividends amounting to 15 per cent. have been paid on the ordinary shares, and it is proposed to add £49,441. to the reserve, £50,000. to the depreciation fund, and £5,000. to the pension fund, and to carry forward the remaining £17,570. An interim dividend of 10 per cent. has been paid on the

ordinary shares for the current year. The board, in order to carry to completion the various enterprises in which they are engaged, to provide for further extensions which are contemplated, and to finance an expanding trade at enhanced values, have decided that the capital must be increased. They recommend that it be raised from £2,000,000. to £10,000,000., by the creation of 8,000,000 shares of £1. each. Their present intention is to duplicate the ordinary share capital of £1,250,000 by offering to the shareholders at par one new share for every ordinary share now held. Mr. C. R. Beckitt, Mr. J. Mouat, and Mr. J. B. Willows (directors), offer themselves for re-election.

Amelia Nitrate Company, Ltd.

The report for the year to June 30 last states that the gross trading profits amount to £17,561., and income on investments to £1,019., making, with £445. brought in, £19,025. Deducting administration expenses, interest, contribution to propaganda, and provision for income-tax, there is available £6,508. After payment of the preference dividend the directors propose a dividend on the ordinary shares of 2 per cent., carrying forward £388. The great falling off in the profits is due to the fact that with the signing of the Armistice the Government orders for nitrate ceased suddenly, and producers were from November till May prevented from finding a market for the large stocks they then had on hand, so that the present accounts treat less than half the usual quantity of nitrate. In view of these adverse market conditions the company's two maquinas were closed down early in 1919, but the extraction and stacking of large stocks of raw material were continued. This period of inaction was also utilised in effecting considerable repairs to the maquinas, which had long been urgently needed, and both oficinas have now re-started work in a state of thorough efficiency. The balance of proceeds of the sale of oficina "Cecilia" was received during the year under review.

Santa Catalina Nitrate Company, Ltd.

The reports for the year to June 30 last states that the gross profit for the year is £23,306. Deducting London expenses, £2,239., income-tax, £1,391. and depreciation of investments, £690., and adding £2,741. brought in, the total is £21,727. An interim dividend of 5 per cent. was paid in June last, and the directors propose a final dividend of 15 per cent., making 20 per cent. for the year, write off £1,675. for depreciation of grounds and £1,675. for depreciation of plant and machinery, carrying forward £2,577. Profit has been taken on 134,895 quintals of nitrate sold and delivered, the quantity manufactured during the year being 371,000 quintals. Manufacture of nitrate has been suspended since July last.

Broken Hill Proprietary (Block 10) Company, Ltd.

Cabled advice having reference to the reports and accounts for the half-year to September 30 last has been received from the head office in Melbourne to the following effect: "Owing to the workmen going on strike, work ceased on May 5. Operations for the half-year have resulted in a net profit of £22,677, including a large surplus received for production of previous period. After providing £17,550. for depreciation on shares in other companies, the balance to the credit of profit and loss account is £85,762. Liquid assets in excess of liabilities, £91,127. This does not include the shares in other companies."

DIVIDENDS.

FULLER'S EARTH UNION COMPANY, LTD.—Interim dividend at the rate of 8 per cent. per annum on the ordinary shares for the past half-year.

SAN LORENZO NITRATE COMPANY, LTD.—No interim dividend will be paid.

GREEK PROHIBITION OF SULPHUR AND SULPHATE OF COPPER IMPORTS.—The Greek Government have decided to prohibit the importation into Greece until October 3, 1920, of sulphur and copper sulphate. This decision has been taken on account of the stocks existing in Greece largely exceeding the needs of the country.

CORRESPONDENCE.

***We do not hold ourselves responsible for the opinions expressed by our correspondents.*

IMPORTATION OF GERMAN DYES.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—Referring to the article in last week's journal, taken from the *Morning Post*, may I be permitted to make a few remarks as an old representative of a German colour firm?

The assertion is made, the writer says, that the agitation in the wool trade for the importation of German colours is due to pre-war German agents for German dyes. I am acquainted with most of the important pre-war agents and representatives of German houses, and I can safely say that this agitation is none of their causing, even though "they are in danger of losing much business through the import restrictions." Quite a large proportion of old representatives of the German houses are now employed by British colour firms. The agitation in the woollen industry has been audibly voiced, but there is great unrest and annoyance in nearly every colour-consuming industry on account of the restrictions. This is not due to a want of patriotism. Most men would like to see a domestic colour manufacturing industry in this country, and would undoubtedly give it all assistance possible, but most Englishmen are reluctant to be forced to give it assistance willy-nilly. What is wanted by the majority of colour consumers, so far as I can judge, is at least the possibility of obtaining more plentiful supplies of dyes from any source, be it British, Swiss, American, German, or even Japanese, and also the possibility of obtaining those dyes never yet made outside Germany. It is surely a very narrow point of view to defend the restrictions by saying our manufacturers are as well placed as any similar class of manufacturers in other parts of the world. That may be the case, but dye consumers now kick against what one might term dodging, and desire to resume at the earliest moment their pre-war normality, to be able to guarantee their goods as formerly, and to lead the way rather than to be only equal to others.

There is tremendous shipping business waiting for this country the moment the various dye consumers can obtain certain colours of pre-war use. Unfortunately, there is not plant enough anywhere outside Germany to cope with this pending business, and we overlook the fact that every penny spent on German colour will bring back so much more from the subsequent shipment of coloured cloth, etc. Are we to thus strangle our exports—the life blood of the nation at the moment—in order to badly protect the colour industry of this country? Could the protection not be given in some other and more effective manner, and in a more equitable way, than the Board of Trade's present scheme?

Why not give the pre-war agents for German colour firms and their old representatives a little consideration? Why not allow the importation of German colour to come through them? Protect the British industry by only allowing colours to be brought in which are not made here, or are not made here in sufficient quantities to give consumers all they want; make a stipulation that no importing firm shall employ German assistance for a term of years; let the Licensing Subcommittee be made more representative, and let it decide as to whether a colour is made here and as to its sufficiency; go further if you like—as the British manufacturer turns out a colour in still greater quantity, sufficient to meet all demands here,—and place an embargo on the identical foreign colour. To adopt such a scheme of protection would be effective and fair, and would give the small section of the community—the pre-war agents and representatives—the chance of coming in for a little of their own, which, with present restrictions, I say candidly they are being robbed of.

These restrictions are imposed, the writer in the *Morning Post* goes on to say, to protect the consumer, and not exclusively for the benefit of the industry. Has it struck people here that whilst we are making good—i.e., to the present German standard,—the Germans, with their greater experience and their remarkable organisation, will be forging ahead of us, and giving people in other and broader-minded countries the benefits of their new inventions to our very serious detriment. The question is indeed very complicated, and we must avoid taking too narrow a view of the matter. In the *Morning Post* reference is also made to what the German monopoly meant in the past and the manner in which it was wielded, and a German authority is quoted as

saying that the Reparation Commission, by its agreement with the German Government, prevents them in the future from selective selling. My experience, and that of a colleague who was with one of the largest German firms, prompts me to say at once that the Germans never sold selectively, as suggested. Such a selective selling policy of, "if you want this you must also take that," was a fact whilst the war was on in our own market.

Sir, the agitation amongst the woollen dyers and others for the importation of German colours is perfectly justified. The shortage is appalling, and every man in the colour-consuming trades knows of it. Where is alizarine red at present; what about Victoria blue, which has risen in price a matter of nearly 10s. per lb. in the last two or three weeks? What about rhodamines, of which there is none about, and dyers and printers are calling in vain for them—starving, as it were? And what about prices paid to-day for colours? Is it right that the present monopolies should be maintained when we have the power to bring in a little healthy competition? What is to be said about the 100 per cent. bonuses of the foreign firms selling here to-day? Are colour consumers to continue paying through the nose for their very essentials? Time after time it has been said how much we are indebted to the Swiss firms for their assistance during the war. No one wants to decry their use to us, but may I dare to suggest they have been very amply remunerated for it?

Surely the Board of Trade has recognised the unrest there is, and it is up to them to alter matters and to be fair to all. It appears as though we are looking no further than the end of our nasal organs.—Yours, etc.,

"FAIRNESS."

Manchester, November 10, 1919.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

(SPECIALLY CONTRIBUTED.)

Nothing has yet occurred to justify an increase of production in the coking and by-product industries of Cumberland, but it seems quite likely that the plants may be able to resume full operations without waiting for a boom in the iron trade. It has been generally assumed that there was not much prospect of any other outlet except the local outlet being found for the softer coke which the district produces. That assumption, however, it is hoped, is to be falsified. Inquiries are coming in from the Continent for Cumberland coke, and there is an exceedingly good chance of a contract being fixed up for a supply of coke spread over three months which would maintain the ovens in full operation for that period. The position certainly is very precarious at present. With the iron moulders' strike still continuing it is more than doubtful whether the output of ordinary iron can be much longer required. There are not more than twelve furnaces in draught on ordinary iron between Workington and Carnforth, and these of course do not absorb even half of the make of the 380 ovens in full blast. The majority of the ovens are indeed working at between a third and a half of their capacity, and small though that production is some of the yards have to be jammed with stocks. East Coast coke supplies are also smaller. To West Cumberland this week they are 4,000 tons, and to the Furness district, 13,000 tons. Benzole and sulphate of ammonia are by-products that are in brisk demand, and a good deal of the pitch is being exported. The chemical works are busier. Sulphuric acid is an improving market.

ELATERITE.—Elaterite is the common name for wurtzilite. This is one of the hard varieties of native asphalt, and is closely similar to gilsonite and grahamite. Practically all the elaterite produced in the United States comes from Uinta County, Utah, says the United States Bureau of Mines Report. Refined elaterite is used principally in the manufacture of marine and iron paints, acid-resisting compounds, and other protective coatings, and in the manufacture of rubber. The demand, though small, appear to be steadily increasing as a consequence, it is believed, of the successful employment of this mineral as a primary constituent of prepared flooring. Development of the elaterite deposits in Utah has been retarded by the restricted market for the material, and by the location of the deposits remote from railway transportation. Petroleum refineries, equipped for the manufacture of asphalt, are located in practically all parts of the United States. In 1917 elaterite at the mines sold for an average of 88.69 dollars per cent. per ton, and gilsonite sold for an works are busier. Sulphuric acid is an improving market.

IMPORTS OF CHEMICALS AND ALLIED PRODUCTS.

THE following returns, which are taken from the import statistics of the United Kingdom, give the amount and value of chemicals and allied products imported during the month ending Oct. 31st, 1919, as compared with Oct. 1918.

ARTICLES.	QUANTITIES.		VALUE.		ARTICLES.	QUANTITIES.		VALUE.	
	Month ended		Month ended			Month ended		Month ended	
	Oct. 31st.		Oct. 31st.			Oct. 31st.		Oct. 31st.	
	1919.	1918.	1919.	1918.		1919.	1918.	1919.	1918.

(To be concluded.)

EXPORTS OF CHEMICALS AND ALLIED PRODUCTS.

THE following returns, which are taken from the export statistics of the United Kingdom, give the amount and value of chemicals and allied products exported during the month ending Oct. 31st, 1919, as compared with Oct., 1918.

		QUANTITIES.		VALUE.				QUANTITIES.		VALUE.	
ARTICLES.		Month ended Oct. 31st.		Month ended Oct. 31st.				Month ended Oct. 31st.		Month ended Oct. 31st.	
		1919.	1918.	1919.	1918.			1919.	1918.	1919.	1918.
				£	£					£	£
BLEACHING POWDER : To U.S.A. cwt.		—	—	—	—	MEDICINES, comprising DRUGS and MEDICINAL PREPARATIONS :					
" Other						Opium, dried and powdered in the United Kingdom lbs.		319	1,611	707	6,347
Countries ..		23,633	1,845	16,345	1,802	Quinine and Qui- nine Salts ozs.		330,269	11,900	50,081	2,482
Total "		23,633	1,845	16,345	1,802	Other Sorts val. £		—	—	299,019	243,658
COAL PRODUCTS, NOT						Total "		—	—	349,807	252,487
DYES:						MURIATE OF					
Aniline Oil and						AMMONIA cwt.		9,572	1,737	26,770	4,938
Toluidine lbs.		590,713	607,770	29,970	38,246	PAINTERS' COLOURS AND					
Anthracene "		235,003	—	2,494	—	MATERIALS :					
Benzol and Toluol gals.		5,914	874,869	5,654	70,199	Barytes cwt.		622	1,700	247	1,094
Carbolic Acid .. cwt.		11,949	16,004	29,887	84,588	White Lead "		14,293	778	43,374	1,937
Coal Tar, Crude ..		3,370	—	943	—	Zinc Oxide "		2,875	540	12,044	2,134
Refined and						Unenumerated ..		105,882	33,278	390,769	100,005
Varnish gals.		339,698	95,892	13,473	3,427	Total "		123,672	36,296	446,434	105,170
Naphtha		36,452	—	4,358	—	POTASH COMPOUNDS :					
Naphthalene .. cwt.		4,568	16,810	5,081	26,723	Saltpetre (Nitrate					
Pitch		657,676	591,516	106,313	82,215	of Potash) British					
Tar Oil, Creosote,						prepared cwt.		9,245	1,212	21,188	4,150
etc. gals.		346,637	7,187	15,625	874	Chromate and Bi-					
Other sorts cwt.		17,266	17,672	20,120	31,659	chromate of Pot-		2,070	1,457	16,669	15,733
Total Value £		—	—	233,913	337,931	ash		—	—	18,523	5,639
						Other Sorts val. £		—	—	56,380	25,522
COPPER, Sulphate						Total "		—	—	56,380	25,522
of tons		708	2,816	34,008	185,852	SODA COMPOUNDS :					
DYE STUFFS:						Soda Ash cwt.		233,578	341,713	75,882	120,300
Products of Coal						" Bicarbonate ..		46,617	31,345	19,539	13,517
Tar cwt.		12,611	9,060	105,090	125,234	" Caustic		118,193	54,312	121,149	88,825
Other Sorts "		9,557	756	33,099	6,818	" Chromate and					
Total "		22,168	9,816	138,189	132,052	" Bichromate ..		12,327	10,147	33,205	32,835
GLYCERINE :						" Crystals		12,043	311	3,900	97
Crude cwt.		332	—	1,229	—	" Sulphate (Salt-					
Distilled		5,621	5,396	32,332	38,005	cake) "		40,669	44,034	6,977	7,622
Total "		5,953	5,396	33,561	38,005	" Other Sorts ..		51,834	53,500	52,534	83,212
						Total "		515,261	535,362	313,186	346,408
MANURES :						SULPHURIC ACID cwt.		1,354	1,896	2,035	3,078
Sulphate of Ammonia :						TARTARIC ACID ..		1,226	114	19,166	2,243
To France..... tons		2,507	1,490	62,654	27,272	CHEMICALS, other					
" Spain and						sorts val. £		—	—	481,682	465,916
" Canaries .. "		150	—	5,100	—	SALT, Rock and White					
" Italy		—	500	—	16,210	(except Table Salt):					
" Dutch East						To Belgium .. tons		1,797	—	7,070	—
Indies "		1,509	—	33,226	—	" U.S.A. "		840	2,065	3,170	5,326
" Japan		8,098	—	174,539	—	" British East					
" U.S.A. "		—	—	—	—	Indies "		6,353	55	19,056	292
" British West						" Australia....		50	—	182	—
India Islands						" New Zealand ..		170	760	766	3,406
(including Ba-						" Canada "		6,186	6,911	20,764	22,617
hamas) and						" Other					
British Guiana ..		100	500	2,170	16,254	Countries .. "		20,171	12,054	75,462	46,977
" Other						Total "		35,867	21,845	126,470	78,618
Countries .. "		1,232	316	30,971	4,712	GREASE & UNREFINED					
Total "		13,596	2,806	308,660	64,488	TALLOW & ANIMAL					
						FAT cwt.		69,588	1,860	288,227	4,911
Superphosphates ..		184	555	1,927	3,619						
Basic Slag.....		2,585	137	10,525	452						
Unenumerated..		4,855	2,780	74,260	32,430						
Total of Manures ..		21,220	6,278	395,372	100,989						

(To be concluded.)

PARLIAMENTARY NEWS.

Steel-testing Laboratory.

In the House of Commons, Mr. Neal asked the Parliamentary Secretary to the Ministry of Munitions whether premises have recently been taken in Sheffield for use as a steel-testing laboratory at an annual rental of £500.; whether it is intended that this laboratory shall be permanent or temporary, and, if the latter, for how long it is intended to use the same; and what is the need for this department and what is the estimated annual cost thereof?

Mr. Kellaway: The premises at Townhead Street, Sheffield, were taken over in December, 1917, at an annual rental of £500. for use as a metallurgical laboratory. During the past year all other temporary metallurgical laboratories, established during the war in various parts of the country, have been closed down. A laboratory, for the testing of steel and other metals for artillery equipment and aircraft, will be required so long as stores of this nature are supplied to the War Office, the Air Ministry, and other Departments. The future annual cost is estimated at £6,100., and it is expected that an approximately equivalent sum will be recovered from contractors.

Transport of China Clay.

The Parliamentary Secretary to the Minister of Transport (Sir Rhys Williams), on Monday, in reply to Sir E. Nicholl, said: I am aware that the china clay district near St. Austell is, together with many other districts, suffering from the shortage of railway wagons, and the possibility of improving the situation is engaging the attention of the Ministry of Transport.

Derbyshire Oil.

The Deputy-Minister of Munitions (Mr. Kellaway), replying to Sir Arthur Fell, said: Progress in the Derbyshire boring operations has recently been somewhat delayed by unavoidable accidents and difficulties in getting material. The boring at Hardstoft is still flowing at the rate of about 260 gals. a day, and the oil is being put into storage on the spot. There are about 36,500 gals. in stock. No further tests as to the quality of the oil have been made, but there is no reason to suppose that there has recently been any appreciable change in its character.

Quality of British Dyes.

Major McKenzie Wood asked, on Monday, the President of the Board of Trade whether he was aware that the subsidised dye manufacturers were supplying to woollen manufacturers dyes which were not fast to milling, and that in consequence quantities of good material were being spoiled weekly; and whether he would take steps to enable woollen manufacturers to obtain dyes that could be guaranteed?

Sir A. Geddes: I have received a complaint to the effect described from one firm, but I have at present no reason to suppose that it is representative. If dye-users cannot obtain dyestuffs of suitable kind or quality from domestic sources it is open to them to apply for licence to import.

Mr. Hogge: The right hon. gentleman has received one complaint. Can he say whether he has investigated it?

Sir A. Geddes: In all these cases investigation is at once undertaken. I am not in a position to say whether the complaint is accurate or not. There is always inquiry made.

Price of Soap.

Major Barnes, on Tuesday, asked the President of the Board of Trade whether, in view of the great increase in the price of soap since the Armistice, and the fact that recent purchases of soap manufacturing companies had brought the manufacture of soap in this country almost entirely under one control, that of Messrs. Lever, Ltd., he would appoint a committee to inquire into the exercise of that control and report as to the desirability of the State taking any action towards the regulation of the price of this essential commodity?

Mr. Bridgeman said a sub-committee of the Central Committee had already been established under the Profiteering Act, and was at present engaged in investigating and inquiring into the manufacture of soap.

Costings Branch of the Ministry of Munitions.

Mr. R. Young asked the Prime Minister whether the successful work of the technical costings branch of the Ministry of Munitions has been brought to his notice; and

whether, in view of the fact that £300,000,000. was saved to the nation in Government contracts during the war at the small cost of £75,000., he will take steps to continue and extend the work of the said committee in relation to all future Government contracts, and thus assist in furthering the work of national economy in all Government Departments?

Mr. Bonar Law: The Government are considering the best way of making use in future Government purchases of the experience gained during the war.

NEW COMPANIES.

Anglo-American Sulphur Company, Ltd.—Capital £150,000., £1. shares (75,000 preference). Registered office: 54, New Broad Street, E.C.

Grenville United Mines, Ltd.—Capital £100,000., 5s. shares. Object: To carry on in Cornwall or elsewhere the business of miners, and preparers for market of tin, wolfram, arsenic, copper, ores and minerals, etc. Registered office: Granville House, Arundel Street, W.C. 2.

Scottish American Oil and Transport Company, Ltd.—Capital £5,000,000., £1. shares. Solicitors: Grundy, Kershaw, Samson and Co., 6, Austin Friars, E.C.

Wailes Dove Bitumastic, Ltd.—Capital £200,000., £1. shares. Object: To take over the business carried on by a company of the same name at Newcastle-on-Tyne, and elsewhere, and to manufacture, deal in, and apply enamels, solutions, tank top coverings, cements, paints and compositions for the protection of steel, iron, wood, and stone work; manufacturers of and dealers in sheathings, coatings, oils, grease, paints, and tar, oil boilers, soap manufacturers, etc. Registered office: 5, St. Nicholas Buildings, Newcastle-on-Tyne.

Welsh Mines Corporation, Ltd.—Capital £50,000., in 44,000 shares of £1 each and 120,000 shares of 1s. each. Object: To enter into an agreement with Lisburne Development Syndicate, Ltd., for the acquisition of certain blende and lead mines and dumps on the estate of the Earl of Lisburne, near Aberystwyth. Office: 80, Bishopsgate, E.C.

British Renovating Company, Ltd.—Private company. Registered October 28. Capital £1,000., £1. shares. Builders, paint manufacturers, boiler coverers, etc. Registered office: 73, Burnham Street, Canning Town, E. 11.

Central Iron and Metal Company, Ltd.—Private company. Capital £5,000., £25. shares. Registered office: 9, Draper's Gardens, E.C.

Charles F. Morriss and Co., Ltd.—Private company. Capital £5,000., £1. shares. Refiners and manufacturers of and dealers in oils, tallow, and grease, etc. Registered office: 143, Lime Street, Hull.

Coal Treatment Processes, Ltd.—Private company. Capital £47,500., in 45,000 preferred ordinary shares of £1. each and 50,000 deferred shares of 1s. each. Object: To acquire processes for the economical treatment of coal, oil, shale, wood, peat, lignite, and other material, etc. Registered office: 638, Salisbury House, E.C. 2.

Darring, Croft, Brown, Ltd.—Private company. Capital £3,000., £1. shares. Object: To acquire the property and rights of D. E. Brown in certain secret processes and formulæ for the manufacture of detergents, toilet and household soaps, etc. Registered office: 36-7, Queen Street, E.C.

Electrofer, Ltd.—Private company. Capital £10,000., £1. shares. Object: To acquire and exploit patents and/or processes for the electrolytic deposition of various metals, etc. Registered office: Maxwell House, Arundel Street, W.C. 2.

Elias Palme Steinchonau (Bohemia) Glass Works, Ltd.—Private company. Capital £100., £1. shares. Registered office: 195, Wardour Street, W.

International Laboratories, Ltd.—Private company. Capital £10,000., £1. shares. Solicitors: Jackson, Elwell and Curran, 65, Coleman Street, E.C.

Oil Nut Trading Company, Ltd.—Private company. Capital £30,000., £1. shares. Registered office: 1, Gresham Buildings, Basinghall Street, E.C.

Power Alcohol, Ltd.—Private company. Capital £3,300., in 3,000 shares of £1. each and 6,000 shares of 1s. each. Object: To acquire the patents granted to C. J. Le Petit for improvements in the manufacture of a motor spirit known as "Alfatyl," and apparatus and machinery therefor, including patents for N.Z., Australia, India, Rhodesia, Union of South Africa, U.S.A., and France. Registered office: 3, Crown Court, Old Broad Street, E.C.

FERTILISER NEWS.

(SPECIALLY CONTRIBUTED.)

Nitrate of Soda.—Last month's shipments from Chili were, as expected, on a much larger scale than for some time past, reaching 168,000 tons, of which 106,000 tons to Europe (including Egypt) and 62,000 tons to the United States and other parts. The quantity of 1,600,000 tons named in our last issue is not "shipped" (as implied by the introduction through a printer's error of the word "went"), but reported "sold" for delivery up to the end of March next; this means an average of nearly 300,000 tons per month from now onwards—a very large order even if tonnage were plentiful instead of scarce as at present. Freight which before the war were about 20s. are now nominally about £11. per ton for steamers and £9. for sailing vessels. The October output in Chili shows a trifling increase at 114,000 tons, but the stocks there, for the first time this year, have been slightly reduced, the total being about 1,650,000 tons, compared, however, with 673,000 tons on November 1, 1913, the corresponding *ante-bellum* date! While they will rapidly be diminished by exports, they will, on the other hand, be added to by the output of numerous oficinas about to resume operations; so there is no prospective dearth of the Chilean fertiliser, the demand for which, in the consuming countries, is still an unknown quantity. That on the West Coast appears to have been satisfied by the large forward sales, no further business being reported by the Producers' Association, but the German companies have sold nitrate for delivery next year at sixpence per quintal under the official price. European merchants having presumably filled their requirements for next spring, the outcry against "fixed prices" in Chili has ceased, but the country dealers, the backbone of the trade, take little interest in nitrate of soda at the present level, and the market is quite nominal.

Sulphate of Ammonia Scarce in Italy.—The Italian market for nitrate of soda is reported as unchanged. Sulphate of ammonia is very high in price, and is quoted round about 140 lire per quintal. There is a continued shortage of foreign goods, and the deficiency in national production is also very marked.

Reconstituting the German Potash Syndicate.—The Germans, with an eye, of course, to the future, are investigating the position of their Potash Syndicate. This syndicate is now reconstituting with a tentative capital of 1,500,000 marks, which, it is observed, is only a starting point.

French Phosphate Securities Confirm Good Business.—The prospects of the fertiliser companies, particularly in the matter of raw material most interesting to the French, are obviously good from the high prices ruling on the French market for shares. The Tunisian Phosphate shares are quoted very firm, but the company has not succeeded in ensuring a vote for increasing its capital, as intended, owing to the necessary forum being lacking at the meeting called for the purpose. The Omnium d'Algerie-Tunisie is held very firm, particularly in view of the impending increase of capital of the Constantine Phosphates concern. The Gafsa concern is also quoted firm, and is considered to be doing well.

Sulphate of Ammonia.—There appears to be something of an improved sale of this material, probably occasioned by the fact that the controlled prices will be dearer later on. There is still nothing, or hardly anything, available for export, and not likely to be before the end of this year. Quotations for export are therefore nominal, and the value is given at anything from £25. to £30. per ton, net cash, f.o.b. British ports, in double bags. Advices from New York state that there is on that side of the Atlantic a decided scarcity of supplies throughout the market. This has been the condition recently, but the situation seems to be gradually becoming more serious. Large unfulfilled orders are reported in many directions, with only occasional quantities of a few hundred tons appearing in the market. Prices are maintained at a high level.

Basic Slag and Superphosphate.—A much bigger business could be done in basic slag were it not for the endless delays at works. This is quite an old story now. The high favour extended both to slag and superphosphate is now well known, and the materials are being asked for more and more. At the same time, there appears to be something like a world's phosphate shortage, and this is not being helped by the

critical position of affairs in the American phosphate districts. First, curtailed production ensued, and shipments almost ceased owing to a strike in Florida; then, when production became better, the wagon situation got bad, and the rock could not be transferred. In America about two-thirds of the acid phosphate plants are now shut down for want of rock, whilst others are operating at a fraction of their capacity. It is said that there are large quantities of rock, however, in Florida mining district ready for shipment if only it could be moved, and the American fertiliser men are hammering away at the Washington Department of Agriculture to secure betterment.

Potash.—Potassic fertilisers appear to be getting a little better into supply, but competing purchasers have now opened out. For example, Scandinavia is declared to be buying Alsatian potash freely, some 20,000 tons having already been ordered. The imports of Alsatian potash into the United Kingdom during the week ending November 8 were 259 tons of 20 per cent. sylvinite and 212 tons of 14 per cent. Current quotations are as follows: Sylvinite, 14 per cent. (French kainit), £7. per ton; sylvinite, 20 per cent. (French potash salts), £8 7s. 6d.; and muriate of potash, 80 per cent., £19. 7s. 6d. per ton.

Other Fertilisers.—The bone meal market is on the dull side, and there has been no change in values; nor, apparently, are there likely to be until something happens in the supplies department. Material is certainly wanted very badly in many quarters. In the meantime, pure steamed 1—60 per cent. meal remains at £13. 10s. to £14., and 3—32 per cent. material at £15. to £15. 10s. Meat meal finds a moderate demand, with values nominally at about 30s. per unit of ammonia. There is very little dried blood offering, and values are at about the same price. Tankage offerings are very small, especially from the River Plate, and values are only nominal at about 30s. for ammonia and 2s. 6d. for phosphates.

SOUTH WALES NOTES.

(SPECIALLY CONTRIBUTED.)

Production of tinplates at the various works is now increasing, and the total output is growing satisfactorily in dimensions. The Far Eastern business is becoming a very important factor in this industry, and the demand for plates for Japan is very good. A pleasing feature in this respect is the fact that a Japanese line of steamers have commenced regular sailings from Swansea, and these will considerably help in the clearance of dock stocks of tinplates. A good sized parcel left during the week for Gothenburg, and there are signs that the Norwegian trade will become even greater than before the war.

The output of patent fuel is still on the increase. The demand, especially for foreign markets, grows week by week, so much so that very often there are no offers made by manufacturers. During the last few days record cargoes have left Swansea for foreign destinations, chiefly Tunis, Palermo, Dieppe, St. Nazaire, Naples, Genoa, and Calais. The Cardiff makers have sent shipments to Rouen and Dieppe.

On Wednesday the funeral of Mr. Samuel Williams, J.P., of Pontardulais, took place at Rhydygoch. The deceased gentleman had intimately been acquainted with the chemical industry in South Wales for many years, being one of the founders of the Pontardulais Chemical Works, and was at one time a director of Messrs. Joseph Bevan and Sons' Chemical Works. He was in his 84th year.

The number of coke ovens operating has been increased, and the by-products are being quickly disposed of. There is a ready market for sulphate of ammonia, and benzole, and the demand for pitch is of a strong character. Important cargoes of coke have been despatched from Newport to St. Malo, Treport and Port Sudan, and Cardiff ovens have supplied good quantities for Port Said.

Much satisfaction is expressed at the settlement of the dispute at the Rio Tinto ore mines in Spain. The home copper trade has suffered greatly during the last 12 or 18 months from the scarcity of ore. There arrived in Port Talbot this week 875 tons of copper precipitate, and 250 tons of unwrought copper from Huelva, and 180 tons of copper matte transhipped at Avonmouth.

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

November 3rd to 8th (inclusive).

Carbonisation of Coal, Lignite, Shale, etc. Bale, G. F. 27,090.
Insecticide. Bardsley, J. W.; and Bradley, G. W. J. 27,336.
Combustible Gaseous Compositions for Cottons, Weaving, etc.
Brownlee, R. H.; and Uhlinger, R. H. 27,290.
Electro-deposition of Aluminium. Chadaick, S.; and Walker, M. 27,490.
Smelting, etc., Furnaces. Coward, W. H. 27,369.
Asphaltic Cement or Bituminous Composition for Road-making.
Flooring, Roofing, etc. Crosbie, M. T. 27,607.
Extraction of Lead and Zinc from Ores. Elmore, F. E. 27,580.
Purification of Sewage. Hartley, C. J. and J. W. 27,295.
Chrome Alum. Hultman, G. H. 27,016.
Diaz-compounds. Knecht, E. 27,318.
Stirring-devices for Agitating Liquid. Lees, W.; and Meers, W. 27,321.
Removal of Dust from Blast-furnace Gases. Lanning, R. 27,257.
Boiling-pans and Mixing-machines. Macdonald, J. 27,436.
Reducing and Refining Apparatus. Marks, E. C. R. (National Equipment Co.). 27,120.
Extraction and Recovery of Gold from Ores. Martin, W. M. 27,039.
Evaporating Plant. Metropolitan-Vickers Electrical Co.; and Scanes, A. E. L. 27,428.
Softening or Purification of Water. Rushton, B. F. 27,019.
Phthalic Anhydride. Sasa, H. 27,221.
Pulverisers, and Process of Fine Grinding. Sevmour, F. 27,522.
Acetyl Cellulose. Silberrad, O. 26,869.
Artificial Silk. Stulemeyer, C. L. 27,209.
Pigments. Tyrer, D. 27,000.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 6d. in stamps to the Comptroller, Patent Office Sales Branch, 25 Southampton Buildings, Chancery Lane, W.C.

1918.

Destructive Distillation of Petroleum Pitch. Nemi, K. 2,432. 114,617
Destructive Distillation of Carbonaceous Materials. Peckin, F. M.; and Nitrogen Products and Carbide Co. 2,920. 134,236
Ammonia and Ammonium Compounds. Taylor, G. G.; and Knapp, I. E. 4,455. 134,237
Indicating and/or Recording Quantities of Carbon Monoxide in Hydrogen. Rideal, E. K.; and Taylor, H. S. 9,205. 134,243
Benzyl Chloride and Benzal Chloride and Homologues and Substitution Products. Levinstein, Ltd.; Levinstein, H.; and Bader, W. 12,227. 134,250
Fermentation of Cellulose. Power Gas Corporation; and Langwell, H. 15,942. 134,265
Colouring-matters. Brass, W. R. 16,939. 134,270
Ammonium Perchlorate. Aarensen, D. 17,700. 121,727
Formation of Precipitates for Example Pigments. Kidd, F. G.; and Wilkinson, Heywood, and Clark. 17,726. 134,313
Tin-soldering and Tin-coating Aluminium or Aluminium Alloys. Bloxam, A. G. (Stabilimenti Biani-Ing. A. Pouchain). 17,739. 134,315
Rectification of Hydrocarbons. De Bataafsche Petroleum Maatschappij; and Brey, J. H. C. de. 17,741. 123,522
Artificial Fuel. Bowen, R. 18,432. 134,355
Retorts and Stills. Prentice, J. 20,447. 134,406
Treatment of Effluent from Piece or Like Scouring Processes. Distillates, Ltd.; and Jarmain, G. G. 20,859. 134,410

1919

Mixing Liquid, Semi-liquid, or Viscid Materials. Sonsthagen, A. 3,117. 134,451
Centrifugal Apparatus. Loring, F. H. 10,891. 134,487
Pyrometer. Malone, J. F. J. 13,357. 134,498
Oil Extraction. Soc. Anon. Usines de Kerkelare. 14,901. 128,222

COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

1919.

Indicating at a Distance the Level of a Liquid Contained in a Tank. Ratti, G. 19,508. 134,520
Alcohol. Elektrizitätswerk Lonza. 19,573. 134,521
Oxidising Anthracene. Barrett Co. 20,707. 134,522
Explosive Compounds. Atlas Powder Co. 21,438. 134,523
Explosive Mixtures. Atlas Powder Co. 21,439. 134,524
Vaseline. Rutgerswerke Akt.-Ges. 24,047. 134,528
Degasification of Coal. Young, N. 25,276. 134,529
Alumina. Norsk Hydro-Elektrisk Kvalifikationselskab. 26,253. 134,531
Recovering Selenium and Noble Metals from Electrolytic Slimes and the Like. Chikashige, M.; and Uns, D. 26,470. 134,536

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Ferro-titanium. H. A. Blackwell, Bispham, Lancashire. British Patent, 131,675, of 1918.

Carbon-free ferro-titanium is obtained from ilmenite, by the thermo-aluminic or analogous process, by preheating

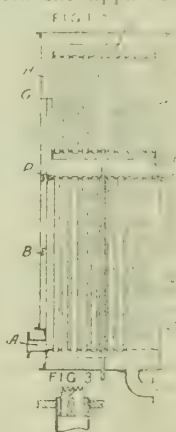
separately the ilmenite and aluminium or like reducing-agent, mixing them, and setting the heated mixture into reaction. Instead of preheating both the ilmenite and the reducing-agent, the ilmenite alone may be preheated before mixing with the reducing-agent. Low-grade ilmenite may be employed.

Cellulose Acetate Solutions, Etc. R. Gilmour and W. Dunville and Co., Belfast. British Patent, 131,647, of 1918.

Acetaldehyde, alone or mixed with other solvents or non-solvents, is employed as a solvent for cellulose acetate; suitable added solvents are acetic acid, acetone, or ethyl acetate; suitable added non-solvents are methyl or ethyl alcohol, benzene, or amyl, butyl, or isobutyl acetate. The solutions so obtained may be used as varnishes, lacquers, or dopes; in an example, cellulose acetate is dissolved in a mixture of acetaldehyde, ethyl acetate, and benzene. The mixture of acetaldehyde with other solvents or non-solvents may also be employed for joining together the surfaces of articles made of cellulose acetate or compositions thereof; examples of mixtures for this purpose are (1) acetaldehyde, acetic acid, and isobutyl acetate; (2) acetaldehyde and ethyl acetate.

Distilling Oils, Etc. E. Whittaker. Deepcar, Sheffield. British Patent, 131,365, of 1918.

Apparatus for distilling oils, etc., consists of a tubular film evaporator L, a tubular preheater E arranged below the evaporator and heated by the residues therefrom, and a dephlegmator or fractional condenser consisting of an annular chamber H encasing the evaporator and preheater. The oil enters the apparatus by a pipe A, rises through the space



around the tubes of the preheater E, and passes through openings in the upper tube-plate into an annular chamber G surrounding the evaporator L. It next overflows the wall J of the evaporator L and passes down the inner walls of the externally heated evaporator tubes in thin films. The residues flow through the preheater tubes and emerge by a pipe D. Open or close steam may be introduced into the chamber U between the evaporator and preheater. The vapours generated in the evaporator enter the upper end of the annular dephlegmator H. Condensates are collected in U-shaped rings B, and the vapours are made to bubble through the condensates by means of similar inverted rings P with serrated outer edges. A uniform distribution of the oil entering the tubes is ensured by fitting the upper ends of the tubes with a sleeve of the construction shown in Fig. 3; these sleeves may be provided with hoods. The tubular film evaporator may be replaced by a vessel consisting of two concentric rings of plates forming an annular heating-chamber and provided with a liquid-distributing device. Horizontal baffles may be provided in the space around the tubes of the preheater; these baffles consist of plates formed with apertures through which the tubes pass, leaving an annular space between the tubes and the rims of the apertures.

Filtering Medium. J. Wetter, London. (A communication from M. Weinrich, New York.) British Patent, 132,164, of 1919.

A carbonaceous filtering-medium is obtained by mixing molasses or other solutions containing sucrose, glucose, etc., with lime, comminuting the hard mass obtained, drying, and calcining, cooling the burnt material, and then either removing the free lime by washing and boiling with dilute hydrochloric acid or rendering it insoluble by means of phosphoric or carbonic acid. Insoluble materials, such as calcium phosphate, fuller's earth, kaolin, fireclay or other clay, and kieselguhr, may be added with the lime in the original mixture. Powdered caustic or slaked lime or a mixture of these is used, the proportions of the materials, the density of the solution treated, and the temperature of treatment being varied accordingly. Milk of lime may be used instead of

powder. The final product, obtained when lime only is added and the free lime afterwards removed by hydrochloric acid, is stated to be an almost pure carbon applicable for the manufacture of printer's ink. The filtering-medium may be revived after use as described in Specifications 6347/13 and 106,519.

Sulphonic Acids. H. D. Gibbs, Cherrydale, Virginia; J. A. Ambler, Norwich, Connecticut; and Selden Company, Pittsburgh, Pennsylvania, U.S.A. British Patent, 131,970, of 1918.

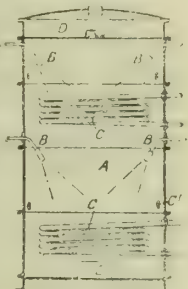
Aromatic hydrocarbons are continuously sulphonated by passing their vapours up through a descending stream of hot sulphuric acid; a tower containing baffle-plates, pebbles, or pumice may be used. The tower may be kept at temperatures at or above the boiling-point of the hydrocarbon, or by using reduced pressure, below the boiling-point. Examples are given of the production of benzene monosulphonic acid, toluene-*p*-sulphonic acid, toluene disulphonic acid, naphthalene-2-sulphonic acid, and naphthalene-2 : 7-disulphonic acid.

Percarbonates. H. Wade, London. (A communication from Deutsche Gold- und Silber-Scheideanstalt vorm. Roessler; Frankfurt-on-Main, Germany.) British Patent, 131,930, of 1917.

Alkali percarbonates are rendered stable by adding to the reagents used in their preparation, or to the finished product, magnesium silicate or chloride, alkali silicate, or gum arabic; or one of these substances may be added during manufacture and another to the finished product. In an example, magnesium silicate or chloride or alkali silicate, or a magnesium salt together with alkali silicate are added to a solution of sodium peroxide, and carbonic acid is introduced while cooling.

Salts of Organic Bases. H. N. Morris and Co., and H. N. Morris, Manchester. British Patent, 131,957, of 1918.

Aniline, toluidine, xylidene, etc., salts are formed by atomising or spraying the base, either free or in solution or emulsion into a chamber A to mix with an acid in the form of a gas or an atomised solution. The spraying is effected by sprayers B. Excessive heat due to the reactions may be prevented by circulating cold water or brine through coils C or by admitting air or inert gas through openings C'. The solids formed are removed through a man-hole E, and vapours escape through a condenser D.



Cellulose Acetates. H. Dreyfus, London. British Patent, 132,283, of 1918.

Cellulose acetate compositions for use in making dopes, films, celluloid, artificial silk, etc., contain as solvents or plastifying-agents the liquid mixtures of isomeric xylene monomethyl sulphonamides, or xylene monoethyl sulphonamides prepared from commercial xylene which contains *o*-, *m*-, and *p*-xylene. The substances may be prepared by treating xylene with chlorosulphonic acid to obtain sulphochlorides, which are treated with amines or with ammonia to form sulphonamides, which are methylated or ethylated. Other plastifying agents, such as triphenyl phosphite or tricresyl-phosphate, may be added. To neutralise traces of acid, the aliphatic derivatives of urea, which are liquid or have a lower melting-point than urea, such as mono-, di-, or tri-methyl urea, mono- or di-ethyl urea, etc., may be added.

Dyeing and Mordanting. J. Barnes, H. Wrigley, and P. Spence and Sons, Manchester. British Patent, 132,345, of 1918.

In dyeing, staining, or mordanting textiles and leather which have been treated with tannic acid, with solutions containing mixtures of titanium and iron salts, the solutions are treated with sulphuric acid or sodium carbonate to vary the acidity or basicity so as to obtain shades varying from the yellow due to titanium alone to the grey or bluish-black due to iron alone. Glauber's salts may be added to render the basic solution stable. The iron may be present in the ferrous or ferric condition. The solutions may be used in the

production of discharge effects in printing, and as mordants for subsequent dyeing with basic or adjective colours such as alizarin, logwood, etc.

Catalytic Apparatus. G. Calvert, Twickenham Park, Middlesex. British Patent, 132,120, of 1918.

In apparatus for carrying out catalytic reactions wherein one of the reacting bodies is vaporised in a boiler and the vapour is mixed with a regulated supply of the other reacting gas at the entrance of the tube containing the catalyst, the vapour is preheated by passage through a coil of piping surrounding the catalyst tube. Two constructions of apparatus for oxidising ethyl alcohol to acetaldehyde are described, identical with the apparatus for oxidising methyl alcohol to formaldehyde described in Specification 126,479.

Explosives. J. Hargreaves, Widnes; C. R. Gardner, Gathurst, near Wigan; and Roburite and Ammonal, Ltd., London. British Patent, 131,380, of 1918.

Consists in the use of dehydrated ulmin or ulmic anhydride in explosive compositions, or in admixture with or as a coating on explosive granules. Ulmin may be prepared by treating decomposed or partly decomposed cellulose with an alkali such as sodium hydrate or carbonate to form an ulmate, then with an acid such as hydrochloric acid to liberate ulmic acid, and dehydrating the mass to form the ulmic anhydride.

Benzoic Acid. F. P. Leach and United Alkali Company, Liverpool. British Patent, 132,433, of 1919.

Benzoic acid is prepared from benzyl chloride, obtained from the chlorination of toluene, by heating it with an alkali to a temperature of 80-90° C. and passing in chlorine, followed by acidulation in the usual manner.

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Concentrating Ores. T. H. Palmer, Melbourne; and H. V. Seale and R. D. Nevett, Broken Hill, New South Wales. British Patent, 132,260. Convention date, September 2, 1918.

A flotation process is carried out in the presence of a small proportion of free sulphur with or without a frothing-agent. The liquor may be acid, neutral, or alkaline, and, in the treatment of mixed sulphides, after the flotation of one mineral has been effected, a second mineral may be recovered by varying the conditions as regards temperature, acid, frothing-agent, etc. The sulphur may be mechanically mixed with the materials, or may be used as a solution in oils, tar, etc. In cases in which ores are sulphidised to render them amenable to concentration by flotation, free sulphur may be added to accelerate the action of the sulphuretted hydrogen or other sulphidising-agent used.

Esters. J. Grolea, Seine, France; and J. L. Weyler, Paris. British Patent, 131,678. Convention date, February 23, 1918.

Esters are prepared from aliphatic acids and alcohols, the more volatile of which pair of reagents boils sufficiently above 100° C. to admit of separation of water therefrom by fractional distillation, by heating the two reagents without a dehydrating agent or catalyst in a distilling vessel provided with a fractionating column, the water produced in the reaction being thus continuously removed while the more volatile component, which is used in excess, is returned to the reaction vessel; practically theoretical esterification of the less volatile component is thus obtained. Examples are given of the preparation of triacetin and dibutyl tartrate; diisoamyl tartrate, dibutyl citrate, diisobutyl citrate, and diisoamyl citrate are prepared similarly.

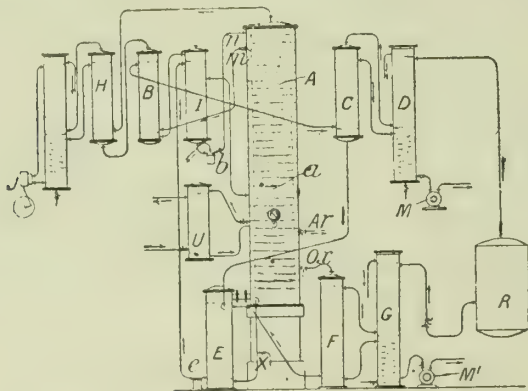
Extracting Bitumen. Rütgerswerke Akt.-Ges, 33, Lutzowstrasse, Berlin. British Patent, 131,588. Convention date, August 9, 1918.

Bituminous constituents are extracted from coal by digestion with tar oil at a temperature of 300-350° C. Anthracene oil is heated to 200° C. and small coal is added, and the mixture is stirred and heated up to 350° C. Volatile oils may be exhausted and condensed, and after several hours the mass is allowed to cool to 200° C., when a further quantity of tar oil is added, and the resulting solution is separated from the residue. The latter may be washed with tar oil,

etc., and utilised as a fuel or road material. The solution is distilled to recover the solvent oil and produce a pitch; distillation in high-pressure steam yields a viscous oil similar to that obtained by carbonising coal at low temperature, and suitable for use as a lubricant. The solution can also be used for asphaltting streets, roofing purposes, insulating material, and as a liquid fuel, a reducing agent, or a paint.

Separating Gaseous Mixtures by Liquefaction. E. Barbet and Fils and Cie, Paris. British Patent, 131,321. Convention date, January 31, 1917.

In a process for separating in a pure state and in a single continuous operation substantially the whole of the nitrogen and oxygen by subjecting air partly in the liquid state and partly in the gaseous state to continuous rectification, the liquid air and the air cooled to near the point of liquefaction are obtained by utilising the cold units of the pure gases obtained. The nitrogen issuing from the top of the rectifying column is compressed, cooled, and liquefied, and after the neon, hydrogen, and helium have been freed from it by expansion, it is returned in a liquid state to the top of the rectifier; about half of the nitrogen returned is withdrawn from the second or third plate of the rectifier for industrial use; the argon is withdrawn in a liquid state from the plate where it has a maximum concentration; a portion of the liquid at the bottom of the rectifier is withdrawn to remove xenon and krypton; pure oxygen is extracted for use a few plates above the bottom of the rectifier; and losses due to radiation are made good by supplementary condensation of gases between the point of supply of the rectifier and the point at which the argon is withdrawn. In the apparatus shown for carrying out the process, gaseous nitrogen from the top of the rectifying-column A passes through a heat-exchanger H to a pump J, the heat of compression is removed, and the nitrogen passes through the heat-exchangers H, B, I where it is liquefied. This liquid nitrogen passes through a separator *b* where the neon, hydrogen, and helium are allowed to escape and the liquid is returned at *n* to the top



of the column A. The pure nitrogen for use is withdrawn in the liquid state from the second plate of the rectifier at *m* and passes through the heat-exchangers B, C, D to cool the nitrogen to be liquefied and to cool compressed air from a reservoir R, the pure gaseous nitrogen passing through a meter M. By driving the pump J at a higher speed, the liquid nitrogen returned at *n* to the column A can be increased without increasing the amount of pure nitrogen withdrawn from the apparatus. The compressed air cooled in the heat-exchanger C passes through a heat-exchanger E containing liquid from the bottom of the column. This liquid is thereby boiled and causes boiling in all the plates of the column, the compressed air being liquefied and after passing through a valve *e* and the heat-exchanger I is passed partly in the gaseous state to the air supply plate *a* of the column. The pure gaseous oxygen for use is extracted at *Ox* a few plates from the bottom of the column and passes through heat-exchangers F, G to a meter M'. Compressed air from the reservoir R passes through the heat-exchangers G, F to the heater E and is liquefied with the compressed air from the heat-exchanger C. Argon is eliminated by withdrawing liquid at the point *Ar*. Xenon and krypton are eliminated by withdrawing liquid at X from the bottom of the column. Vapour from a plate between the supply plate *a* and the point at which argon is withdrawn is condensed in a vessel U supplied with liquid air and is returned to its

plate. In a modified form of the apparatus, the nitrogen escaping from the top of the column is passed through heat-exchangers, compressed, and liquefied by passing it through the heat-exchanger E. The gaseous oxygen withdrawn from the apparatus passes through the heat-exchangers to cool air, which is supplied in the gaseous state to the supply plate *a* of the column. Liquid air is also supplied to this plate, the liquefaction being effected in heat-exchangers by the cold units of the pure liquid nitrogen withdrawn for use.

Sulphonic Acids. E. Barbet and Fils and Cie, Paris. British Patent, 132,298. Convention date, June 26, 1917.

The process of sulphonating benzene described in the parent Specification is applied to the sulphonation of other aromatic hydrocarbons, such as naphthalene. In sulphonating naphthalene, the hydrocarbon is vaporised by means of hot combustion gases instead of steam, and the condenser for the naphthalene vapours from the sulphonating-vessel is kept warm to prevent crystallisation.

Ammonium Alum. R. Gans, Berlin. British Patent, 132,510. Convention date, September 21, 1917.

Ammonium alum is obtained comparatively free from iron by adding to aluminium sulphate solution containing ferric sulphate, an excess of ammonium sulphate, and a sufficient quantity of a base such as ammonia, to convert the ferric salt to a basic salt which is maintained in solution by the excess of ammonium sulphate, while the ammonium alum is allowed to crystallise during agitation to obtain small crystals.

GAZETTE NEWS.

LIMITED COMPANIES.—Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions, Orders, and Official and Other Notices.

Cambria Tinplate Company, Ltd.—Resolved October 6, confirmed October 22: That the company be wound up. J. S. C. Taylor, Russell Buildings, 13, St. Mary Street, Swansea, chartered accountant, liquidator. Meeting of creditors at liquidator's, November 10. Claims to liquidator by December 15.

Motor Sheet Metal Company, Ltd.—Claims to P. E. Slack, 16, Great James's Street, Bedford Row, W.C., liquidator, by December 1.

Rubel Bronze and Metal Company, Ltd.—Claims to H. S. Foster, 82, Victoria Street, Westminster, S.W., liquidator, by December 10.

Wailles Dove Bitumastic, Ltd., Newcastle-on-Tyne.—Resolved October 7, confirmed October 23: That it is desirable to reconstruct the company, and, accordingly, that the company be wound up. F. H. Hunter, Newcastle-on-Tyne, secretary, of the company, liquidator, who is authorised to consent to the registration of a new company, to be named Wailles Dove Bitumastic, Ltd. Meeting of creditors, November 10. Claims to liquidator at 5, St. Nicholas Buildings, Newcastle-on-Tyne.

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 4, Queen Anne's Gate Buildings, London, S.W. 1, whence, unless otherwise stated, further information may be obtained:—

France.

An import and export company in France are desirous of getting into touch with United Kingdom manufacturers of manures, fertilisers, etc., with a view to acting as agents for the sale of such articles in the South of France. (Reference No. 999.)

COMING EVENTS.

Institution of Petroleum Technologists.—Meeting, Tuesday, November 18, at 5.30 p.m., at the House of the Royal Society of Arts, John Street, Adelphi, W.C. 2. Paper: "The Conservation of Oil," by Rear-Admiral (Retd.) Philip Dumas, C.B.

Sweden.

A firm of commission agents in Gothenburg, who claim to be well connected with buyers in Sweden, are desirous of representing British firms in chemicals. (Reference No. 1014.)

Brazil.

A well-established firm of merchants, with branches in Brazil and selling organisation, wish to represent United Kingdom manufacturers of heavy and fine chemicals. Com-

munications should be addressed to the Secretary, Statistical and Information Department, London Chamber of Commerce, 97, Cannon Street, London, E.C. 4.

Chili.

A British subject in Santiago de Chili is desirous of representing British manufacturers in the following articles: White zinc paint (paste), cement, explosives, and fulminants. (Reference No. 1021.)

MARKET REPORTS.

GERMAN CHEMICAL MARKET.

The following market report is issued from Frankfort, accompanying a general statement on the situation: Fine silver has been dealt in at 810 marks per kilogramme, whilst nitrate of silver, chemically pure, is offered at 560 marks. It is known that even at these high prices inquiries from consumers' circles are insistent. The price of platinum too has gone higher. Only small quantities are now available at the price of 105 marks per gramme. Borax powder and crystals could be had at 9.50 marks per kilogramme, and boric acid was offered at 11.50 marks per kilogramme, but was correspondingly dearer for small quantities. Alum powder was obtainable at 90 marks per 100 kilogrammes, and crystals at about 120 marks per kilogramme. Sal ammoniac (white) was quoted at 420 marks per 100 kilogrammes. The prices for bromine preparations tended upwards. Bromide of potash was offered at 40 marks per kilogramme, whilst ammonia bromide, etc., were neglected at lower prices. These are being exported in large quantities abroad. Dibasic phosphate of soda was asked for at 4.26 marks, and tribasic at 4.15 marks per kilogramme. Sulphate of soda was hard to obtain. Concentrated goods were quoted at 175 marks per 100 kilogrammes. Sulphate of alumina could only be dealt in in small quantities at 68 marks per 100 kilogrammes. Carbon disulphide was sold in small quantities at 270 marks per 100 kilogrammes. Cyanide salts have gone dearer. Yellow prussiate of potash made 5.65 marks; whilst red prussiate of potash was offered at 15 marks per kilogramme. Permanganate of potash has become dearer, and is now fetching 54 marks per kilogramme. Chloride of calcium (90/95%) rose rapidly in price. It is now 55 to 60 marks per 100 kilogrammes, but consumers do not show any readiness to pay the price. Hydrogen peroxide, 30%, fetched 8.50 marks per kilogramme. The demand for chemicals required for preservation purposes is limited. Benzoic acid sublimate was offered at 20 marks, and benzoate of soda 19.70 marks per kilogramme. Formic acid, 50%, chemically pure, made 300 marks, and 85% technical, 400 marks per 100 kilogrammes. Oxalic acid was much inquired for; the price rose to about 500 marks per 100 kilogrammes. Acetone, chemically pure, is being dealt in 8.50 marks, per kilogramme.

TAR AND AMMONIA PRODUCTS.

WEDNESDAY.

Benzole: London, 90%, 2s. to 2s. 1d.; North, 1s. 11d. to 2s.; 50%, 1s. 10d. to 1s. 11d.; North, 1s. 9d. to 1s. 10d., naked; pure, 3s., naked, at works. Carboic acid, crude, 60%, East and West Coast, nominally 1s. 7d. to 1s. 8d.; crystals, 39-40%, 3½d. to 9d., f.o.b. Crude tar, London, 45s. to 50s.; Midlands, 44s. to 46s.; North, 45s. per ton, ex works. Refined tar, 32s. 6d. per barrel. Pitch, 80s.; East Coast, 70s. to 75s., f.o.b.; West Coast, 62s. 6d. to 65s., f.a.s. Solvent naphtha, naked, London, 90-100%, 2s. 5d.; North, 2s. 3d. to 2s. 4d.; 90-160%, naked, London, 2s. 5d.; North, 2s. 2d. to 2s. 3d. Crude naphtha, naked, 30%, 9d.; North, 8d. to 8½d. Refined naphthalene, £16. to £18.; salts, £6. to £7. Toluol, naked, London, 2s. 6d.; North, 2s. 5d. Creosote, naked, London, 6½d.; North, 5½d. to 5½d.; heavy oil, 6½d. Anthracene, 40-45%, 7d. per unit. Cresylic acid, 95%, 2s. 5d. to 2s. 6d.; 97-99%, 2s. 7d. to 2s. 8d., ex works. London, and f.o.b. other ports. Sulphate of ammonia: home trade, November £20. 15s., basis 24½%. Nitrate of soda, £22. to £22. 10s.

FERTILISER MATERIALS. LIVERPOOL, THURSDAY.

Nitrate of Soda.—There is no change in either the tone of the market or in the price of this material, the quotation on spot for 95/96% quality remaining at £20. 2s. 6d. per ton, net cash, f.o.r. for prompt delivery. East Indian Bone Meal.—Shippers of this material maintain a firm attitude, the quota-

tion for November-December shipment being £17. 10s. per ton, net cash, ex ship Liverpool, for 4½% ammonia, and 52% phosphates. On spot Liverpool, holders require £17. 10s. per ton, net cash, for 4½% and 45% quality. Mineral Phosphates.—There is no change to report in this market and values at present are only nominal. Dried Blood.—This article is very scarce and full prices are being paid for any parcels available, the value being about 32s. 6d. per unit of ammonia per ton, net cash.

LONDON METAL MARKET.

THURSDAY.

Copper: Standard brands, £100. 15s. 0d. to £101. 0s. 0d., cash; £102. to £102. 5s. 0d. three months; electrolytic, £112. to £117. Tin: Standard, £281. 15s. 0d. to £282. cash; £282. 15s. 0d. to £283. three months; Straits, £282.; English, £281. to £282. Lead: Soft foreign, £34. 10s. 0d.; English, £35. 10s. 0d. Spelter, £47. 10s. 0d.; hard, £33. to £34. Antimony, English regulus, 90%, £47. 10s. Aluminium, £150. Nickel, £205., delivered; packages extra. Quick-silver, £17. 5s. to £17. 10s. Bismuth, 12s. 6d. Platinum, 442s. per oz. Wolfram, 32s. 6d. per unit.

MANCHESTER CHEMICAL MARKET.

THURSDAY.

The demand continues good for all heavy chemicals, both for home and export trade. Values generally are well maintained. Caustic soda, 70%, in strong request at £24. 10s. to £25. per ton. Makers are well engaged with orders for bleaching powder, and price firm at £17. softwoods, on rails. High prices are being obtained for resale parcels of bicarbonate soda and 58% alkali, and supplies are short. Chlorate of soda is in fair inquiry at 6d. per lb. Potash quiet at 1s. per lb. Roasted saltcake unchanged at 70s. per ton, carriage paid. Recovered rock sulphur, £17. on rails. There is very little improvement in demand for copper sulphate, and price easy at £40. per ton f.o.b. Borax continues scarce and dear. Hypo-sulphate of soda (commercial) firm at £19. per ton. Commercial sodium sulphide in good request, and price higher at £23. in drums. Phosphate of soda £28. per ton. White powdered arsenic still short, and price firm at £60. per ton. Yellow prussiate of potash only moving slowly at 1s. 9d. per lb. Soda is well inquired for, and price dearer at 1s. 1d. per lb. Acetic acid and acetate of soda are unaltered at recent rates. Owing to the advance in metal, lead salts have an upward tendency. White is now £84. Brown £68. and nitrate £55. per ton. English brown and grey acetate of lime is also higher at £12. 10s. and £19. per ton respectively. Miscible wood naphtha 10s. 6d. per gallon. Barium chloride is only selling slowly, and price easy at £23. per ton. Nitrate of soda scarce and dear at £60. per ton. Oxalic acid steadier at 1s. 1½d. per lb. delivered. Green copperas in better demand, but price unchanged.

SWANSEA MARKET REPORT.

THURSDAY.

Tinplates are in strong demand, and prices have advanced to 44s. to 45s. per standard box f.o.b. Swansea. Copper is somewhat easier, and fairly active at £100. cash and £101. 5s. three months. Tin easier at £279. 5s. prompt, and £279. 10s. three months. Lead more active and firmness well maintained at £33. 12s. 6d. for Spanish and £34. 10s. for English. Spelter had a steady trade at £44. 15s. per ton over next two months. Zinc sheets firm at £67. per ton for English, and Americans easier at £66. 10s. at New York. Antimony very steady at £47. 10s. Aluminium £150. Quicksilver £17. 10s. per bottle. Silver 68½d. per ounce. Nickel £205, delivered London or equal. Palm oil steady: Lagos £87.; softs £86. 10s.; Benin, £86.; and hards £84. per ton. Turpentine steady at £6. 8s. 6d. per cwt. Linseed oil quiet, and rather scarce. Sulphate of copper steady, with small sales at £40. per ton f.o.b. Sulphate of ammonia very steady at £20. 15s. per ton

for this month's delivery. Nitrate of soda quiet at 21s. 6d. per cwt. in bags. Bone meal quiet at £17. 10s. per ton net. Pitch remains rather scarce at 62s. 6d. per ton at ship. Oxalic acid remains quiet at 1s. 0½d. per lb. Arsenic in poor demand at £58. per ton for white powdered f.o.b. Linseed oil scarce at 91s. per cwt. net cash.

TURPENTINE MARKET REPORT.

Messrs. James Watt and Son, Ltd., of 101, Leadenhall Street, London, E.C. 3, report that the stocks of turpentine on November 8 were: American, 33,932 barrels, compared with 3,501 barrels at the corresponding date of 1918; French, 1,074 barrels (797 barrels); and Spanish, 318 barrels (1,140 barrels). Deliveries during the week ended November 8 were 1,790 barrels, against 665 barrels last year, and since January 1, 64,047 barrels, compared with 21,940 barrels in 1918. The price on Saturday last was 126s. 9d. per cwt., compared with 105s. at the corresponding date of last year. November-December delivery was quoted at 127s. 6d., and January-April (1920) 129s. 3d.

LIVERPOOL CHEMICAL MARKET.

THURSDAY.

Business in chemicals has again been active, an improved demand having been made for supplies on export account. The strike in the United States has caused a number of inquiries to be made at Liverpool for supplies on U.S. account, but local makers and sellers have not been able to meet these in any large way, owing to the shortage of stocks at hand, or likely to be at an early date. Bleaching powder has been more inquired for and available stocks are small. The quotation for home trade uses is £17. per ton, free on rail or conveyance, in buyers' packages, and for export, £15. to £18. per ton. Chloride of calcium has been in fair request, and is £8. to £11. per ton, in casks, f.o.r. Caustic soda has met with a brisk inquiry, an increased demand on Continental account having been made. For 76%, £24. per ton is being quoted; for 70 to 72%, £22. per ton, and for 60 to 62%, £21. per ton. Nitrate of soda has sold rather more freely, and is £21. to £22. per ton. Saltcake has been in very fair request, and is £6. 10s. per ton in casks, f.o.b. Soda crystals have been well inquired for, and are £5. 10s. per ton, in 2cwt. bags, f.o.r. at works. Bicarbonate of soda has been in fairly brisk demand, and is £8. 5s. to £10. per ton, according to terms of delivery. Borax has been in good request, and is £39. per ton for ordinary, and £40. per ton for powdered, in bags, less 3% for lots of not less than 50 tons. Ammonia alkali has met with an active inquiry, and is £6. 10s. to £6. 15s. per ton, f.o.r. at works. Hyposulphite has been in moderate request, and is £18. 10s. per ton for ordinary, and £22. per ton for pea crystals in 1cwt. bags. Sulphite of sodium has been in quietly steady demand, and is £10. per ton for ordinary, and £16. to £18. per ton for pea crystals, in 1cwt. kegs. Sulphide of sodium has been in fair request, and is £22. per ton in casks, and £23. per ton in drums. Prussiate of soda has been quiet, and is 11d. to 1s. per lb. Bichromate of soda has been in moderate request, and is 9½d. per lb. Phosphate of soda has been in limited demand, and is £26. per ton. Chlorate of potash has been more inquired for, and is 1s. to 1s. 1d. per lb. Permanganate has been in quietly steady demand, and is 3s. 6d. per lb. Sulphate of potash has been quiet, and is £25. per ton. Carbonate of potash has been in very fair request, and is £95. to £100. per ton for 80 to 85%. Caustic potash has sold somewhat freely, and is £120. per ton. Nitrate of potash has been rather more in request, and is £55. to £60. per ton for refined, and £40. per ton for ordinary. Canadian potashes have been quiet. First quality Montreal are £200. to £220. per ton and second quality, £190. to £210. per ton. Bichromate of potash has been more inquired for, and is 1s. 6d. to 1s. 7d. per lb. Yellow prussiate of potash has been in fair demand, and is 1s. 9d. to 1s. 10d. per lb. Salammuniac has been steadily called for, and the supply, at hand, has been very limited. Prices have advanced and are: £90. per ton for first quality; £85. for second quality, and £5. per ton extra for crushed. Sulphate of ammonia has been quieter. Prices are: £20. 15s. per ton, for November; £21. for December; £21. 7s. 6d. for January, 1920; £21. 15s. for February, and £22. per ton for March to May, 1920. Carbonate of ammonia has been in fair request, and is 6½d. per lb. Muriate has been but little called for, and is £18. to £50. per ton. Magnesia has been rather more in request. Carbonate is £2. 5s. per cwt., and sulphate £11. to £16. per ton, according to grade. Alum has been in very fair demand, but has again been in small supply for prompt or early deliveries; £18. 10s. per ton is quoted for

home trade uses, and £18. 10s. to £19. 10s. per ton, for export. Aluminoferric has been very quiet, and is £8. 10s. to £12. per ton, according to quality. Sulphate of alumina has been in moderate request, and is £12. to £17. per ton according to grade. Sulphur has been in good request. English flowers are £32 per ton, roll is £28. per ton and rock, £22. per ton, in bags, f.o.r. Sicilian grades are; flowers, £28. per ton; roll, £22. 10s. per ton, and rock, £17. 15s. per ton. Cream of tartar has been in quietly steady demand, and is £12. to £12. 5s. per cwt. Tartaric acid has been in fair request, and is 3s. 2d. to 3s. 3d. per lb. Boracic acid has been rather more in demand. Crystals are £72. per ton, and powdered, £74. per ton. For delivery in casks, from £2. to £3. per ton extra is charged. Oxalic acid has been quieter, and is 1s. to 1s. 1d. per lb. Citric acid has been in moderate request, and is 4s. 3d. per lb. White acetate of lead has been but little in request, and is £83. per ton. Arsenic has again been in fair request, and is £58. to £60. per ton for white powdered. Sulphate of copper has been more inquired for, and is £40. per ton for the home trade, and £40. to £41. per ton, less 5%, in casks, f.o.b. at Liverpool.

TYNE CHEMICAL REPORT.

TUESDAY.

Market continues very firm, and there is a steady demand for home and export, caustic soda and bleaching powder in particular. Locally soda crystals are in strong request at £5. 10s. per ton 2cwt. bags. Sulphur remains scarce and firm at £22. per ton.

The following prices are per ton net:—Bleaching powder, softs and hards, £17.; caustic soda, 76/77%, £24.; 74/76%, £23. 10s., do., 70%, £22. 5s., do., 60%, £21. 10s.; recovered sulphur, 2cwt. bags, £22.; hyposulphite of soda, 5/7cwt. casks, £19., 1cwt. kegs, £25.; sulphite of soda, 5/7 casks, £12., do., 1cwt. kegs, £20.; silicate of soda, 75Tw., £9. 12s. 6d., do., 100Tw., £10.; do., 140Tw., £10. 10s.; soda crystals, 2cwt. bags, £5. 10s.; sulphate of soda (saltcake), in bulk, £4.; pure white sulphate of alumina, £19. 10s.; blanc fixe, £22. sulphide of sodium, crystals, £18., do., refined concentrated solid, 60/62%, £25.; hydrate of barium, crystals, £56.

COALS.—Market very firm and the position of collieries generally is satisfactory. Business is active and there is more trade than can be dealt with. To-day's quotations: Best Northumbrian steam coals, 95s. to 100s. per ton, seconds, 90s. to 95s.; Northumbrian small coals, 75s. to 80s., seconds, 67s. 6d. to 72s. 6d.; best Durham gas coals, 80s. to 85s., seconds, 65s. to 75s.; Durham bunkers, 70s. to 80s., seconds, 65s. to 67s. 6d.; foundry coke, 100s.; gas coke, 95s. to 100s.

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Wednesday.

There continues a good demand for all classes of chemicals, and during the past week the volume of business has been steadily increasing. Prices are of a fluctuating character, with the tendency being decidedly upward, and in this connection it may be mentioned that arsenic is now quoted at £64. (as against £62. per ton previously); bicarbonate of soda £10. 10s. and £12. 10s. for 6-8cwt. casks and 1cwt. kegs (as against £9. 15s. and £10. 10s. previously); salammuniac, £95. and £85. (as against £90. and £85. previously); and saltpetre, £3. 2s. (as against £3. previously). Current quotations now stand as follows: Arsenic, £64. per ton, net, Glasgow; bicarbonate of soda, £10. 10s. and £12. 10s. per ton for 6-8cwt. casks and 1cwt. kegs, net. Liverpool; boracic acid crystals, English refined, £72 for 2cwt. bags; and borax crystals, £39. for 2cwt. bags, carriage paid; caustic soda, white, 70-72%, £25. per ton net, Glasgow; chlorate of potash, 1s. 1d. per lb., net, Glasgow; chloride of soda, 8d. per lb., net, Glasgow; citric acid, 4s. 4d. per lb., 5%, Glasgow; cream of tartar, 98%, £11. 15s. per cwt., net, Glasgow; paraffin wax, U.K. deliveries, 1250, 6½d. to 6½d.; 121-30, 5½d. to 5½d.; 118-200, 5d.; 110-120, 4d. to 4½d.; and 98-1020, 4d. to 4½d.; salammuniac, £95. and £85. per ton, net, any port, for first and second lump respectively; salammuniac crystals, £70. per ton, net, Glasgow; saltpetre, £3. 2s. net, Glasgow; tartaric acid, 3s. 3d. per lb., 5%, Glasgow.

Among the whale oils business is also good, and some big deals are reported as having been transacted during the past week. The whale oils continue to show much the old level of values, but pale is now stronger at 94s. as against 92s. previously. Brown and black, however, still keep to the former level of 76s. and 74s. respectively; while yellow is still conspicuous only by its absence. Newfoundland cod is

still on offer at 80s. (its old price); and there are no changes recorded as far as pale seal is concerned at 96s. and Menhaden at 80s.

In the coal trade everything is moving on the old lines with, if anything, an increasing demand for all classes of fuel.

There is now a cold snap in the air which has caused an expansion of the demand from the domestic standpoint, and industrially there is plenty of work going on in the different local shipbuilding, engineering and other works to call for a big consumption of fuel.

IMPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LIST OF CONTRACTIONS USED IN THE IMPORT AND EXPORT LIST.

Blus.	Balloons.	Cbys.	Carboys.	Gals., Gl.	Gls.	Qnty.	Quantity (otherwise undeclared).	qr.	Quarters.
Bls.	Bales.	Css. or Cs.	Cases.	or Gl.	Gallons.			lb.	Pounds.
Brls.	Barrels.	Cks.	Casks.	Hf. pps.	Half pipes.				
Bgs.	Bags.	Chts.	Chests.	Hhds.	Hogsheads.	Rnlt.	Runlets.		
Btls.	Bottles.	Cylds.	Cylinders.	Kgs.	Kegs.	Sks.	Sacks.		
Bdls.	Bundles.	Dms. Drs.	Drums.	Ozs.	Ounces.	Slbs.	Slabs.		
Bskts.	Baskets.	Djns.	Demijohns.	Pks.	Packages.	Tes.	Tierces.		
Bxs.	Boxes.	Frkns.	Firkins.	Pns. Puns.	Punchcons.	t. c.	Tons. Cwts.		

Note.—There is no information available as to the net weights of the various items, nor do we recognise in them any standard.

BRISTOL.

Publication of Official Returns Suspended.

GLASGOW.

Week ending November 8.

DYESTUFFS—
Myrabolans
Calcutta, 1,200 pkgs.

GLUE—
Boston, 50 bgs.

IRON PYRITES—
Huelva, 2,496 t.

PITCH—
Archangel, 50 brls.

SALT—
Antwerp, 1 cs.

TAR—
Archangel, 1,830 brls.

GOOLE.

Week ending November 8.

GLUE—
Antwerp, 8 bgs.

GRANGEMOUTH

Week ending November 8.

CAUSTIC POTASH—
Rotterdam, 62 drms.

ROSIN—
Christiania, 43 brls.

TURPENTINE—
Christiania, 6 brls.

GRIMSBY.

Week ending November 8.

DYESTUFFS (otherwise undecorated)—
Antwerp, 287 cks.; Dieppe, 30 cks.

HULL.

Week ending November 8.

BARYTES—
Barcelona, 96 brls.

FERRO SILICON—
Christiania, 130 cs.

GLUE—
Rotterdam, 6 cks.

LITHIOPONE—
Rotterdam, 40 cks.; Denia, 200 brls.

MANGANESE—
Gothenburg, 50 cs.

TAR—
Gothenburg, 6 brls.

TAR PITCH—
Gothenburg, 15 cs.

WHITE LEAD—
Montreal, 89 cks.

ZINC SLAG—
Christiania, 21 brls.

LEITH.

Week ending November 8.

NIL.

LIVERPOOL.

Week ending November 8.

ANILINE COLOURS—
Hamburg, 9 cs.

BARIUM CARBONATE—
Pt. Aransas, 606 bgs.

BARIUM SULPHATE—
Barcelona, 200 cks.; Tarragona, 892 brls.

BARYTES—
Genoa, 320 bgs.

BEES WAX—
Boston, 7 cs.; Montreal, 57 cs.;
Marseilles, 85 bdls.

CARNAUBA WAX—
Lisbon, 84 bgs.

CHLOROPHYLL—
Amsterdam, 3 cks.

COPPER PRECIPITATE—
Huelva, 209 bgs.; W. C. Africa, 4 bxs.

CREAM OF TARTAR—
Bordeaux, 35 cks.; Palermo, 220 cks.

DYESTUFFS—
Argols
Messina, 64 cks.

Chestnut Extract—
Genoa, 500 brls.; 900 cs.; Leghorn, 148 brls.; Pt. Aransas, 1,000 brls.

Cutch—
Rangoon, 300 bxs.

Indigo—
Genoa, 5 cs.

Myrabolan Extract—
Calcutta, 1,712 bgs.

Myrabolans—
Calcutta, 13,268 pkts., 2,000 pkgs.; Bombay, 9,407 pkgs.

Sumac—
Palermo, 1,118 bgs.

Tanning Extract—
Baltimore, 2,339 bdls.; Genoa, 45 brls.

Turmeric—
Bombay, 111 bgs.

FATTY ACIDS—
Amsterdam, 407 brls.

GLUE—
Bordeaux, 18 brls.

MINERAL WHITE—
Bordeaux, 1,480 bgs.

OCHRE—
Rouen, 155 cks.

PARAFFIN WAX—
Calcutta, 667 bgs.

PINE TAR—
Pensacola, 500 brls.

PLUMBAGO—
Genoa, 300 bgs.

PYRITES—
Huelva, 4,519 t.

ROSIN—
Bordeaux, 1,172 cks.; Pensacola, 3,750 brls.; Savannah, 1,009 brls.; Lisbon, 67 cks.; Para, 7 cks.; Valencia, 400 kgs.

SILICO MANGANESE—
Bordeaux, 117 cks.

SOAP—
Boston, 200 brls.

SODIUM CHLORATE—
Rouen, 500 cks.

STEARINE—
Antwerp, 63 bgs.

SULPHUR—
Naples, 2,720 bgs., 115 brls.

TALLOW—
Hankow, 983 cs.; Nanking, 160 cs.; Bombay, 40 cks.; Zarate, 2,327 tes.

TAR—
Marseilles, 40 cks.

TARTARIC ACID—
Marseilles, 50 cks.; Palermo, 100 cks.

TURPENTINE—
Pensacola, 1,115 brls.

WAX—
Marseilles, 10 cs.

WOOD OIL—
Hankow, 1,200 cs., 596 cks.

ZINC OXIDE—
Antwerp, 10 brls.

LONDON.

Week ending November 8.

ACID—
Holland, £16.

ALUMINA SULPHATE—
France, £51.

AMMONIUM NITRATE—
Norway, 39 cks.

ARSENIC—
Germany, 10 t.; Portugal, £1,000.

BARYTES—
Holland, 68 cks., 400 bgs.

BEES WAX—
British India, 47 brls., 184 cs.; Portuguese E. Africa, 198 bxs.; U.S.A., 773 cs.

CALCIUM LACTATE—
France, £40.

CHEMICALS (otherwise undecorated)—
France, 5 pkgs.

CITRATE OF LIME—
B.W.I., £4,480.

DYESTUFFS—
Aniline Dye
Switzerland, 1,276 pkgs.

Argols—
France, 7,807 pkgs.; Portugal, 510 pkgs.

Chestnut Extract—
France, 100 cks.

Dyewood Extract—
U.S.A., 5 pkgs.

Myrabolans—
British India, 10,610 pkgs., £5,880; Italy, 265 pkgs.; Spain, 47 pkgs.

Tanner's Bark—
France, 5 t.

Tanning Extract—
British India, 20 cs.

Turmeric—
British India, 100 pkgs.

FISH OIL—

Japan, 3,470 cs.; N.Z., 57 drms.; Portugal, 30 cks.

GELATINE—
Belgium, £2,007.; France, £1007.; Japan, £285.; Spain, £236.

GLUE—
Belgium, £1,150.; France, £889.

GLUE SIZE—
Spain, £123.

HYDROGEN PEROXIDE—
U.S.A., £1,100.

LITHIOPONE—
Holland, 80 cks.

MAGNESIUM CHLORIDE—
Germany, £148.

MAGNESITE—
Germany, £200.

OXALIC ACID—
Holland, £213.; Sweden, 80 cks., 37 brls.

PITCH—
Finland, 20 brls.

POTASSIUM BROMIDE—
Denmark, £120.

POTASSIUM PRUSSATE—
Holland, 31 pkgs.

ROSIN—
Denmark, 2 cs.; France, 605 cks.; Greece, 77 brls.; Portugal, 78 cks.; U.S.A., 208 cks., 450 brls.

STEARINE—
Belgium, 13 bgs.; N.S.W., 53 cks.

TALLOW—
Channel Islands, 334 t.; N.Z., 50 t.; N.S.W., 173 t.; Victoria, 41 t. 3 c.; W. Australia, 17 t. 10 c.

TAR—
Sweden, 100 brls.; U.S.A., 500 brls.

TARTARIC ACID—
Holland, 36 pkgs.; Italy, 112 pkgs.

WAX—
British India, 12 pkgs.; Germany, 20 bgs.

WOOD OIL—
China, 100 cks.

ZINC OXIDE—
Holland, 50 cks.

ZINC WHITE—
N.S.W., 61 brls.

MANCHESTER.

Week ending November 8.

ANTIMONY SALTS—
Rouen, 10 cks.

FORMIC ACID—
Rouen, 32 cks.

MAGNESIUM SULPHATE—
Alexandria, 80 brls.

SILICO MANGANESE—
Rouen, 105 cks.

SODIUM NITRATE—
Rouen, 50 cks.

TARTAR EMETIC—
Rouen, 90 cks.

MIDDLESBROUGH.

Week ending November 8.

NIL.

NEWCASTLE-ON-TYNE

Week ending November 8.

OXIDE—

Almeria, 48 brls.

N. & S. SHIELDS.

Week ending November 8.

NIL.

SWANSEA.

Week ending November 8.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

BRISTOL.Publication of Official Returns
Suspended.**GLASGOW.**

Week ending November 8.

AMMONIUM CARBONATE—
Calcutta, £154.; Rangoon, £44.;
Singapore, £40.**AMMONIUM PHOSPHATE**
Havre, £975.**AMMONIUM SULPHATE—**
Kobe, 1,006 bgs.; Yokohama,
2,221 bgs.**CAUSTIC SODA—**
Genoa, 403 drms.; Leghorn,
172 drms.; Naples, 59 drms.;
Rangoon, 25 drms.**CHEMICALS (otherwise undescribed)**
Antwerp, 100 pkgs.; Barcelona,
40 pkgs.; Buenos Ayres, £155.;
Genoa, 218 pkgs.; Kobe, 444
pkgs.; Penang, 5 pkgs.; Singa-
pore, 313 pkgs.; Yokohama, 317
pkgs.**COAL PRODUCTS (otherwise undes.)**
Alexandria, £172.; Antwerp,
£2,053.; Buenos Ayres, £240.;
Genoa, £1,170.; Montreal, £20.;
Rangoon, £1,163.**DISINFECTANTS (otherwise undes.)**
Rangoon, £21.; Singapore, £10.**DYESTUFFS (otherwise undescribed)**
Antwerp, £389.**DYESTUFFS—**
Tanning Extract
Alexandria, £939.**GLUE, SIZE, AND GELATINE**
Alexandria, £55.**LEAD NITRATE—**
Antwerp, £54.; Bordeaux, £10.**MAGNESIUM CARBONATE**
Havre, 194 pkgs.**PARAFFIN WAX**
Antwerp, 30 t. 1 c.; Naples,
150 t.**POTASSIUM BICHRIMATE—**
Alexandria, £331.; Calcutta, £85.;
Valencia, £59.**POTASSIUM CHROMATE**
Antwerp, 310 pkgs.**ROSIN—**
Alexandria, £64.**SHEEP DIP**
Barcelona, £114.; Buenos Ayres,
£1,415.**SOAP—**
Antwerp, 6 bxs.; Calcutta, 6
bxs.; Penang, 200 bxs.; Ran-
goon, 171 bxs.; Singapore, 139
bxs.**SODIUM BICARBONATE**
Genoa, £33.**SODIUM CHROMATE**
Bordeaux, 4 t. 15 c.**TANNIC ACID**
Havre, £50.**TAR (WOOD)**
Alexandria, £40.; Rangoon, £35.**GOOLE.**

Week ending November 8.

NIL.

GRANGEMOUTH

Week ending November 8.

BORIC ACID—
Stockholm, 1 t. 19 c.**PITCH—**
Genoa, 2,150 t.**GRIMSBY.**

Week ending November 8.

NIL.

HULL.

Week ending November 1.

BEE'S WAX
Mantyluoto, 1 ck.**BLEACHING POWDER—**
Rotterdam, 107 cks.**CAUSTIC SODA—**
Catania, 35 drms.; Palermo,
25 drms.**CHEMICALS (otherwise undescribed)**
Aarhus, 6 cs., 4 cks., 121 drms.;
Antwerp, 18 cs., 17 cks., 50 bgs;
21 kgs.; Calais, 14 drms.,
10 cks., 1 kg.; Christiania, 1 cs.,
68 cks., 20 kgs., 5,364 slbs.;
Esbjerg, 7 bgs.; Mantyluoto,
1 ck.; Rotterdam, 45 drms.,
1 kg., 28 cks., 343 pkgs., 374 bgs.;
Trieste, 40 drms.**CHROME ORE—**
Rotterdam, 10 t.**COAL PRODUCTS—**
Tar
Rafio, 100 brls.**DYESTUFFS (otherwise undescribed)**
Christiania, 10 c.**GLUE—**
Christiania, 60 bgs.**PARAFFIN WAX**
Aarhus, 24 brls.**PITCH—**
Dunkirk, 1 ck.; Rotterdam,
6 drms., 9 cks.**PLUMBAGO—**
Christiania, 2 cks., 1 t. 8 c.**SOAP—**
Antwerp, 774 cs.; Aarhus, 101
cs.; Dunkirk, 15 brls.; Rotter-
dam, 10 cs.; Trieste, 10 brls.**SODA**
Mantyluoto, 19 bgs.**TAR**
Antwerp, 43 cs., 1 drim.; Rauno,
50 brls.; Wasa, 1 cs.**LEITH.**

Week ending November 8.

POTASSIUM BICARBONATE
Ghent, 15 c., £125.**SODIUM BICARBONATE**
Antwerp, 5 t. 13 c., £80.; Ghent,
12 c., £63.**LIVERPOOL.**

Week ending November 8.

ACETIC ACID
Arica, 1 c., £6.; Galatz, 3 c.,
£20.; Secondee, 2 c., £20.;
Smyrna, 5 c., £18.**ALUM**
Barcelona, 2 t., £40.; Burutu,
1 c., £2.; Buenos Ayres, 1 t.
18 c., £125.; Cheribow, 5 t. 18 c.,
£108.; Lyttleton, 1 t. 6 c., £21.;
Manaos, 2 qrs., £5.; Para, 2 c.,
£3.; Patras, 2 t., £36.; Rio de
Janeiro, 1 t. 19 c., £43.; Rouen,
1 t. 2 c.; Sydney, 1 t. 2 c., £22.;
St. John's, N.F., 1 c., £2.; Soer-
abaya, 5 t. 18 c., £102.; Velo, 3 t.,
£55.; Winnebuh, 2 c., £3.**ALUM AMMONIA—**
Iquique, 1 c., £8.**ALUMINOFERRIC**
Antwerp, 20 t. 1 c., £294.**AMMONIA**
Acera, 1 c., £6.; Iquique, 3 c.,
£20.; Lagos, 1 c., £9.; Piraeus,
1 t. 2 c., £35.; Reval, 6 c., £20.**AMMONIUM CARBONATE—**
Calcutta, 10 c., £35.; Calcutt,
1 t., £79.; Cartagena, 1 t. 19 c.,
£134.; Gothenburg, 17 t., £1,041.;
Kobe, 13 t. 6 c., £801.; Mar-
seilles, 2 t. 10 c., £168.; Moji,
1 t. 19 c., £202.; New York,
3 t. 15 c., £219.; Penang, 10 c.,
£33.; Para, 1 c., £8.; Patras,
1 t. 2 c., £66.; Tuticorin, 1 t.,
£79.; Yokohama, 31 t. 15 c.,
£1,914.**AMMONIUM CHLORIDE—**
Buenos Ayres, 2 c., £13.;
Iquique, 2 c., £15.; Reval, 1 c.,
£3.; Talcuhano, 2 c., £5.**AMMONIUM MURIATE—**
Alexandria, 3 t., £173.; Buenos
Ayres, 10 c., £35.; Galatz, 8 c.,
£22.; Gijon, 1 t. 4 c., £72.;
Lisbon, 19 c., £50.; Naples,
2 t. 10 c., £159.; Piraeus, 19 c.,
£58.; Rotterdam, 19 c., £49.;
Santander, 1 t. 19 c., £117.;
Zante, 2 c., £3.**ANTIMONY SALTS—**
Barcelona, 6 c., £170.**ANTIMONY SULPHIDE—**
Barcelona, 4 c., £27.; Gijon,
1 t. 6 c., £55.; Para, 1 c., £5.**ARSENIC—**
Barcelona, 1 t., £57.; Buenos
Ayres, 1 t. 19 c., £142.; Calcutta,
2 t., £143.; Valencia, 1 t., £57.**BARIUM CARBONATE—**
Sydney, 1 t., £19.**BARIUM CHLORIDE—**
Barcelona, 3 t., £72.**BITUMASTIC SOLUTION—**
Aden, 20 drms.**BLEACHING POWDER**
Bilbao, 2 t. 10 c., £45.; Bombay,
21 t. 4 c., £376.; Buenos Ayres,
9 t. 19 c., £167.; Calcutta, 55 t.,
£822.; Gothenburg, 146 t. 9 c.,
£1,692.; Havre, 30 t. 13 c., £360.;
Hong Kong, 20 t., £320.; Lisbon,
55 t. 18 c., £1,521.; Rouen,
29 t. 17 c., £351.; Syra, 2 t. 1 c.,
£33.; Valencia, 5 t. 1 c., £78.**BORAX**
Antwerp, 21 t. 2 c., £946.;
Duala, 2 c., £6.; Iquique, 1 c.,
£7.; Manaos, 2 c., £13.; Palermo,
1 t. 10 c., £75.; St. John's, N.F.,
3 c., £15.; Valparaiso, 2 c., £5.**BORIC ACID—**
Antwerp, 2 c., £7.; Para, 2 c.,
£16.; Piraeus, 10 c., £48.; Reval,
1 t., £71.; Valparaiso, 2 c., £13.;
Wiborg, 8 c., £37.**CALCIUM CARBONATE**
Acera, 7 c., £10.; Duala, 3 c.,
£9.; Kano, 2 c., £2.; Lagos, 3 c.,
£7.; Opobo, 10 c., £22.; Winne-
bah, 9 c., £20.**CALCIUM CHLORIDE**
Auckland, 20 t. 2 c., £155.;
Barcelona, 2 t. 13 c., £23.;
Bombay, 71 t. 15 c., £605.;
Fremantle, 10 t. 2 c., £69.;
Karachi, 5 t. 1 c., £37.; Pt. Said,
10 t. 1 c., £69.; Pt. Elizabeth,
15 t. 1 c., £75.; Pt. Harcourt,
6 c., £3.; Rangoon, 16 t. 1 c.,
£110.; Reval, 4 c., £19.; Singa-
pore, 2 c., £37.**CALCIUM SULPHATE**
Iquique, 1 c., £5.**CAUSTIC SODA—**Adelaide, 29 pkgs.; Calcutta,
9 drms.; Durban, 105 cs.; Fre-
mantle, 21 pkgs.; Macassar,
10 pkgs.; Patras, 11 pkgs.;
Paramaribo, 60 pkgs.; Porto
Alegre, 50 pkgs.; Yokohama,
1,079 pkgs.**CHEMICALS (otherwise undescribed)**
Gothenburg, 1 t. 1 c., £41.;
Malta, 2 c., £11.; Smyrna, 1 t.
1 c., £62.**CHROME ACETATE—**
Rio de Janeiro, 1 t., £36.**CITRIC ACID—**Bahia, 5 c., £115.; Bilbao, 1 t.,
£480.; New York, 1 t., £452.;
Reval, 5 c., £120.; Valparaiso,
6 c., £120.**COAL PRODUCTS (otherwise undes.)**Accra, 2 t. 6 c., £36.; Algoa Bay,
4,000 galls., £150.; Bamako,
6 t. 8 c., £37.; Barranquilla, 8 c.,
£7.; Bissau, 15 c., £9.; Cape
Palmas, 7 c., £3.; Cape Town,
14,000 galls., £525.; Dunkwa, 1 t.,
£7.; Iddo, 6 c., £3.; Iquitos,
2 c., £3.; Grand Bassam, 7 c., £3.;
Jebba, 4 c., £3.; Lagos, 2 t. 2 c.,
£28.; Lisbon, 10 t., £90.;
Manaos, 1 t. 6 c., £11.; Rufisque,
1 t., £13.; Secondee, 1 t. 2 c.,
£11.**COAL PRODUCTS—**Aniline Dye
Barcelona, 1 t. 4 c., £721.;
Boston, 1 c., £103.; Kobe, 3 c.,
£938.; Rio de Janeiro, 1 qr.,
£39.; Yokohama, 4 t. 3 c., £1,384.**Carbolic Acid**
Calcutta, 2 t. 6 c., £88.; Galatz,
16 t. 5 c., £34.; Piraeus, 15 c.,
£56.**Cresosote**
Mombasa, 125 galls., £6.**Creolina**
Porto Alegre, 2 t. 18 c., £209.;
Rio de Janeiro, 7 t. 8 c., £956.**Cresylic Acid**
Gothenburg, 14 t. 16 c., £509.;
Monte Video, 5 t. 12 c., £168.**Dyes**
Oporto, 1 t., £202.; Shanghai,
18 c., £109.**Naphthalene**
Addah, 1 c., £6.; Buenos Ayres,
10 t. 2 c., £210.; Copenhagen,
1 t. 2 c., £37.**Pitch**
Cadiz, 750 t., £2,625.**Tar**
Savanilla, 9 c., £6.**COPPER SULPHATE—**Beyrout, 10 t. 14 c., £97.; Bor-
deaux, 170 t. 8 c., £5,112.;
Calcutta, 27 t. 16 c., £401.;
Callao, 4 t. 19 c., £45.; Constant,
10 c., £20.; Ibicury, 1 c., £3.;
Karachi, 2 t. 10 c., £102.; Lagos,
5 c., £10.; Madras, 10 c., £79.;
Monte Video, 23 t. 19 c., £968.;
Napier, 10 c., £20.; Timaru, 1 t.,
£40.; Volo, 29 t. 18 c., £763.**DISINFECTANTS (otherwise undes.)**
Bombay, 10 t. 14 c., £124.;
Calcutta, 3 t. 9 c., £141.;
Colombo, 8 c., £14.; Delagoa
Bay, 6 t. 14 c., £352.; Durban,
13 t. 7 c., £704.; Galatz, 4 t. 6 c.,
£108.; Gibraltar, 15 c., £54.;
Gothenburg, 1 t. 3 c., £204.;
Iddo, 1 c., £5.; Iquitos, 19 galls.,
£25.; Grand Bassam, 1 c., £4.;
Koko, 9 galls., £5.; Kilindini,
1 t. 5 c., £49.; La Guaira, 1 t.
16 c., £104.; Manaos, 6 c., £26.;
Madras, 9 c., £20.; Pt. Said,
1 t. 5 c., £95.; Pt. Cortez, 1 c.,
£3.; Para, 2 qrs., £6.

DYESTUFFS (*otherwise undescribed*)
Patras, 1 c., \$2.; Sapele, 2 q., \$2.;
Secocondee, 1 c., \$5.; Singapore,
7 t. 3 c., \$372.; Savanna, 2 c.,
\$4.; Valencia, 2 c., \$7.; Winne-
bah, 19 c., \$48.

DYESTUFFS (*otherwise undescribed*)
Christiania, 2 c., \$60.; Genoa,
19 t. 15 c., \$11,972.; Havre, 1 t.,
\$211.; Lisbon, 2 c., \$48.; Madras,
1 t. 4 c., \$391.; Montreal, 16 c.,
\$273.; Palermo, 1 c., \$49.;
Smyrna, 10 c., \$77.; Toronto,
3 t. 13 c., \$892.

DYESTUFFS—
Aniline Dye
Quebec, 1 t., \$480.

FERRO MANGANESE—
Baltimore, 460 t.; Copenhagen,
30 t.; Montreal, 7 t.; New
Orleans, 430 t.

GLUE—
St. Lucia, 2 pkgs.

GLUE, SIZE, AND GELATINE—
Yokohama, 150 pkgs.

GLYCERINE (DISTILLED)—
Constantinople, 30 pkgs.

HYDROCHLORIC ACID—
Callao, 2 c., \$15.

IRON AND AMMONIUM CITRATE
Bordeaux, 1 c., \$31.

IRON OXALATE—
Bordeaux, 1 c., \$10.

IRON SULPHATE—
Reval, 4 c., \$3.

JODELITE—
Pt. Sudan, 4 t. 7 c., \$70.

LACTIC ACID—
Piraeus, 30 lbs., \$22.

LEAD CARBONATE—
Iquique, 8 c., \$10.

MAGNESIUM CARBONATE—
Barcelona, 2 c., \$5.; Para, 2 qrs.,
\$8.

MAGNESIUM CHLORIDE—
Adelaide, 9 c., \$10.; Bangkok,
2 t., \$39.; Bombay, 44 t. 16 c.,
\$753.; Ferrol, 10 t. 15 c., \$188.;
Lisbon, 11 c., \$10.; Porto Alegre,
1 t., \$25.; Rouen, 10 t. 4 c., \$220.;
Valencia, 10 c., \$11.

MAGNESIUM SULPHATE—
Abo, 2 t., \$24.; Accra, 1 c., \$5.;
Beira, 10 c., \$11.; Bombay,
25 t., \$233.; Corinto, 5 c., \$10.;
Elmina, 2 c., \$2.; Iquique, 5 c.,
\$10.; Manaos, 1 c., \$2.; Rio de
Janeiro, 2 t. 7 c., \$31.; Rouen,
40 t., \$560.; Seconde, 1 c., \$2.;
St. John's, N.F., 18 c., \$36.;
Sierra Leone, 2 c., \$5.; Sav la
Mar, 5 c., \$9.

MURIATIC ACID—
Manaos, 2 qrs., 12 c.; Zanzibar,
2 c., \$6.

OXALIC ACID—
Lisbon, 10 c., \$70.; Melbourne,
1 t., \$145.

PHOSPHORUS AMORPHOUS—
Calcutta, 3 c., \$30.

PITCH—
Argentina, 10 t., \$350.; Bathurst,
1 c., \$1.; Iquique, 1 t. 16 c., \$37.;
Rouen, 10 t. 8 c., \$200.

POTASSIUM BICHROMATE—
Barcelona, 1 t. 14 c., \$273.;
Canea, 11 c., \$51.; Halifax, 2 c.,
\$32.; Rouen, 1 t., \$230.; Valen-
cia, 1 t. 2 c., \$178.

POTASSIUM CARBONATE—
Lisbon, 2 c., \$14.

POTASSIUM CHLORATE—
Coquimbo, 2 qrs., \$7.; Iquique,
3 c., \$40.; Reval, 5 c., \$29.;
Vigo, 2 c., \$14.

POTASSIUM NITRATE—
Para, 1 c., \$11.; Sav la Mar, 1 c.,
\$5.

POTASSIUM PRUSSATE—
Ibicy, 2 c., \$22.

POTASSIUM SULPHATE—
Buenos Ayres, 8 c., \$25.; Las
Palmas, 5 t., \$205.

POTASSIUM TARTRATE—
Helsingfors, 2 c., \$25.

ROSIN OIL—
Venice, 20 brls.

SALAMMONIAC—
Beyrout, 9 c., \$36.; Bombay,
8 t. 11 c., \$504.; Buenos Ayres,
6 c., \$25.; Cape Town, 1 t., \$63.;
Constantinople, 4 t. 19 c., \$319.;
Gothenburg, 1 t. 1 c., \$79.; Para,
1 t., \$76.; Piraeus, 3 t., \$218.;
Prevesa, 2 c., \$7.; Stamboul,
1 t., \$72.

SALICYLIC ACID—
Reval, 1 c., \$15.

SALT—
Aalborg, 200 t.; Abonema, 76 t.;
Adelaide, 10 t.; Antwerp, 16 t.;
Lome, 3 t.

SALTPETRE—
Atterboe, 2 c., \$9.; Bilbao, 10 c.,
\$45.; Burutu, 1 c., \$3.; Halifax,
5 c., \$26.

SHEEP DIP—
Algoa Bay, 5 t. 16 c., \$375.;
Auckland, 7 t., \$245.; Bathurst,
1 c., \$1.; Beira, 12 c., \$38.;
Buenos Ayres, 58 t. 2 c., \$3,589.;
Buena Ventura, 2 t. 4 c., \$144.;
Cartagena, 10 c., \$99.; Delagoa
Bay, 1 t., \$59.; Durban, 13 t. 4 c.,
\$781.; Invercargill, 13 t., \$455.;
Napier, 17 t. 1 c., \$534.; Nelson,
4 t. 14 c., \$174.; Patras, 2 c.,
\$5.; Rio Gallegos, 35 t. 11 c.,
\$1,514.; San Julian, 11 t. 15 c.,
\$438.; Wellington, 9 t. 8 c.,
\$350.

SILVER NITRATE
Helsingfors, 20 lbs., \$66.

SOAP—
Algiers, 760 bxs.; Algoa Bay,
22 cs.; Amboina, 100 cs.; Anto-
fagasta, 3 cs.; Antwerp, 5 bxs.,
632 cs.; Athens, 200 cs.; Bar-
bados, 920 bxs.; Bahia, 2 bxs.;
Banjoervan, 300 bxs.; Bangkok,
105 bxs.; Batavia, 565 bxs.;
Bucharest, 5,150 bxs.; Callao,
600 cs.; Calabar, 20 bxs.; Cape
Coast, 500 bxs.; Caracas, 6 bxs.;
Casablanca, 515 bxs.; Chinde,
400 bxs.; Christiania, 222 cs.;
Colombo, 69 cs.; Constantinople,
58 cs.; Demerara, 4,527 bxs.,
250 cs.; Duala, 585 bxs., 130 cs.;
Elmina, 100 bxs.; Galatz, 1,858
cs.; Madras, 31 bxs.; Manizales,
2 cs.; Malta, 2 cs., 50 bxs.;
Melilla, 10 bxs.; Mohammedah,
460 bxs.; Opobo, 560 cs.; Oran,
135 cs.; Orotava, 56 bxs.; Para,
150 bxs.; Pt. Harcourt, 200 bxs.;
Porto Barrios, 1 bx.; Sabang,
25 bxs.; St. Lucia, 112 bxs.;
Saltpond, 100 bxs.; Samarang,
10 bxs.; Santander, 1 pkg.;
Schiedam, 20 pkgs.; Seconde, 100
pkgs.; Shanghai, 815 pkgs.;
Singapore, 2,621 pkgs.; Smyrna,
130 pkgs.; Sydney, 47 bxs.;
Tangiers, 400 bxs.; Winnebah,
3 bxs.

SODA ASH—
Adelaide, 191 pkgs.; Buenos
Ayres, 1,323 pkgs.; Calcutta,
3,167 pkgs.; Genoa, 171 pkgs.;
Gothenburg, 1,858 pkgs.; Kobe,
1,966 pkgs.; Montreal, 5 pkgs.;
Parnahyba, 19 pkgs.; Smyrna,
15 pkgs.; Vigo, 29 brls.; Yoko-
hama, 3,787 pkgs.

SODA CRYSTALS—
Alexandria, 150 pkgs.; Bombay,
140 pkgs.

SODIUM BICARBONATE—
Alexandria, 100 pkgs.; Bombay,
3,000 pkgs.; Brisbane, 234 pkgs.;
Calcutta, 450 pkgs.; Cologne,
500 pkgs.; Yokohama, 1,077
pkgs.

SODIUM CYANIDE—
Batavia, 15 cs.

SODIUM SILICATE—
Bombay, 66 pkgs.; Buenos
Ayres, 100 pkgs.; Cartagena,
30 pkgs.; Fremantle, 232 pkgs.;
Funchal, 32 pkgs.; Valparaiso,
17 pkgs.

STEARINE—
Trieste, 62 brls.

SULPHUR—
Iquique, 1 c., \$10.; Iquitos, 2 c.,
\$4.; Manaos, 1 c., \$10.

SULPHUR—
Para, 1 c., \$9.

SULPHURIC ACID—
Callao, 3 c., \$15.; Mombasa,
9 c., \$20.; Suez, 43 t. 8 c., \$668.;
Zanzibar, 16 c., \$36.

SUPERPHOSPHATE OF LIME—
Teneriffe, 53 t.

TALLOW—
Cologne, 60 cks.

TANNIC ACID—
Piraeus, 40 lbs., \$32.; Reval,
1 c., \$50.; Smyrna, 10 c., \$54.

TAR—
Madeira, 3 t. 13 c., \$62.; Mom-
basa, 250 galls., \$9.

TARTARIC ACID—
Bahia, 5 c., \$81.; Callao, 18 c.,
\$322.; Reval, 2 c., \$33.; Val-
paraiso, 6 c., \$135.

VEGETABLE PITCH—
Lagos, 1 t. 9 c., \$15.

VEGETABLE TAR—
Lagos, 5 c., \$11.

WOOD PRESERVATIVE—
Bilbao, 3 t. 15 c., \$80.; Curacao,
3 c., \$5.; Para, 1 c., \$10.;
Wellington, 10 c., \$14.

ZINC CHLORIDE—
Dunedin, 8 c., \$21.; Karachi,
8 c., \$23.; Rangoon, 3 t. 2 c.,
\$156.; Vera Cruz, 9 c., \$26.

LONDON.

Week ending November 5.

ACETIC ACID—
Alexandria, 2 cs., \$8.; Auckland,
10 cs., \$26.; Channel Islands,
2 cs., \$6.; Galatz, 20 cbs., \$125.;
Genoa, 27 cks., \$345.; Port
Moresby, 10 cs., \$22.; Salonica,
11 cbs., \$75.

ACETO SALICYLIC ACID—
Genoa, 5 cs., \$114.; Perth (F.),
1 cs. (pt.), \$7.; Shanghai, 1 cs.,
\$9.

ACETONE—
Brussels, 1 drim., \$33.

ALUM—
Bahia, 1 t., \$35.; Calcutta, 5 c.,
\$15.; Durban, 4 c., \$7.; Mel-
bourne, 5 c., \$7.; Piraeus, 10 c.,
\$11.

AMMONIA—
Bangkok, 2 cs., \$15.; Beira,
6 cs., \$12.; Boulogne, 28 drms.,
\$265.; Bombay, 10 cs., \$34.;
Buenos Ayres, 4 cs., \$10.; Cape
Town, 25 cs., \$48.; East London,
7 cs., \$14.; Delagoa Bay, 5 cs.,
\$10.; Durban, 27 cs., \$51.;
Hong Kong, 5 cs., \$11.; Karachi,
7 cs., \$14.; Lourenco Marques,
10 cs., \$19.; Pt. Elizabeth, 5 cs.,
\$10.; Santos, 4 cs., \$13.;
Shanghai, 5 cs., \$10.; Suez, 1 cs.,
\$6.; Tasquah, 2 cs., \$4.; Trini-
dad, 4 cs., \$7.

AMMONIA (ANHYDROUS)—
Pt. Said, 5 cys., \$30.; Suez,
12 cys., \$220.

AMMONIUM BENZOATE—
Calcutta, 1 cs. (pt.), \$9.

AMMONIUM BROMIDE—
Bombay, 2 cs. (pt.), \$27.; Perth,
(F.), 1 cs. (pt.), \$8.

AMMONIUM CARBONATE—
Barranquilla, 2 c., \$11.; Bang-
kok, 1 c., \$8.; Buenos Ayres,
1 t. 19 c., \$156.; Calcutta, 8 c.,
\$43.; Cape Town, 6 c., \$22.;
Cartagena, 1 c., \$6.; Fremantle,
1 t., \$70.; Gibraltar, 2 c., \$8.;
Kobe, 2 t. 10 c., \$149.; Parangua,
10 c., \$52.; Payta, 2 c., \$11.;
Penang, 2 t., \$174.; Pt. Eliza-
beth, 4 c., \$15.; Rangoon,
2 t. 7 c., \$164.; Samarang, 4 c.,
\$14.; Trondjheim, 2 t. 15 c.,
\$193.; Wellington, 2 c., \$7.;
Yokohama, 5 t., \$300.

AMMONIUM CHLORIDE—
Canton, 1 cs., \$7.; Calcutta,
1 cs., \$9.; Penang, 1 cs., \$4.;
Sydney, 1 ck., \$6.

AMMONIUM CITRATE
Calcutta, 1 cs., \$18.

AMMONIUM HYDRATE—
Calcutta, 1 cs. (pt.), \$21.

AMMONIUM HYDROSULPHIDE—
Brussels, 3 cs., \$13.

AMMONIUM IODIDE—
Piraeus, 3 cs. (pt.), \$8.

AMMONIUM MURIATE—
Smyrna, 6 c., \$30.

AMMONIUM PERSULPHATE—
Yokohama, 4 cs. (pt.), \$10.

AMMONIUM PHOSPHATE—
Montreal, 7 cks., \$150.; Piraeus,
1 ck., \$14.

AMMONIUM VANADATE—
Yokohama, 4 cs. (pt.), \$18.

AMYL ACETATE—
Hong Kong, 3 cs., \$89.; Paris,
7 drms., \$105.

AMYL ALCOHOL—
Yokohama, 2 cs., \$21.

AMYL NITRITE—
Santiago, Chili, 1 cs., \$6.

ANTIMONY SULPHIDE—
Copenhagen, 1 ck., \$28.; Dun-
kirk, 7 cks., \$147.; Genoa,
7 cks., \$137.; Halmstad, 1 ck.,
\$24.; Montreal, 2 cks., \$125.;
Paris, 13 cks., \$240.

ANTIMONY TARTRATE—
Copenhagen, 1 ck., \$18.

ARSENIC—
Bordeaux, 9 t. 4 c., \$478.
Malta, 2 c., \$9.
Rio de Janeiro, 1 t., \$90.

ARSENIC HYDROCHLORIDE
Calcutta, 1 cs., \$5.

BARIUM HYDRATE—
Antwerp, 1 ck., \$9.

BARIUM NITRATE—
Barcelona, 1 ck., \$15.

BARIUM SULPHIDE—
Bombay, 3 cs., \$25.; Calcutta,
3 cs., \$22.

BENZOIC ACID—
Calcutta, 1 cs. (pt.), \$8.

BENZYL CHLORIDE—
Brussels, 1 drim., \$83.

BISMUTH—
Bombay, 3 cs., \$232.; Calcutta,
2 cs., 3 cs. (pt.), \$376.; Lisbon,
1 cs. (pt.), \$18.; Monte Video,
1 cs., \$18.; Perth, 1 cs., \$6.

BISMUTH CARBONATE—
Cape Town, 1 cs., \$16.; Calcutta,
1 cs. (pt.), 3 cs., \$197.; Santiago,
Chili, 1 cs., \$56.

BISMUTH SALTS—
Shanghai, 1 cs. (pt.), \$18.

BISMUTH SUBNITRATE—
Calcutta, 1 cs. (pt.), \$33.

BLEACHING POWDER—
Bombay, 3 c., \$14.

BORAX—
Aden, 6 c., \$13.; Antwerp, 15 t.,
\$805.; Bombay, 5 t., \$195.;
Barranquilla, 10 c., \$23.; Colon,
4 c., \$10.; Dantzig, 10 t., \$550.;
Durban, 5 c., \$17.; East London,
6 c., \$21.; Galatz, 10 c., \$19.;
Gibraltar, 3 c., \$6.; Madras,
1 t. 5 c., \$49.; Malta, 10 c., \$21.;
Rio de Janeiro, 1 t. 10 c., \$72.;
Rio Grande do Sul, 5 c., \$10.;
Alsace, via Rotterdam (F.), 10 t.,
\$100.; Vienna, via Rotterdam
(F.), 20 t., \$785.; Sydney, 5 t.,
\$327.; Tientsin, 1 c., \$6.

BORIC ACID—
Alexandria, 8 c., \$30.; Bombay,
9 c., \$44.; Calcutta, 7 c., \$32.;
Canton, 5 c., \$20.; Malta, 1 c.,
\$5.; Peking, 2 c., \$8.; Penang,
(F.), 12 c., \$47.; Shanghai, 6 c.,
\$25.; Stockholm (F.), 2 t., \$144.;
Tientsin, 3 c., \$19.

CALCIUM CARBIDE
Channel Islands, 1 t. 15 c., \$75.

CALCIUM CHLORIDE—
Colombo, 10 c., \$7.; Marseilles,
1 t. 3 c., \$12.

CALCIUM HYPOPHOSPHITE—
Bombay, 2 cs. (pt.), \$12.; Genoa,
2 cs., \$78.; New York, 80 cs.,
\$1,680.; Toronto, 1 cs., \$45.

CARBON BISULPHIDE

Durban, 6 cs., £21.; Copenhagen, 20 drms., £30.

CARBON TETRACHLORIDE

Antwerp, 1 drin., £35.

CERESINE WAX

Yokohama, 12 c.

CHEMICALS (otherwise undescribed)

Autofagasta, 1 cs., £11.; Antwerp, 4 pkgs. (pt.), £1,302.; Auckland, 2 pkgs., £30.; Bangkok, 1 cs., £20.; Canton, 2 cs., £19.; Buenos Ayres, 3 cs. (pt.), £22.; Calcutta, 1 cs., £17.; Dominica, 1 cs., £24.; Durban, 12 cs., £61.; East London, 9 cs., £57.; Haifa, 1 cs., £8.; Malta, 2 cs., £10.; Penang, 1 cs., £13.; Perth, 3 cs., £42.; Pt. Elizabeth, 1 cs., £11.; Rio de Janeiro, 1 cs., £16.; Sydney, 9 cs. (pt.), £208.; Tientsin, 1 cs., £18.; Trinidad, 6 cs. (pt.), £33.

CHLORIDE OF LIME

Pernambuco, 17 c., £16.

CITRIC ACID

Amsterdam, 10 c., £226.; Spain, via Calais, 1 t., 19 c., £937.; Callao, 1 c., £27.; Cologne (F.), 1 t., £504.; Melbourne, 1 cs. (pt.), £5.; Montreal, 3 t. 15 c., £1,696.; Perth, 1 cs., £23.; Pt. Elizabeth, 2 c., £45.; Sydney, 2 t., £862.; Valencia (F.), 2 c., £49.

COAL PRODUCTS

Alizarine
Bombay, 105 cks., £3,317.; New York, 5 cks., £128.

Aniline Colour
Genoa, 35 kgs., £1,336.

Aniline Dye
Amsterdam, 4 kgs., £69.; Bombay, 188 pkgs., £7,731.; Brussels, 1 ck., £34.; Cape Town, 3 pkgs., £50.; Gothenburg, 2 cks., £180.; Mauritius, 1 cs. (pt.), £26.; Paris, 6 kgs., £88.; Port Elizabeth, 4 pkgs., £80.

Benzole
Durban, 1 cs., £9.

Bisnitrotolul
Paris, 1 ck., £28.

Bitumen
Genoa, 54 cks., £101.

Carbolic Acid
Amoy, 3 cs., £30.; Bombay, 23 cs., £66.; Channel Islands, 7 cks., £55.; Gothenburg, 4 cs., £43.; Melbourne, 5 cs., £8.; Rangoon, 74 drms., £23.; Singapore, 5 cks., £29.; Taganrog, 20 cs., £125.

Cresosote
Amsterdam, 25 cks., £93.

Cresylic Acid
Melbourne, 20 drms., £21.

Naphthalene
Aden, 4 kgs., £18.; Montreal, 58 cks., £216.; Pt. Elizabeth, 2 cs., £15.; Taganrog, 20 cks., £186.

Nitronaphthalene
Lisbon, 1 kg., £35.

Paranitraniline
Paris, 35 cks., £88.

Pitch
Alexandria, 400 brls., £337.; Calais, 236 t., £1,003.; Mauritius, 25 brls., £26.; Rotterdam, 2,600 t., £8,000.

Tar
Beira, 50 drms., £20.; Cape Town, 100 drms., £9.; Cebu, 12 drms., £26.; Delagoa Bay, 60 drms., £7.; Durban, 535 drms., £50.; Malmo, 750 cks., £1,225.; Mauritius, 15 runlets, £33.; Pt. Elizabeth, 183 drms., £24.; Pt. Sudan, 20 drms., £16.

Tar Oil
Dunkirk, 136 cks., £263.

Toluol
Bangkok, 1 cs., £7.

COPPER SULPHATE

Salonica, 1 t., £45.

COPPER SULPHOCYANIDE

Copenhagen, 5 drms., £31.

COPPERAS

Brussels, 4 cks., £7.

CREAM OF TARTAR

Adelaide (F.), 1 t. 13 c., £379.; Barranquilla (F.), 6 c., £88.; Bombay, 2 t. 3 c., £556.; Brussels, 4 c., £39.; Beira (F.), 1 cs., £6.; Copenhagen, 2 c., £25.; Delagoa Bay (F.), 2 c., £50.; Durban, 1 cs. (pt.), £6.; Durban (F.), 4 c., £68.; Fremantle, 9 c., £118.; East London (F.), 2 c., £30.; Manta (F.), 1 cs. (pt.), £7.; Rangoon (F.), 3 c., £42.; Brisbane (transit) (F.), 8 t., £1,440.; Cairns (transit) (F.), 3 t. 6 c., £594.; Melbourne (transit) (F.), 14 t. 10 c., £2,610.; Sydney (transit) (F.), 3 t. 16 c., £684.

DISINFECTANTS (otherwise undescribed)

Aden, 18 c., £10.; Antigua, 9 c., £14.; Alexandria, 15 c., £64.; Amoy, 4 c., £5.; Bangkok, 3 c., £20.; Blantyre, 2 c., £7.; Bombay, 6 t. 2 c., £328.; Brussels, 1 t. 5 c., £47.; Cape Town, 1 t. 19 c., £109.; Durban, 1 t. 2 c., £40.; Hong Kong, 5 t. 5 c., £286.; Klang, 2 t. 6 c., £55.; Medan, 2 t. 6 c., £108.; Montreal, 3 t. 11 c., £78.; Penang, 1 t. 13 c., £75.; Pernambuco, 3 c., £8.; Pt. Elizabeth, 1 t. 13 c., £50.; Porto Alegre, 2 c., £5.; Pt. Swettenham, 2 t. 10 c., £99.; Rio de Janeiro, 4 c., £10.; Rangoon, 16 c., £16.; Singapore, 7 t. 16 c., £386.; Swatow, 4 c., £5.; Tarquah, 1 c., £7.; Tientsin, 1 c., £11.; Trinidad, 1 t. 8 c., £35.; Shanghai, 9 c., £28.

ETHER

Calcutta, 4 cs., £21.; Talcahuano, 1 cs., £16.

ETHER (METHYLIC)—
Bombay, 2 cs., £14.

ETHER (SULPHURIC)

Rangoon, 1 cs. (pt.), £6.; Talcahuano, 1 cs., £6.

FATTY ACIDS

Paris, 20 t.

FISH OIL

Ghent, 1 t. 8 c.

FORMALDEHYDE

Santiago, Chili, 2 cs., £14.

GALLIC ACID

Sydney (F.), 1 cs., £42.

GELATINE

Montreal, 1 t.; Toronto, 2 t.

GLUE

Rio de Janeiro, 7 c.; Toronto, 7 c.

GLUE, SIZE, AND GELATINE

Amsterdam, 3 c.; Antwerp, 1 t. 5 c.; Bergen, 1 t. 2 c.; Bombay, 10 c.; Cape Town, 2 t. 1 c.; Calcutta, 1 t. 19 c.; Colombo, 7 c.; Cologne, 5 t.; Copenhagen, 2 t. 17 c.; Dantzig, 1 t.; Dunedin, 2 t.; Durban, 1 c.; East London, 1 c.; Karachi, 10 c.; Melbourne, 7 c.; Paris, 1 t. 3 c.; Perth, 1 c.; Pt. Elizabeth, 3 c.; Pt. Said, 6 c.; Rangoon, 1 c.; Rockhampton, 2 c.; Rotterdam, 13 t. 8 c.; Santos, 4 c.; Sydney, 3 c.; Yokohama, 2 t.

GLYCERINE (DISTILLED)

Barcelona, 4 t. 6 c., £540.; Bahia, 3 c., £35.; Bangkok, 4 c., £34.; Buenos Ayres, 2 c., £30.; Calcutta, 2 c., £16.; Dantzig, 10 c., £65.; Durban, 1 c., £5.; Hong Kong, 1 c., £7.; Monte Video, 1 c., £16.; Paris, 2 t. 5 c., £250.; Peking, 1 c., £7.; Tientsin, 3 c., £26.

GLYCEROPHOSPHATES

Alexandria, 1 cs., £32.

HYDROBROMIC ACID

Colombo, 1 cs., £21.

HYDROCHLORIC ACID

Bombay, 2 c., £11.

HYDROGEN PEROXIDE

Batavia, 4 cs., £6.; Cape Town, 4 cs., £28.; Colombo, 4 cs., £17.; Italy, 1 cs., £19.; Mauritius, 12 cs., £55.

IODINE

Genoa, 4 cs., £404.; Perth, 1 cs. (pt.), £26.

IODINE (RESUBLIMED)

Bilbao, 2 cs., 1 cs. (pt.), £221.; Shanghai, 1 cs. (pt.), £16.

IRON AND AMMONIUM CITRATE

Boulogne, 1 cs., £55.; Shanghai, 1 cs., £42.; Sydney, 3 cs., £78.

IRON AND AMMONIUM OXALATE

Montreal, 2 cs., £42.

IRON & POTASSIUM TARTRATE

Calais, 1 cs., £25.

IRON CARBONATE

Sydney, 5 cs., £13.

IRON CITRATE

Amsterdam, 2 cs., £58.; Ghent, 2 cs., £62.

IRON OXALATE

Sydney, 1 cs. (pt.), £5.

IRON PERCHLORIDE

Singapore, 2 cs., £12.

IRON, POTASSIUM, & SODIUM GLYCEROPHOSPHATE

Constantinople, 5 cs., £305.

KIESERLITZ

Piraeus (F.), 10 t., £180.

LACTIC ACID

Calais (F.), 25 cks., £370.; Rostoff-on-Don, 2 cs., £150.

LEAD ACETATE

Genoa, 48 cks., £830.; Lisbon, 2 cks., £40.

LITHIUM CARBONATE

Genoa, 1 ck., £100.

MAGNESIA

Bombay, 8 cs., £275.

MAGNESIA (CALCINED)

Boulogne, 30 cs., £177.; Dunkirk, 6 cs., £57.; Las Palmas, 1 cs., £8.; Montreal, 1 cs., £6.; Rio de Janeiro, 3 cs., £46.; Santiago, Chili, 1 cs., £11.

MAGNESIUM CARBONATE

Auckland, 2 cs., £8.; Barcelona, 60 bgs., £150.; Invercargill, 2 cs., £9.; Durban, 1 cs. (pt.), £6.; Malaga, 25 bgs., £15.; Perth, 1 kg., £5.; Shanghai, 150 bgs., £375.

MAGNESIUM CITRATE

Accra, 1 cs., £9.; Buenos Ayres, 4 cs., £38.; Havana, 2 cs., £9.; Malta, 1 cs., £5.; Monte Video, 4 cs., £38.; Smyrna, 1 cs., £9.

MAGNESIUM SULPHATE

Accra, 15 c., £30.; Amoy, 5 c., £7.; Beira, 5 c., £10.; Brisbane, 1 t. 2 c., £44.; Cape Town, 10 c., £14.; Cartagena, 12 c., £29.; Colon, 6 c., £15.; Corinti, 1 t. 10 c., £71.; Durban, 9 c., £20.; Horianopolis, 1 t. 1 c., £31.; Guayaquil, 9 c., £23.; Launceston, 1 t. 3 c., £45.; Melbourne, 3 t. 11 c., £135.; Panama, 5 c., £13.; Peking, 5 c., £10.; Porto Alegre, 13 c., £34.; Secondee, 5 c., £9.; Shanghai, 4 c., £6.; Sydney, 8 t., £329.; Tientsin, 3 c., £6.

MERCURIALS

Bombay, 2 cs., £70.; Calcutta, 1 cs. (pt.), £6.; Hong Kong, 1 cs. (pt.), £8.

MERCURY OXIDE

Calais, 2 cs., £140.

MERCURY OXYDATE

Amsterdam, 1 cs., £85.

MERCURY PERCHLORIDE

Calcutta, 2 cs., £10.

METHYL ALCOHOL

Durban, 20 drms., £386.

METHYL SALICYLATE

Santos, 1 cs. (pt.), £12.

MIRBANE OIL

Antwerp, 1 drin., £7.; Lourenco Marques, 2 drms., £33.

MURIATIC ACID

Aden, 1 c., £6.; Santos, 2 t. 8 c., £143.

NICKEL SULPHATE

Antwerp, 2 cks., £28.

NITRIC ACID

Piraeus, 9 c., £63.

NUCLEIC ACID

Calais, 2 cs. (pt.), £49.

OXALIC ACID

Melbourne, 1 ck., £10.; Santiago, Chili, 1 cs. (pt.), £6.

PARAFFIN SCALE

Copenhagen, 10 t.

PARAFFIN WAX

Antwerp, 2 t.; Paranagua, 1 t. 2 c.

PHOSPHATE

Channel Islands (F.), 27 t., £81.

PHOSPHORIC ACID

Treport, 10 cs., £88.; Yokohama, 4 cs. (pt.), 2 cs., £96.

PITCH

Galatz, 10 t.

PLUMBAGO

Bangkok, 10 c.; Fremantle, 2 t. 13 c.; Piraeus, 1 t.

POTASSIUM ACETATE

Alexandria, 4 cs. (pt.), £41.; Calcutta, 2 cs., 4 cs. (pt.), £44.; Lisbon, 1 cs. (pt.), £8.

POTASSIUM BICARBONATE

Calcutta, 1 cs., £8.; Perth, 1 kg., £9.

POTASSIUM BROMIDE

Bangkok, 1 cs., £27.; Colombo, 1 cs., £12.; Bombay, 2 cs. (pt.), £35.; Hong Kong, 1 cs., £6.; Melbourne (F.), 1 cs. (pt.), £10.

POTASSIUM CHLORATE

Galatz, 2 c., £50.

POTASSIUM CITRATE

Bombay, 1 cs., £26.; Lisbon, 1 cs. (pt.), £5.; Hong Kong, 4 cs. (pt.), £7.

POTASSIUM CYANIDE

Bombay, 1 cs. (pt.), 1 cs., £15.; Calcutta, 2 cs. (pt.), 6 cs., £75.; Calais, 10 cs., £125.

POTASSIUM FERROCYANIDE

Bangkok, 2 cs., £58.; Melbourne, 1 cs. (pt.), £7.; Hong Kong, 1 cs. (pt.), £10.

POTASSIUM IODIDE

Amsterdam, 1 cs., £168.; Bangkok, 3 cs., £221.; Genoa, 28 cs., £2,307.; Rio de Janeiro, 2 cs., £198.; Tarquah, 1 cs. (pt.), £7.; Shanghai, 1 cs., £77.

POTASSIUM METABISULPHITE

Buenos Ayres, 25 cks., £353.; Paris, 1 t. 10 c., £365.

POTASSIUM MURIATE

Channel Islands (F.), 12 t., £240.

POTASSIUM PERMANGANATE

Calcutta, 4 c., £85.

POTASSIUM PROTOXIDE

Galatz, 1 kg., £21.

POTASSIUM PRUSSATE

Mauritius, 1 c., £12.

POTASSIUM SULPHOCALCATE

Calcutta (F.), 1 cs. (pt.), £10.

POTASSIUM TARTRATE

Hong Kong, 5 pkgs. (pt.), £69.

PYRO ACID

Durban, 1 cs. (pt.), £6.; Melbourne (F.), 1 cs. (pt.), £45.

QUININE

Bombay, 8,094 ozs.; Buenos Ayres, 960 ozs.; Calcutta, 2,282 ozs.; Montreal, 47,000 ozs.; New York, 15,000 ozs.

ROSIN

Mauritius, 18 c.

SALAMONIA

Durban, 5 c., £16.; Teneriffe, 1 c., £5.

SALICYLIC ACID

Aalborg (F.), 1 cs., £10.; Bangkok, 1 cs., £14.; Hong Kong, 1 cs. (pt.), £14.; Trinidad, 1 cs., £7.

SALT

Antwerp, 145 t.; Bombay, 2 t. 11 c.; Cairns, 2 c.; Casablanca, 26 t.; Dunedin, 5 t.; Gothenburg, 1 t.; Madras, 2 t.; Trinidad, 3c.

SALTPETRE

Bilbao, 18 t., £1,091.; Bombay, 3 c., £13.; Calcutta, 1 c., £6.; Durban, 1 t., £64.; Lagos, 2 c., £7.; Monte Video, 8 c., £22.; Montreal, 1 t., £52.; Paranagua, 1 c., £14.; Pt. Elizabeth, 12 c., £37.; Rio de Janeiro, 1 t. 10 c., £87.; Valencia, 1 t. 10 c., £80.

SHEEP DIP—

Bluff, 2 t., £113.; Buenos Ayres, 56 t. 4 c., £3,300.; Dunedin, 2 t. 5 c., £125.

SILVER NITRATE—

Calcutta, 1 cs. (pt.), £21.; Piraeus, 3 cs. (pt.), £20.; Rostoff-on-Don, £309.

SOAP—

Adelaide, 1 c.; Alexandria, 3 c.; Amsterdam, 15 c.; Antwerp, 405 t. 17 c.; Auckland, 4 c.; Barbados, 4 c.; Barcelona, 1 t. 4 c.; Belawan, 3 c.; Beira, 3 c.; Bergen, 3 t. 14 c.; Bluff, 17 c.; Bombay, 2 c. 2 c.; Boston, 18 c.; Boulogne, 2 t.; Calais, 1 c.; Cape Town, 1 c.; Calcutta, 2 t. 18 c.; Christchurch, 3 c.; Cologne, 74 t. 18 c.; Colombo, 1 c.; Copenhagen, 13 c.; Dominica, 2 c.; Dantzic, 2 t. 14 c.; Durban, 1 t. 1 c.; Demerara, 1 c.; Dunkirk, 1 t.; Dieppe, 1 t. 12 c.; Djibouti, 1 c.; Dunedin, 1 c.; Galatz, 26 t. 14 c.; Genoa, 11 c.; Grenada, 5 c.; Halifax, 3 c.; Harlingen, 1 t. 4 c.; Hamburg, 5 c.; Hargesund, 1 c.; Havre, 1 c.; Hong Kong, 6 c.; Helsingfors, 1 c.; Jaffa, 1 c.; Karachi, 7 c.; Lisbon, 2 t. 10 c.; Lytleton, 2 t. 3 c.; Madras, 3 c.; Manila, 1 c.; Melbourne, 3 c.; Montreal, 1 c.; Nelson, 1 c.; New York, 1 t. 17 c.; Novorissk, 7 c.; Ostend, 1 t. 2 c.; Paris, 3 t. 11 c.; Perth, 4 c.; Piraeus, 5 t.; Pt. Elizabeth, 6 c.; Porto Alegre, 1 c.; Pt. Said, 6 c.; Rangoon, 6 c.; Rouen, 5 t.; Santander, 1 c.; Trinidad, 5 c.; Treport, 16 c.; Trondhjem, 2 t. 4 c.; Vienna, 5 t.; Wellington, 2 c.

SODA ASH—

Aalesund, 3 t., £26.; Antwerp, 30 t. 16 c., £524.; Cologne, 4 t., £30.

SODA CRYSTALS—

Madras, 10 c., £5.

SODIUM ARSENATE—

Durban, 15 c., £52.; Lourenco Marques, 1 t., £69.

SODIUM BENZOATE—

Cape Town, 4 cs., £100.; Piraeus, 3 cs. (pt.), £12.

SODIUM BICARBONATE—

Batavia, 1 t., £28.; Calcutta, 1 t. 2 c., £71.; Cartagena, 12 c., £25.; Corinto, 17 c., £35.; Durban, 10 c., £17.; East London, 4 c., £7.; Hong Kong, 5 t., £64.; Montreal, 1 t., £54.; Rangoon, 4 c., £12.; Smyrna, 3 c., £20.; Sydney, 4 c., £10.

SODIUM BICHRIMATE—

Genoa, 5 c., £19.

SODIUM BISULPHATE—

Piraeus, 3 t., £21.; Singapore, 4 drms., £11.

SODIUM BISULPHITE—

Colombo, 5 c., £6.; Marseilles, 1 t. 2 c., £34.; Pt. Swettenham, 5 t. 9 c., £150.; Singapore, 5 t. 5 c., £167.

SODIUM BROMIDE—

Perth (F.), 1 cs. (pt.), £7.

SODIUM CHLORATE—

Cape Town, 4 t., £348.

SODIUM CITRATE—

Calcutta, 3 cs. (pt.), £17.

SODIUM CYANIDE—

Colombo, 1 cs., £15.

SODIUM HYDROSULPHITE—

Shanghai, 5 c., £105.

SODIUM HYPO—

Antwerp, 8 t., £148.; Demerara, 5 c., £7.; Genoa, 3 cs., £135.; Penang, 10 c., £16.; Pernambuco, 4 c., £5.; Rotterdam, 1 t., £21.

SODIUM HYPOPHOSPHITE—

New York, 40 cs., £989.

SODIUM IODIDE—

Genoa, 2 cs., 3 cs. (pt.), £324.; Gothenburg, 1 cs., £94.

SODIUM METABISULPHITE—

Bordeaux, 2 cs., £125.; C. Town, 1 ck., £6.; Paris, 3 t. 4 c., £102.

SODIUM NITRATE—

Galatz, 1 t., £30.

SODIUM PHOSPHATE—

Alexandria, 1 cs., £6.; Rio de Janeiro, 12 t. 2 c., £302.

SODIUM PRUSSATE—

New York, 7 t. 1 c., £900.

SODIUM SALICYLATE—

Bombay, 2 cs., 2 cs. (pt.), £33.; Paris, 7 cs., £179.; Perth, 1 ck., £20.; Sydney, 3 cs., 1 cs. (pt.), £89.

SODIUM SULPHATE (GLAUBER SALTS)—

Galatz, 1 t., £30.

SODIUM SULPHIDE—

Paris, 1 t. 3 c., £19.

SODIUM SULPHITE—

Colombo, 5 c., £6.; Brussels, 10 c., £20.; Mauritius, 8 pkgs. (pt.), £2.; Melbourne, 1 t., £27.; Toronto, 9 c., £21.

SODIUM SULPHOCARBONATE—

Aalborg, 5 cylds., £15.

SODIUM TARTRATE—

Amsterdam, 5 c., £35.; Calcutta, 2 c., £12.; Lisbon, 1 c., £6.; Sydney, 10 c., £55.

STRONTIUM NITRATE—

Barcelona, 1 ck., £15.

SULPHUR—

Allepey, 3 c., £9.; Amsterdam, 3 c., £15.; Corinto (F.), 7 kgs., £25.; Dantzic, 9 c., £15.; Bahia, 4 t. 13 c., £157.; Gothenburg (F.), 2 t. 10 c., £71.; Lourenco Marques (F.), 2 t., £66.

SULPHUR (FLOWERS)—

Cape Town (F.), 9 t., £15.; Rostoff (F.), 1 t., £29.

SULPHURIC ACID—

Alexandria, 3 cs., £13.; Calcutta, 18 cs., £52.; Colombo, 3 t. 15 c., £149.; Hankow, 1 cs., £10.; Pt. Swettenham, 1 t. 5 c., £70.

TALLOW—

Genoa, 5 t.

TANNIC ACID—

Constantinople, 1 kgs., £138.; Piraeus (F.), 3 cs. (pt.), £8.

TAR—

Galatz, 10 t. 3 c.

TAR (STOCKHOLM)—

Mauritius, 18 c.

TARTARIC ACID—

Amsterdam, 1 t., £310.; Beira, 1 cs., £8.; Callao, 1 c., £20.; Colombo, 1 cs., £5.; Cologne, (F.), 1 t., £388.; Delagoa Bay, (F.), 2 c., £43.; Durban, 2 c., £36.; Durban (F.), 3 c., £58.; East London (F.), 1 c., £21.; Dunedin (F.), 5 c., £87.; Hong Kong, 9 c., £169.; Jamaica, 1 c., £23.; Melbourne, 5 t., £1,447.; Montreal, 3 t., £931.; Piraeus (F.), 5 c., £89.; Pt. Elizabeth (F.), 2 c., £43.; Pt. Elizabeth, 2 c., £35.; Toronto, 1 t. 10 c., £494.; Winnipeg, 2 c., £37.; Yokohama, (F.), 2 t., £710.

WAX—

Bahia, 6 c.; Bordeaux, 10 t.; Galatz, 2 t.; Genoa, 1 t.

WHITE LEAD—

Antwerp, £60.; Geraldton, £63.; Lagos, £36.; Monte Video, £92.; Paris, £1,578.; Rio de Janeiro, £36.; Shanghai, £66.; Singapore, £193.; Wellington, £540.

ZINC SULPHIDE—

New York, 2 cs., £92.

MANCHESTER.

Week ending November 8.

ACETATE OF LIME—

Melbourne, 191 bgs.

ALUM—

Alexandria, 35 brls.; Bombay, 70 brls.

ALUM (LUMP)—

Tunis, 36 brls.

ALUMINA SULPHATE—

Antwerp, 32 cs.

ALUMINA SULPHOCYANIDE—

Rouen, 5 cs.

AMMONIA—

Rouen, 77 drms.

AMMONIUM CARBONATE—

Gothenburg, 80 cs.

BARIUM SULPHOCYANIDE—

Boston, 12 cs.

BLEACHING POWDER—

Gothenburg, 269 cs.

BORAX—

Alexandria, 5 brls.; Rotterdam, 70 bgs.; Tunis, 1 brl.

BORIC ACID—

Alexandria, 2 brls.

CARBON BISULPHITE—

Gothenburg, 4 cs.

CAUSTIC SODA—

Famagusta, 1 drm.

COAL PRODUCTS (otherwise undes.)

Alexandria, £688.; Antwerp, £2,512.; Gothenburg, £300.; Rouen, £764.; Malmö, £32.; Melbourne, £97.; Montreal, £354.; Rotterdam, £48.

COAL PRODUCTS

Carbolic Acid
Boston, 100 cs.

COPPER SULPHATE—

Tunis, 1 ck.

CREAM OF TARTAR—

Adelaide, 50 kgs.; Montreal, 11 cs.

DISINFECTANTS (otherwise undes.)

Bombay, 2 cs.

DYESTUFFS (otherwise undescribed)

Alexandria, 1 pkg.; Rotterdam, 1 kg.

DYESTUFFS

Tanning Extract
Auckland, 16 cs.

FERRO MANGANESE

Philadelphia, 1,000 t.

FISH OIL—

Rotterdam, 1 ck.

GELATINE—

Boston, 1 cs.

HEMATINE CRYSTALS—

Bombay, 30 kgs.

LEAD ACETATE

Bombay, 300 cs.

PARAFFIN WAX—

Tunis, 35 cs.

POTASSIUM BICHRIMATE—

Alexandria, 15 cs.; Beyrout, 5 brls.

POTASSIUM PRUSSATE—

Tunis, 1 ck.

ROSIN SIZE—

Bombay, 54 cs.

SALAMMONIAC—

Alexandria, 22 cs.; Tunis, 7 crts.

SALT—

Ghent, 7,000 bgs.; Gothenburg, 2,706 pkgs.; Malmö, 2,715 bgs.; Quebec, 2,400 pkgs.; St. John, 1,820 sks.

SHEEP DIP

Alexandria, 40 cs.

SIZE—

Gothenburg, 1 ck.

SOAP—

Alexandria, 2 bxs., 1 drm.; Antwerp, 86 cs.; Bombay, 3 cs., 40 pkgs.; Tunis, 77 cs., 50 pkgs.; Wellington, 4 cs.

SODA ASH—

Gothenburg, 250 bgs.

SODA CRYSTALS—

Alexandria, 64 bgs.

SODIUM BICARBONATE—

Alexandria, 28 bgs.; Beyrout, 200 kgs.; Larnaca, 15 kgs.; Tunis, 50 drms.

SODIUM BISULPHATE—

Bombay, 10 drms.

SODIUM HYDROSULPHATE—

Bombay, 11 cs.

SODIUM PHOSPHATE—

Bombay, 22 bgs.

SODIUM PRUSSATE—

New York, 28 cs.; Tunis, 1 ck.

SODIUM SILICATE—

Alexandria, 80 cs.

SODIUM SULPHIDE—

Alexandria, 2 drms.; Rouen, 115 drms.

SULPHUR—

Malmö, 30 bgs.

TALLOW—

Rotterdam, 8 brls.

TURPENTINE

Damascus, 1 drm.

ULTRAMARINE BLUE—

Melbourne, 3 cs.

WHITE LEAD—

Beyrout, 1 kg.

ZINC SULPHATE—

Bombay, 4 cs.

MIDDLESBROUGH.

Week ending November 8.

AMMONIUM SULPHATE

Kobe, 249 t., £5,589.; Yokohama, 199 t., £4,004.

SODIUM HYPO & SULPHATE—

Bombay, 1 t., £28.

PITCH—

Antwerp, 1,322 t., £3,845.; Rotterdam, 2,150 t., £6,996.

SALT—

Cape Town, 2 t., £78.; Faroe Islands, 261 t., £685.; Fremantle, 15 c., £64.; Helsingborg, 252 t., £880.; Melbourne, 31 t., £1,313.; Launceston, 2 t., £64.; Natal, 4 t., £142.; Pt. E. Africa, 9 c., £21.; Rhodesia, 6 c., £14.; Sydney, 1 t. 2 c., £796.

NEWCASTLE-ON-TYNE

Week ending November 8.

ANTIMONY—

Antwerp, 1 t.; Rotterdam, 110 t.

ANTIMONY OXIDE—

Christiania, 1 t.

BARIUM SULPHATE

Antwerp, 17 c.

BITUMASTIC SOLUTION—

Genoa, 2 t.

BLEACHING POWDER—

Antwerp, 25 t.; Rotterdam, 111 t.

CAUSTIC SODA—

Genoa, 16 t. 6 c.; Narvik, 7 t. 10 c.; Rotterdam, 1 t. 13 c.; Stavanger, 7 t.

MAGNESIUM CARBONATE—

Antwerp, 2 t.

RED LEAD—

Antwerp, 8 t. 2 c.; Esbjerg, 7 t. 2 c.; Genoa, 10 c.

SODA COMPOUND—

Rotterdam, 80 t.

SODIUM SILICATE—

Genoa, 50 t.

SODIUM SULPHITE—

Antwerp, 5 t.

SULPHUR ROCK—

Rotterdam, 10 t.

PRICES CURRENT.

THURSDAY, Nov. 13, 1919.

PREPARED BY MESSRS. HIGGINBOTTOM AND CO., 21, SPRING GARDENS, MANCHESTER.

The values stated are F.O.R. at makers' works, or at usual ports of shipment in U.K., unless otherwise specified
The prices in different localities may vary.

Acids:—		£	s.	d.
*Acetic, 40% and 60% ...	per cwt.	29/-	&	43 6
" Glacial ...	per ton	85	0	0
Arsenic, S.G. 2,000 ...	per ton	70	0	0
Boric, Crystals ...	"	72	0	0
*Fluoric ...	per lb.	0	0	7
*Muriatic (Tower Salts), 28° Tw. ...	per carboy	0	7	0
*Nitric, 80° Tw. ...	per ton	32	0	0
*Oxalic ...	per lb.	0	1	1½
Phosphoric, 1,750° ...	"	0	1	9
*Sulphuric (fuming, 70%) ...	per ton	—	—	—
" (Pyrites, 168°) ...	"	7	18	9
" (" 140°) ...	"	4	10	0
" (free from arsenic, 144°) ...	"	5	7	4
Tannic (commercial) ...	per lb.	0	2	6
Tartaric (crystals) ...	"	0	3	1
*Acetone ...	per ton	80	0	0
*Alum, loose lump (delivered) ...	"	16	10	0
Alumina Sulphate (pure) ...	"	16	10	0
Aluminotric (in slabs) ...	"	8	10	0
Aluminium (Ingot Metal, 98/99%) ...	per ton	150	0	0
*Ammonia, Anhydrous ...	per lb.	0	2	0
" 85° ...	per ton	33	0	0
" 92° ...	"	20	0	0
" Carbonate ...	per lb.	0	0	6½
" Muriate (grey) ...	per ton	47	10	9
" (sal ammoniac) 1st & 2nd, per cwt.	80/- & 75/-			
" Nitrate ...	per ton	60	0	0
" Phosphate ...	"	110	0	0
" Sulphate (grey), London, net	"	—	—	—
" " Hull ...	"	—	—	—
" " Manchester ...	"	—	—	—
*Aniline Oil (pure) ...	per lb.	0	1	2
Aniline Salt ...	"	0	1	2
Antimony ...	per ton	45	0	0
" (tartar emetic), 43/44% ...	per lb.	0	3	1
" (golden sulphide) ...	"	0	1	3
Arsenic, white powdered ...	per ton	60	0	0
Barium Chloride (in casks) ...	"	23	0	0
" Carbonate (native), 92/94% ...	"	11	10	0
" Sulphate (native levigated) ...	"	47	0	14
Baryta Chlorate ...	per lb.	0	1	1
*Bisulphide of Carbon ...	per ton	55	0	0
*Bleaching Powder, 35% ...	"	17	0	0
" Liquor, 7% ...	"	6	0	0
Casein (commercial) ...	"	85	0	0
Chromium Acetate (crystals) ...	per lb.	0	1	0
Calcium Chloride ...	per ton	8	0	0
China Clay (at Runcorn), in bulk ...	"	70/-	to	90/-
Coal-tar Products and Dyes:—				
Alizarine (artificial), 20% ...	per lb.	0	2	0
Magenta ...	"	18/-	to	35/-
Anthracene, 40/50% A, f.o.b., L'don, per unit,	"	0	0	7
Benzol, 90's (naked) ...	per gal.	0	2	0½
" 50/90's ...	"	0	1	10½
Carbolic Acid (crude, 60°) ...	"	0	1	7½
" (crystallised, 40°) ...	per lb.	0	0	9½
" Acid (pale liquid, 97/98%) ...	per gal.	0	2	9
*Creosote (ordinary), naked ...	"	0	0	6½
*Crude Naphtha, 30% at 120°C. ...	"	0	0	9
*Grease Oils, 18° Tw. (naked) ...	per ton	6	10	0
Pitch, f.o.b., Liverpool or Garston ...	"	3	2	9
*Solvent Naphtha, 90% at 160° ...	per gal.	0	2	5
Copper ...	per ton	100	15	0
" Sulphate ...	"	40	0	0
Dross Salts ...	"	39	0	0
*Glycerine (crude), 80% ...	"	72	0	0
" (industrial, S.G. 1,260) ...	"	110	0	0
*Iodine ...	per oz.	0	1	0
*Iron Nitrate, 80° Tw. ...	per ton	12	0	0
" Sulphate (copperas), delivered ...	"	4	5	0
" Sulphide ...	"	9	0	0
Lead (Foreign Pig) ...	"	34	15	0
" Litharge (flake) ...	"	47	10	0
" Acetate (white) ...	"	84	0	0
" (brown) ...	"	88	0	0
Lead, Carbonate (White lead), pure ...	per ton	12	0	0
" Nitrate ...	"	55	0	0
Lime, Acetate (brown) ...	"	12	10	0
" (grey), 80% ...	"	19	0	0
Magnesium Chloride ...	"	15	10	0
" Carbonate (light) ...	per cwt.	2	7	6
" Calcined Magnesite ...	per ton	21	10	0
" Sulphate (Epsom Salts, comd.) ...	"	12	0	0
" (druggists) ...	"	16	0	0
Manganese, Sulphate ...	"	75	0	0
" Borate ...	"	95	0	0
*Methylated Spirit, 64° (industrial) ...	per gal.	0	5	7
*Naphtha (Wood), Solvent ...	"	0	10	0
" Miscible, 60° p. ...	"	0	10	6
Oils:—				
*Cottonseed ...	per ton	95	0	0
*Linsed, Raw ...	"	95	0	0
Stearine, 115-120° M.P. ...	"	95	0	0
Potassium, Bichromate ...	per lb.	0	1	6
" Carbonate, 85% ...	per ton	100	0	0
" Chlorate ...	per lb.	0	1	0
" Hydrate (Caus. Pot.) 88/100% ...	per ton	105	0	0
" " 75/80% ...	"	95	0	0
" Potash Hydrate Liquid, 50/13 ...	"	65	0	0
" Nitrate (refined) ...	"	55	0	0
" Permanganate (commercial) ...	per lb.	0	3	3
" Prussiate (yellow) ...	"	0	1	9
" (red) ...	"	0	5	6
" Sulphate, 90% (ex ship) ...	per ton	25	0	0
" Muriate, 80% ...	"	25	0	0
Silver (metal) ...	per oz.	0	5	9
Sodium (metal) ...	per lb.	0	1	3
" Acetate ...	per ton	49	0	0
" Arseniate, 45% ...	"	60	0	0
" Borate (Borax), Crystals ...	"	39	0	0
" Bicarbonate (2 cwt. bags) ...	"	8	5	0
" Bichromate ...	per lb.	0	1	11
" Carb. (Caustic Soda-ash), 48% ...	per ton	12	10	0
" (Alkali), 58% (bags) ...	f.o.r. {	6	10	0
" (Soda Crystals), (bags) car. pd. ...	wks. {	5	10	6
" Chlorate ...	per lb.	0	0	6
" Cyanide (100% basis) for export ...	"	0	0	11
" Hydrate (76% C. Soda) (f.o.r.) ...	per ton	24	0	0
" (74% C. Soda) ...	"	23	5	0
" (70% C. Soda) ...	"	22	0	0
" (60% C. Soda) ...	"	21	0	0
" (pure liquid, 90° Tw.) ...	"	10	2	6
" 77/78% Powdered (99%) Hydrate ...	"	24	10	0
" Hyposulphite (commercial) ...	"	19	0	0
" Manganate, 25% ...	"	65	0	0
" Nitrate, 96%, rofd., f.o.r., L'pool ...	"	21	0	0
" Nitrite, 100% ...	"	60	0	0
" Phosphate ...	"	28	0	0
" Prussiate ...	per lb.	0	1	1
" Silicate (glass) Alkaline ...	per ton	12	5	0
" (liquid, 100° Tw.) ...	"	9	10	0
" Sulphate (Saltcake), delivered ...	"	3	10	0
" (Glauber's Salt) ...	"	4	0	0
" Sulphide (conc.), 60/65% casks ...	"	22	10	0
" Sulphite ...	"	12	0	0
Sulphocyanide, Ammonium, 95% ...	per lb.	0	2	0
" Barium, 95% ...	"	0	1	4
" Potassium ...	"	0	2	4
" Alumina ...	"	0	0	9
Sulphur, (Flowers) ...	Sicilian per ton	23	0	0
" (Roll Brimstone) ...	"	22	10	0
" Brimstone (best thirds) ...	"	—	—	—
" (ex ship) ...	"	13	10	0
Tallow ...	"	110	0	0
Tar, Crystals ...	per lb.	0	2	0
" English Ingots ...	per ton	282	0	0
Titanium, Potass. Oxalate ...	per lb.	0	1	6
Titanous Chloride ...	per cwt.	4	0	0
Zinc (Spelter) ...	per ton	48	0	0
" Powder, 38/42% ...	"	5	0	0
* " Chloride (solution, 102° Tw.) ...	"	24	0	0
" Sulphate, Crystal ...	"	22	0	0

* Packages extra or returnable; otherwise, prices usually include packages.

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CURRENT TOPICS

THE CONSERVATION OF OIL.

IT is a long time since a scientific and technical institution has listened to such a paper as that read before the Institution of Petroleum Technologists on Tuesday by Rear-Admiral (Retired) Philip Dumas on "The Conservation of Oil." In the first place the Admiral made no pretensions to be scientific, and the one plea throughout the paper was that steps should be taken to eliminate waste in oil, the supplies of which were regarded as so precious as to warrant the most drastic steps being taken to limit its use. No mere reading of the printed paper, however, can ever do justice to the author's manner of delivery. It was, the President (Sir Frederick W. Black) said, as if a fresh breeze from the ocean had blown into the meeting room. Even that, however, by no means conveys the atmosphere which Admiral Dumas introduced. Perhaps we can best indicate to our readers what we mean when we say that Admiral Dumas is an out-and-out disciple of Lord Fisher. He attacked everything and everybody, from the oil producers to the oil users, for waste, with a perfectly well-intentioned manner. He constantly digressed from the printed text of his paper, and peppered his remarks with mildly lurid exclamations in order to drive home his arguments and give vent to his feelings and enthusiasm to such an extent that we are afraid that though he himself was perfectly serious in what he said and really imagined that the position is as bad as he painted it, he really developed in his audience that feeling of easy tolerance which obtrudes itself when listening to an irresponsible speaker. As a matter of fact, Sir John Cadman in the discussion hinted as much, for before he spoke we had such men as Sir Marcus Samuel, Admiral Sir Charles Goodwin, Sir Tennyson D'Eyncourt, and Sir Charles Greenway saying that all the bogies which Admiral Dumas had put up were really of his own creation and did not exist in fact. Whilst admitting the

good intentions of the Admiral and granting that, despite exaggerations, he did put a finger on some spots where oil waste goes on—moreover, nobody can deny that oil conservation is essential,—the paper provided a curious anomaly, in that whilst on the one hand it urged that coal should be used on all battleships during peace time and oil conserved in this way, yet he gave a most graphic and picturesque description of the horrors of coaling ships, and predicted that before long we shall find stokers refusing to do this filthy work. He spoke, too, as if the large oil companies had done nothing in the way of research, whereas Sir Charles Greenway reminded him that the staffs of chemists of British oil companies are at least as large as those of any German company. A typical sentence in the paper ran thus: "It is this factor [waste] which is the keynote of my lecture, for inquiry shows waste—waste all along the line, haphazard education, and waste of brains, wasteful research, wasteful boring, wasteful production, wasteful storage, wasteful use of main and by-products, wasteful transport, wasteful retail sale, waste in the lack of concentrated chemical research into its constituents, and, lastly, waste in its most economic use." In that one breathless sentence we have the gist of the paper, which did nothing to suggest—as indeed perhaps could hardly be expected—how this awful state of affairs was to be remedied. This whole string of problems was simply flung at the heads of the members of the Institution as problems which have to be tackled, and of course it is not to be denied that they exist, in degree. They always will, no matter what progress is made, but the Admiral utterly failed to stampede his audience into the belief that the state of affairs is quite so alarming as he suggested it was. Nevertheless, we must not condemn Admiral Dumas as an out-and-out irresponsible, for he was secretary of the Royal Commission on Oil Fuel and Engines, and as such is in possession of a vast amount of information collected by that body but not yet published. Therefore, some of his views are worthy of serious consideration. For instance, his plea for the institution of Chairs of Geology at all our universities is a sound one. Indeed, he begged of the oil millionaires to come forward and build a university for geological education alone. A paper such as this should have the effect of giving a stimulus if only for the fine monetary rewards promised or, rather, predicted in this and that direction. Certain it is that the Admiral's paper was in the true Fisher vein, for everybody remotely associated with the subject came in for a share of his condemnation. However, it was all good to listen to, and condemned as we ourselves are to attend so many scientific and technical meetings we only wish there were more authors after the style of Admiral Dumas. We are afraid, however, that true scientific progress demands there should not be. Probably one of the best points in the paper was the prophecy that eventually the distribution of oil throughout the country will be by pipe lines to the main centres, and so avoid the wasteful method—as far as time goes at any rate, and also oil to some extent—of distributing by means of large drums on lorries. Again, credit was given to those in the oil

industry for much good work, but the sly dig at the authorities that "we give a peerage to the caterer of the House of Commons and damn all who have done anything useful" seemed rather to be lost on the audience. On several occasions the Admiral referred to the necessity for putting the price of oil to its proper economic height. The point was not dealt with in the discussion, but apparently it is assumed that that is the way to check the use of oil. If so, the Admiral is welcome to his opinion, for the industry does not anticipate a shortage of oil, and to attempt to restrict its use by unduly inflating the price will only have the effect of seriously retarding progress in many engineering industries, and not the least of all in mechanical road transport, upon which the country will have to depend to an ever increasing extent in the near future. Here again the Admiral was inconsistent, for after telling us that there will not be enough oil to go round before long and that it ought to be treated as a luxury, he asks if anyone can doubt that there are vast fields of oil yet to be located.

EFFECTS OF NUCLEIC ACID DERIVATIVES ON PLANT GROWTH.

A PAPER by Professor W. B. Bottomley on "The Effect of Nitrogen-fixing Organisms and Nucleic Acid Derivatives on Plant Growth," was communicated by Professor F. W. Oliver, F.R.S., at a meeting of the Royal Society last week.

The products of the nitrogen-fixing organism, *Azotobacter chroococcum*, were shown to have a marked effect in increasing the rate of growth of plants of *Lemna minor* in water culture; and the derivatives of nucleic acid, which the author has found can be extracted from raw peat, are also able to act as accessory food substances. The addition of these two separate materials to the culture solution increased the number of plants from 1,817 in mineral solutions only, to 96,921 and 80,179 respectively in the liquids containing these substances. Not only was the rate of multiplication increased by these organic materials, but the plants supplied with them maintained their normal size and health, 100 plants from the two series containing these substances weighing respectively at the end of the experiment 18.6 and 18.7mg.; while 100 plants from the series growing in pure mineral nutrients weighed only 4.7mg. When both the nucleic acid derivatives and the *Azotobacter* products were added together to the culture solution, the number of plants obtained was 293,171, an effect practically identical with that of bacterised peat, for the series containing this latter extract showed 292,864 plants in the same time. The nitrogen-fixing organism, *Bacillus radiclecola*, is found to have a similar effect to that of *Azotobacter chroococcum*. A similar series of experiments was carried out with the ash of the crude nucleic acid derivatives and of the *Azotobacter* growth, and neither of these materials had the slightest effect on the rate of multiplication or the health of the *Lemna* plants.

It is therefore the organic material which is so essential for the complete metabolism of these plants, and they cannot maintain their normal growth and vigour for any length of time without the presence of small quantities of organic substances.

COST RECORDS OF ACID MANUFACTURE AND RECOVERY.*

(Concluded from page 532.)

THE entire secret of successful cost analysis depends upon dividing each manufacture into a number of separate processes, and showing clearly the efficiencies and costs of each of these processes. A number of the obvious processes are nitric-acid manufacture, sulphur-trioxide manufacture, denitration, etc. It must be noted that these processes are considered in detail apart from the explosive into the manufacture of which they enter. In analysing the cost of the finished explosive, the incidence of the cost of the subsidiary operations is shown after exact allowance has been made for the effect of changes in process stocks. The primary idea in a number of costing systems seems to be to allocate each item of expense directly against the finished product. For example, the cost of concentration is considered from the point of view of a debit against the manufacture of an explosive, rather than as a separate process, with the result that the effect of the costs and efficiencies of these important processes, upon which depends so closely the cost of the finished product, may be obscured and ignored.

The following are the headings of expenditure shown on typical cost sheets:—

1. *Materials Used*.—The figures are arranged so as to express the actual and 100 per cent. quantities and rates, and the sterling value of each material consumed.

2. *Process Wages*.—Under this heading are shown the following sub-headings:—

- (a) *Plant Officers*.—Salaries of all plant officers, including chemists, danger building officers, shift engineers, etc., whose whole time is spent on the plant concerned.
- (b) *Operative Wages*.—Wages of foremen and all process workers.
- (c) *Overtime Allowances*.—The excess wages earned by overtime rates, over and above the ordinary rates, the overtime wages at ordinary rates being shown as operative wages. Here also should be included holiday money.
- (d) *Yard and Traffic*.—The labour cost of handling raw materials and products into and out of the particular plant to which the process sheet applies

3. *Fuel, Water, Power, Etc.*—Under this heading are shown all fuel and other sources of power grouped into the following sub-headings:—

- (a) *Process Fuel*.—The quantities and sterling amounts of direct fuel consumed, separate headings being shown for coal, coke, gas, and oil.
- (b) *Water and Water Power*.
- (c) *Steam and Steam Power*.
- (d) *Electric Power and Light*.
- (e) *Compressed Air*.
- (f) *Refrigeration*.

Under each of these services is given the proportion of expenditure on such services allocated to the various processes, including engineers' salaries, where these can be directly allocated.

For each service it is desired to obtain the actual cost exclusive of factory general oncost. Expenditure, however, of a direct nature which, while not admitting of

specific allocation, refers generally to several of the above headings, is apportioned between and included in the expenditure under such heads. As such an item may be mentioned engineers' shop charges.

4. *Plant General Expenses*.—Under this heading are given all plant general expenses sub-divided into:—

- (a) *Plant Stores*.
- (b) *Clothing*.
- (c) *Shift House and Mess Room*.—This only applies where there are separate shift houses or mess rooms for each plant.

5. *Maintenance of Plant and Process Buildings*.—This is divided into:—

- (a) *Materials*.
- (b) *Wages*.
- (c) *Oncost (Shops and Salaries)*.—This item includes cost of repair shops, salaries of maintenance engineers, foremen, tradesmen, etc., but not any portion of the factory general oncost.

6. *Deduct By-products, Etc.*—This includes all by-products—e.g., nitre-cake, pyrites cinders, etc.—but not any credits of an extraordinary nature.

7. *Add Oncost (General Expenses)*.—This includes all office, management, police, welfare, medical, and main stores charges; accident pay; upkeep of general buildings (buildings other than process buildings); wages of yard and traffic gangs not occupied exclusively on particular plants; transport charges for workers; garage expenses and all overhead charges which cannot be otherwise directly allocated. No factory general oncost is allocated to other heads of expenditure on the process sheets.

The general oncost is allocated on the basis of operative wages (2 b only), exclusive of any other wages, however allocated.

8. *Adjust For*.—This heading allows for credits for sales of scrap, and for any other extraordinary charges or credits.

Factory oncost, it will be noticed, has been allocated on the basis of operative wages, and none of the ordinary service charges such as wages, water, steam, and power, maintenance, etc., carry any proportion of the factory oncost. It was thought that adopting this method of allocation would lead to greater economies at the factories, for the managers at the various sections could then see clearly the exact amounts that they themselves had spent directly on the various operations. Perhaps a more satisfactory allocation of the factory oncost referred to in heading 7 would have been on the basis of the total wages included in the process—i.e., the officers' and operatives' wages, overtime allowances, wages spent on maintenance, and also the corresponding proportion of the wages included in the amount spent on fuel, water, steam, and power.

The materials shown on the cost sheets as used and produced should agree exactly with the figures as given by the technical records. The only exception is in cases where it is necessary to allow for loss in handling, wastage, etc.—e.g., at a Grillo plant, experience has shown that it is necessary to add about 0.7 per cent. to the recorded usage of sulphur at the plant in order to reconcile the invoice weight of sulphur with the amount

*Abstracted from the Report on the Statistical Work of the Factories Branch, issued by the Ministry of Munitions (Department of Explosives Supply).

used at the plant. These adjustments are made in the cost sheets. The best procedure is to show this loss on the technical records as well, and later this was done, so that a typical nitric-acid report shows two efficiencies—

- (1) The plant efficiency, determined by the actual amount of nitrate delivered to the retorts;
- (2) The over-all efficiency, which takes into account a percentage added to the amount used at the retorts in order to cover the loss in handling, in bags, etc.

The values charged on the above sheet for the raw materials in the "raw materials used statement" require careful consideration. Occasionally, as in the manufacture of nitric acid, for example, where the raw materials are sodium nitrate and sulphuric acid, which may both be purchased from outside sources, no difficulty arises as to the costs at which they are to be charged to the plant. When the process, however, refers to waste-acid treatment, the starting point for the operation is waste acid, and various considerations govern the values at which this is to be charged to the plant. Similar questions must be discussed in connection with the nitration of substances, as to the costs of the fresh-mixed acids used, and the credit to be allowed for the waste acids produced.

In entering the acids in the costs, it has been found best to adopt the 100 per cent. H_2SO_4 and HNO_3 units, both on process sheets and in acid accounts. The one exception to this is on the oleum plant process accounts, in which the 100 per cent. SO_3 unit is used, but in transferring quantities from the oleum process to the acid accounts and to other processes, or *vice versa*, these quantities are shown both as SO_3 and H_2SO_4 , in order to avoid any possibility of misunderstanding.

It should be noticed that, as far as a system of accounts is concerned, when acids are produced they are at once transferred to an appropriate stock account. Thus the strong acid stock account would be drawn up somewhat as follows:—

	Tons.	Rate.	Amount.
		£	£ s. d.
Stock at beginning of period	6.7	42.116	282 3 7
Produced at retorts during period	1,174.1	43.561	51,145 11 0
Produced at stills during period	1,650.0	43.561	71,875 13 0
	2,830.8	—	123,303 7 7

	Tons.	Rate.	Amount.
		£	£ s. d.
Delivered to NG acid mixing	636.1	43.715	27,807 2 2
Transferred to NC acid mixing	2,136.0	43.715	93,374 17 0
Unaccounted for	10.0	—	—
In stock at end of period	48.7	43.561	2,121 8 5
	2,830.8	—	123,303 7 7

It is, perhaps, soundest if the material in stock at the end of the period is valued at the cost of manufacture or purchase, while the material delivered to the various sections is charged at a uniform rate necessary to make both sides of the account balance. The same method applies, of course, to the stock accounts, not only of acids, but also of raw materials and intermediates or finished products. Thus, in the above stock account, the stock at the beginning of the period is valued at the cost of production for the preceding month, whilst the productions at the retorts and stills are credited at the cost of production. The stock at the end of the period is valued at the cost of production for the period—namely, £43.561.,—while the issue price of nitric acid—namely, £43.715. per ton HNO_3 —is such that both sides of the account balance.

The discussion of acid values will be simplified if it is noticed that, in the sulphur trioxide plants at H.M. Factories, oleum or sulphuric acid of any strength can be produced at the same cost per ton of SO_3 content. Hence all the strong sulphuric acid produced at the factory, including that at the concentrators, is valued on its SO_3 content, according to the cost of production or purchase of sulphur trioxide for the month; the materials charged statement for the oleum process sheet will be somewhat as follows:—

	Tons H_2SO_4 .	Tons SO_3 .	Rate SO_3 .	Amount.
			£	£
Strong sulphuric acid	1,468	1,198	7.803	9,349
Less weak acid charged	235	191	7.112	1,364
Net acid charged	1,233	1,007	—	7,985
Production of oleum as SO_3 (1,476 tons) from 645 tons of sulphur at £12 10s. per ton	—	1,476	5.458	8,057
4.51 tons of sulphur at 0.7 per cent. handling loss	—	—	—	56
To this add plant expenses	—	—	—	3,875
Total cost	—	2,483	—	19,973

Thus the cost of producing oleum equivalent to 2,483 tons of sulphur trioxide—i.e., $1,007 + 1,476$ —is £19,973., and this gives the current cost of manufacture of sulphur trioxide—viz., £8.044. per ton of SO_3 (or £6.567. per ton of H_2SO_4).

The question arises as to the rates at which the strong sulphuric acid or weak sulphuric acid respectively are to be charged or credited to the plant. A simple method, not involving much work, and only very slight error, is to value them at the same rates as for the previous month, and this method has been adopted at the factories.

Having fixed the price of strong sulphuric acid from the cost of production and/or purchase for the current month, the value of the weak sulphuric acid is determined by subtracting from the value of the strong sulphuric acid resulting from its concentration the actual expense of concentration.

The raw materials statement for the concentration cost would be then:—

	Tons H_2SO_4 .	Rate	Amount
		£	£
Strong sulphuric acid produced	6,485	6.567	42,586.338
Less cost of concentration	—	—	3,555.896
Denitrated acid used	6,562	—	39,030.442

The total in this account then gives the value of the weak sulphuric acid—viz., $\frac{£39,030.4}{6,562}$ or £5.948. per ton

H_2SO_4 . It should be noted when referring to the cost sheet that in arriving at this figure no allowance has been made for the charge of £87. entered there, for this is an unusual item.

The nitric-acid raw materials statement is comparatively simple, as the raw materials are sodium nitrate, which is purchased, and strong sulphuric acid, which may also be purchased. If the strong sulphuric acid is not purchased, the method of finding its value is that given above.

Nitric acid is frequently made in two strengths, strong nitric acid and weak nitric acid. Its value in either case has been based on the same rate for the 100 per cent. HNO_3 content, when it has been possible for the factory to absorb all the weak nitric acid in acid mixing.

If the weak nitric acid is to be distilled, the cost of distillation and the cost of manufacture jointly determine the respective values of strong and of weak nitric acid.

The raw materials statement for the distillation process cost account would read:—

	Tons.	Rate.	Amount.]
Weak nitric acid			
Strong sulphuric acid			
Less weak sulphuric acid produced			
Expenses			
Strong nitric acid produced			

The account then gives one relation between the value of strong nitric acid and of weak nitric acid. The other relation is given by the nitric-acid manufacturing account, and the two combined give, by a simple calculation, the values of weak and strong nitric acid.

The weak sulphuric acid is valued at the current rate for weak sulphuric acid, so that the nitric acid has been made to bear, not only the actual expense of distillation, but also the loss on the depreciated sulphuric acid. This is only equitable since, in this distillation, the sulphuric acid is used only for the purpose of producing strong nitric acid.

In nitrocellulose manufacture spent acid is produced which must be distilled. In this case, as both the recovered sulphuric and nitric acids are of value, it seems logical to share the distillation expenses between the recovered acids in the ratio of their values. There will be no difficulty in doing this, since the recovered nitric acid has the current value of manufactured strong nitric acid, while the recovered sulphuric acid has the current value of weak sulphuric acid. This process also fixes the value of the nitrocellulose spent acid produced, on the basis of the values of the H_2SO_4 and of the HNO_3 contents of the waste acid.

Frequently, however, weak nitric acid, mixed with sulphuric acid for distillation, and the spent nitrocellulose acid, are distilled together. In this case the most logical procedure would be to consider the recovered acid as divided into two parts. One part is sulphuric acid which has been used solely for the sake of concentrating the weak nitric acid by distillation, and this should not carry any share of the distillation expenses. The other part is sulphuric acid recovered from the nitrocellulose spent acid, and this should, of course, bear its proper share of the distillation expenses. The first method, however—namely, that of making the nitric acid bear the entire cost of distillation,—has been used throughout at H.M. Explosives Factories. In dividing up the sulphuric acid into the two parts, it is assumed, of course, that the percentage loss on the sulphuric acid is the same for both the sulphuric acid added to the nitric acid and also for the sulphuric acid in the nitrocellulose spent acid.

In the denitration, however, of waste acids from MNT, TNT, picric acid, and nitroglycerine, the complication mentioned above does not arise, and the denitration expenses have always been divided between the nitric and sulphuric acids recovered in the ratio of their values. The value of the recovered nitric acid depends upon its future use. If it is re-used in the form of mixed acid for the same manufacture, its value is taken at the current value of nitric acid, reckoned, of course, on a 100 per cent. basis; if, however, it is necessary to distil it, its value is that of weak nitric acid determined as outlined above, and it has been customary to value it at this rate in cases when it has been transferred to another section—i.e., the nitrocellulose section. The value of the sulphuric acid is, of course, equal to that of the current weak sulphuric acid. Hence this method really fixes the values of nitroglycerine, mononitrotoluene, TNT, and picric acid waste acids.

THE OUTLOOK FOR THE CHEMICAL INDUSTRY.

THE first meeting for the session of the Liverpool Section of the Society of Chemical Industry took place on Monday evening in the Adelphi Hotel, Liverpool, Mr. A. T. Smith, J.P., presiding. The chairman, in introducing Dr. E. F. Armstrong, who was to address the Section, said that that was his last appearance in the chair, and it was his pleasing duty to introduce Dr. Armstrong as chairman of the Section for the next two years.

Dr. Armstrong paid a warm tribute to the retiring chairman for the valuable services he had rendered the Section during the past two years, and proposed that a hearty vote of thanks be accorded him for his services.

The vote of thanks was passed very cordially.

Dr. Armstrong then proceeded to address the meeting on the subject of "The Outlook for the British Chemical Industry." He first referred sympathetically to the passing away, since they last met, of one very great chemical industrialist, Sir John Brunner. What Sir John Brunner and Dr. Mond had done for the chemical industry in that district everyone knew, and he thought they ought not to let the occasion go by without mention of their names. Proceeding to his subject, Dr. Armstrong said that individuality, that marked British characteristic, had led, as in other trades, to the formation of sections buying from one another, and involving transport charges. The German chemical industry might be said to be better balanced than ours, and that was a prime factor in the German's success. They had primary articles and all their by-products within the one factory. They had a pooling of interests without sinking the individuality of the firms concerned. All, even the designers of plant, were in the pool, enabling it to manufacture so cheaply that no assistance was wanted in the form of import duties to keep competitors out of the market. The conditions pointed to large-scale industries as being necessary in industry in future.

Dr. Armstrong spoke next of the need for technical management. The successful manager must, he said, be a modern Admirable Crichton, able to get the best results out of the workpeople and be a master of detail. Unless something could be done to bring that type of man into industry in future, we should be severely handicapped in the competition with America. The position of the chemist in chemical industry was many-sided. He might have to be able to carry operations through from the laboratory to the large scale. Success depended on the co-ordination of many factors. In our works there had been too little of scientific control. In Germany, often in small factories, the man in charge was a trained chemist instead of a simple organiser. In consequence, most of the smallest German works were highly efficient technically. The British chemical industry must employ a far larger number of trained chemists in future if the position was to be maintained.

The popular idea that success was based on secrets was a fallacy. An ideal plant would not compensate for bad leadership. The right kind of man was in small supply in England. Standard types of plant had been out of the question owing to the difficulties of their operation in small works. All the processes of the industry required specialised engineering knowledge, and it was for us to see that all were trained. With regard to labour, higher wages, shorter hours, and less work, all tended to increase cost. Unless production per individual

were increased, higher wages could only mean higher prices. Probably, if pains were taken to give the worker a general understanding of a process, he would be in a position to earn higher wages with diminished repair bills and higher yields.

The possession of a modern, highly equipped plant was essential to cheap production. Unfortunately, the very large factories, like those at Gretna and other places, built by the State, were considered by commercial men to be totally unfit for commercial processes. Had they been conducted in connection with existing works they would have been of use to practical men, instead of which they were of no immediate value. None would question the great amount of successful work of those responsible for the production of explosives. It was only by having peace industries formed to be able to turn at once to war products that they would be of the greatest value, and be turned in future, if wanted, from peace to war. Then there was the question of transport. The war had left British transport in a state of chaos, and a serious increase of charges was inevitable.

The chemical industry was a technical industry. The outlook was best described as full of promise, but it needed the whole-hearted and intelligent co-operation of those engaged in it if it were to attain the high position to which it was entitled, but above all we must not look to protection. He did not want anyone to think he had overrated the Germans, but we must not make the mistake, because we had beaten the Germans, of underestimating what Germany had done in the chemical world. We did not want slavishly to copy, but we must study what had been done and apply the lessons to our own advantage.

The Chairman said it was of very great importance to them to look round and see what they had to face in the technical difficulties that were before them. He was practically certain that the problems of the next few years bristled with difficulties. We were short of everything we wanted. Whilst we had competition outside to face, we were faced by an enemy in our own camp—the unwillingness of labour to pull its weight. It came out of their own pockets after all, because the working-man was the largest consumer in this country. He therefore said to working-men: We can only make progress by sticking to it, but so long as the brake is on the wheels, and there is "ca' canny," we shall never succeed and only be left behind. He was much obliged to Dr. Armstrong for his paper, and had very much pleasure in moving that they pass a hearty vote of thanks to him for it.

Mr. T. W. Stuart seconded. Alluding to the references made to the labour problem, they all recognised, he said, that they should all do their utmost. The question of labour was about the most serious problem anyone who had to control large works had to face.

Mr. John Gray said he wished to join with the others who had expressed their views in his own appreciation of Dr. Armstrong's opening address. He was sure they were to be congratulated on the choice of their chairman for the coming session.

Mr. Arthur Carey expressed his agreement with the whole of Dr. Armstrong's address. Speaking of transport, he said that in this country it was in a very bad way, and he thought they might be faced with a complete breakdown at any moment. The explanation of the railway companies was that the Government had taken the wagons. He thought they put the figure at 10,000, and there had been no construction during the

war, and very little repairs. How far that was a cause, and how far it was an effect of the conditions that were affecting their factories, the position of labour that was unwilling to take its coat off and pull all it was worth, they were not in a position at the moment to say, but he knew the effects were most serious.

The vote of thanks was passed unanimously.

THE MANUFACTURE OF NITRATE OF LIME IN NORWAY.

By G. A. Cowie, M.A., B.Sc., A.I.C.

WHILE the principle of the process used in Norway for the production of nitrates from atmospheric nitrogen is generally understood, it would be difficult without actual inspection to form anything like an adequate conception of the magnitude of the industry. A total of 300,000 to 350,000 H.P., rendered available from waterfalls, is now in use in the synthetic manufacture of nitrates. The first factory was established at Notodden in 1905, but Rjukan, where works were also opened in 1911, and considerably extended after the commencement of the war, is now the chief centre of the industry. A few practical details about the manufacture of nitrate of lime at the latter place may serve to convey some idea of the nature and proportions of the enterprise.

Rjukan 1, as it is called, to distinguish it from the newer works there, is in reality the largest water-power station in the world (140,000 H.P.). The current from there is conducted to the furnace-house through 60 cables of a length of three miles each. By means of blowers 1,000 million gallons of air are at Rjukan driven through the electric furnaces every 24 hours. The heat in the furnaces, exceeding 3,000° C., brings about a combustion of the nitrogen of the air resulting in the formation of nitric oxide (NO). These hot gases (800° C.) are used as fuel in large steam boilers, where the temperature is reduced approximately to 250° C. By water-coolers the heat of the gases is further reduced to about 50° C.

The subsequent retention of the gases for some time in large oxidation tanks results in the transformation of nitric oxide (NO) to nitrogen dioxide (NO₂). The gases are next conveyed through three granite towers, 23 metres high, and filled with quartz sprinkled with water. This operation causes the absorption of the nitrogen dioxide by the water with the production of weak nitric acid (30 per cent.). This acid is then passed over limestone, and a solution of nitrate of lime is thus obtained.

The weak solution of nitrate of lime is next concentrated by evaporation until it contains 13.1 per cent. nitrogen. The liquid nitrate being now thick is passed over revolving cylinders, which are internally cooled; the nitrate is here rapidly solidified and is taken off in leaves. The leaves of nitrate are then granulated in small mills. From high silos the nitrate in the finished state is filled into barrels of 100 kilos net weight. At Rjukan alone the normal daily production is 2,000 barrels.

It may be of further interest to mention that Rjukan, where the barrels themselves are made, possesses actual facilities for making 5,500 and packing even 6,122 barrels daily. What this means may be illustrated by the fact that the staves required for this number of barrels would, if placed end to end, extend over 80 miles, and the iron for the hoops over 20 miles. By working at full pressure it is possible with the existing facilities to fill a cask every one-sixth of a second.

PRODUCTION OF ARTIFICIAL ABRASIVES.

MR. C. J. BROCKBANK (Thorold, Ontario) read a paper on "The Production of Artificial Abrasives in the Electric Furnace" at a meeting of the Birmingham and Midland Section of the Society of Chemical Industry held on Thursday (November 13) at the University of Birmingham. Members of the Birmingham Metallurgical Society also attended. Mr. L. P. Wilson (chairman) presided.

Artificial abrasives require for their production, said Mr. Brockbank, large quantities of electrical energy, such as can be furnished cheaply by the enormous water-power developments of Canada, the United States, and similar countries abroad. Due to this natural advantage, there have developed in Canada several plants of large size devoted entirely to the manufacture of artificial grinding materials called by various trade names, but consisting of two groups, one silicon carbide, and the other aluminous abrasive, or artificial corundum. The refractory by-products produced are also of great importance, and have contributed very materially to increased efficiency in the operation of many types of furnaces. The first artificial abrasive was discovered by Dr. Acheson, in 1890, while endeavouring to crystallise carbon by dissolving in melted silicate of alumina fused by a small electric arc in an iron pot. His ignorance of chemistry led to one of the most remarkable discoveries in the electro-metallurgical field, and formed the foundation of what is to-day one of the most important industries in the world. Dr. Acheson, conceiving that the blue crystals resulting from his experiments must be a combination of carbon and alumina, and ignorant of their real chemical composition, named the material carborundum.

Silicon carbide is not a universal abrasive, in that it cannot be used on all classes of grinding. It is suitable and highly efficient in the grinding of brittle materials such as cast iron, marble, mother-of-pearl, etc., and the finishing of leather. The physical properties of silicon carbide render it unsuitable for producing the fine, smooth finish required in steel grinding. It is intensely hard (the next hardest material to the diamond), and very brittle. During grinding the edges of the individual grains are constantly fracturing, exposing fresh cutting edges, which score deeply into a tough material such as steel. The discovery that aluminous ores such as bauxite and emery could be electrically smelted with coke, and commercially pure, crystallised artificial corundum obtained therefrom, completed the requirements of the abrasive field, and rapidly forced natural emery into the background, except for a few restricted operations such as glass polishing.

Silicon carbide is formed by the reaction at high temperatures of silicon and carbon. In practice it is found necessary to add varying amounts of sawdust and sodium chloride; the former is to maintain porosity, so that the large volumes of carbon monoxide may escape without causing blowholes at local spots in the furnace; the salt is used to assist in the elimination of the impurities present in the coke and sand as chloride. A typical furnace mixture when all new materials are used is: Petroleum coke, 1,500lb.; white sand, 2,520lb.; sawdust 300lb. (180 c.f.), and salt 40lb. A considerable proportion of the mixture used in a furnace is not converted into silicon carbide, acting merely as a heat-insulating blanket, and this material will ordinarily be returned to the mixing department. Petroleum coke is the carbon residue left in the stills when distilling crude oils. It is the only form

of carbon that can be used satisfactorily for producing the highest grade of silicon carbide. This does not appear to be due altogether to its purity, since good silicon carbide cannot be made from lamp-black, but is in some way due to the readiness with which this form of carbon is converted into graphite by the agency of heat. Charcoal is readily changed to graphite, and similarly will make excellent silicon carbide. Silicon carbide furnaces are built in sizes varying from 1,000H.P. capacity to 3,000H.P. capacity. A furnace of less than 1,000H.P. size cannot be operated economically. A 3,000H.P. furnace will produce approximately 7 per cent. more silicon carbide per unit of power input than a 1,000H.P. furnace, although the advantage is somewhat offset by the fact that the quality from the largest size is not so good. A 1,000H.P. electric furnace is 20ft. long between the heads carrying the electrodes, and 5 or 6ft. wide inside. The heads carrying the electrodes are 40in. thick, and two electrodes are used for each terminal, made from graphite, 10in. diameter and 48in. long. The method of loading the furnace is as follows: The furnace is charged with mixture slightly above the level of the electrodes, and a trench formed in this mixture 36in. wide and 10in. deep, which is filled with about 1,200lb. of graphite powder. This forms the resistor core, and conducts the current from one terminal to the other. The mixture is then piled on this core and the furnace is ready to operate. There is considerable shrinkage during the run, the level gradually falling below the side walls of the furnace. The side walls must not be removed till at least 24 hours after a furnace has been disconnected, otherwise the product is liable to be injured by oxidation. Subsidiary reactions involving to some degree recrystallisation of the product take place after the furnace is disconnected.

Regarding the finishing of the silicon carbide, Mr. Brockbank explained that the crystalline silicon carbide after removal from the furnace is crushed in a pan mill and treated successfully with a sulphuric-acid and caustic-soda bath. This removes the surface impurities from the grain, consisting of graphite, silicon, silicides of iron, and silicide of aluminium. It is then washed and dried in a rotary dryer, and passed over screens which separate the grains into various sizes from $\frac{1}{16}$ in. mesh to $\frac{1}{32}$ in.; finer sizes are graded by hydrostatic methods. This material forms the pure product used by the wheel manufacturer for making abrasive wheels.

Regarding aluminous abrasives or artificial corundum, these are manufactured by smelting a mixture of bauxite and coke in an arc furnace; the impurities, mainly silica and iron oxide, are reduced and settle to the bottom of the furnace, and the fused alumina is recovered in the form of a large pig or ingot weighing four to five tons. A typical furnace mixture is calcined bauxite 1,750lb., coke 100lb., iron borings 350lb. The furnace is started by placing a layer of mixture in the furnace about 1ft. deep, and laying a train of graphite powder from one electrode to the other on the top of this. As soon as a small path of molten ore is formed this carries the current, and more mixture is charged into the furnace as required. These furnaces operate at about 100 volts, and require 550kw. Reduction must not be carried too far, otherwise the abrasive will be too pure and brittle. The presence of one or two per cent. of iron oxide, silica, and titanium dioxide increases the toughness of the product. The metallic residue recovered will contain from 10 per cent. to 15 per cent. of silicon. Sufficient iron borings are added to the mixture to keep the silicon content of the alloy below 15 per cent.; otherwise the material would

be too weakly magnetic to be separated from the crushed corundum. Power is a comparatively small proportion of the total manufacturing cost of artificial corundum, and it would therefore appear to be quite practicable that aluminous abrasive should be manufactured in England at a cost that would compete with the foreign product.

The paper was well illustrated, and was followed by a discussion, chiefly of inquiry.

THE EFFICIENCY OF SHEEP DIPS.

THEIR EFFECT ON WOOL.

AT a meeting of the Leeds University Textile Association last week, Dr. Sidney Williamson, of the Cooper Research Institute, delivered a lecture on "The Effects of Sheep Dips on Wool," and referred in turn to a number of compounds used as sheep dips, including nicotine preparations, cresylic acid, arsenic, and alkaline sulphides.

The lecturer confessed that it was impossible to say what the effects of these varieties upon wool were, for the reason that such investigation as had been carried out was largely of a biased character. Practically they had only the evidence of the proprietary sheep dip manufacturers, who were making a living out of the article which they sold, and, on the other hand, of the respective Governments whose object it was to give the farmers as cheap a dip as possible without running the risk of killing the sheep. The whole discussion as to the effects of dips on wool had unfortunately centred mostly in the lime and sulphur dip, the one which the farmer himself made for the sake of cheapness. Naturally, that dip was opposed by the manufacturers of proprietary dips. In spite of much research for authentic evidence as to the injurious effects of dip upon wool, the lecturer said he had come across nothing which could be regarded as conclusive. In regard to the proprietary dips, he thought they could leave it to the manufacturers in their own interests to ensure that their dips were non-injurious.

Regarding the lime and sulphur dips, if they could have the dip made perfectly and used under perfect conditions, there would be no injury to the wool. But the danger was that when the lime and sulphur dip was made carelessly, and used without proper regard to the conditions, the effect might be to render the wool harsh, and so as not to dye properly. All the evidence was clear, however, that there was no injury from the lime and sulphur dip if properly prepared. The Sheep Dipping Committee, which reported to the British Government in 1904 upon the dips then on the market, came to the conclusion that they produced no injury whatever to the wool. He was not convinced that that conclusion was quite correct. What he had found from personal observation was that all dips would injure the wool to a greater or lesser extent if they were wrongly prepared. There had been used in the past a certain oil in dips, which had such an effect upon the wool that when scoured it turned pink. Nowadays no manufacturer ever used that particular oil.

On the general question of the effect of dips upon wool, Dr. Williamson gave it as his opinion that nicotine in dip was not injurious so long as pure nicotine was used. Carbolic acids, as a rule, were only injurious if they contained an excess of alkali, which tended to disintegrate the fibres. If a farmer used impure tar oil in dipping he might get wool which, after scouring,

would turn almost brick-red in colour, but such instances were rare. Arsenical dips were not injurious unless an excess of alkali had been used in making the arsenic soluble. On the whole, he was inclined to believe that the arsenical dip improved the wool, but it was an exceedingly difficult thing to prove. The Australian farmer believed that the dip gave him a heavier and better clip. The lecturer would not like to assert that that was so, although, he said, he was able to bring other evidence in support of that conclusion. He had had a great deal of experience of dipping cattle in South Africa, and after dipping in an arsenical bath, cattle had a better coat. If that was the effect observed upon cattle, he did not see why it should not obtain in regard to sheep, and if such dipping improved the skin of the sheep, he thought it followed that it must improve the wool. On the other hand, if the arsenical dip was too strong, it would undoubtedly injure the wool. That was the whole position with regard to all dips, and the greatest danger so far as he could see was that farmers might be crude in their preparation of the lime and sulphur dip. It would be found that the wool from countries which used the lime and sulphur dip did not stand so high in the market values as the wool from those countries where cresylic or arsenical dips were used.

AUSTRALIAN IMPORT RESTRICTIONS.

THE High Commissioner for Australia has received advice from the Prime Minister to the effect that a Proclamation, dated November 1, 1919, has been issued prohibiting the importation of the undermentioned goods except by licence. The conditions upon which the Minister for Trade and Customs will issue a licence will be published later.

Absolute alcohol; amylic alcohol; collodion; sulphuric ether; anæsthetic ethers; ethyl acetate; antimony, star, antimonial and lead compounds—viz., type and linotype metal, antifriction, and plastic metals; copper—viz., angles and tees, bars and rods, pipes and tubes, plate sheet and strip, wire; phosphor copper—bars, rods, and ingots; zinc and spelter—bar and ingot; oils, coal-tar, viz., benzol, naphtha (solvent), naphtha (heavy); paints and colours—viz., dry white lead, kalsomine water paints and distempers in powder form, white lead in oil, paint ground in liquid in packages weighing over 14lb., plaster of Paris; carbolic acids; cresylic acid; crude creosote and crude tar oils; naphthalene, crude; naphthalene N.E.I.; arsenate of calcium; arsenate of lead; arsenite of soda; arsenite of zinc; carbolic disinfectants; sodium hyposulphite; arsenic; arsenate of soda; arsenic sulphide; ethyl chloride; sodium sulphate (Glauber's salts).

The Board of Trade understand from a cable they have received from their Senior Trade Commissioner in Australia that goods in the course of shipment or on *bona fide* order, except those previously specially prohibited, will not be refused entry.

A Proclamation dated August 20 revokes the Proclamation of August 14, 1918, by which the importation into the Commonwealth of caustic soda, soda ash, soda sulphide, white lead, and red lead was prohibited.

PERSONAL.—Dr. R. H. Pickard, F.R.S., principal of Blackburn Municipal Technical School, has accepted the position of principal of Battersea Polytechnic, London, at a salary of £1,250. During the war he has done a great deal of valuable research work for Government departments in connection with anæsthetics and explosives.

MONOAZO DYESTUFFS FOR LAKES AND PIGMENTS.

A PAPER on "Monoazo Dyestuffs suitable for the production of Lake and Pigment Colours" was read at a meeting of the Oil and Colour Chemists' Association on November 13 by Mr. W. A. Allsebrook. In introducing the paper, the author said he was not an authority on dyes, or even dyestuffs. Neither was he engaged in the manufacture of intermediate products or lake dyestuffs. The subject was his hobby, and his object was to encourage the lake maker to produce goods of pre-war quality, as he believed he had a better chance than chemists engaged in large dye concerns, who knew little or nothing as regards the use the particular dyestuffs might be put to.

The first part of the paper enumerated the monoazo dyestuffs common to the textile and colour industries, all of which, with the exception of the developed colours, are soluble in water. Soluble monoazo dyestuffs were divided into two chief classes—viz., amidoazo and oxyazo compounds. The number of the former is limited, and they are basic in character with the exception of their sulphonic acids. Aniline yellow was the first monoazo dyestuff to be discovered, and was used for dyeing wool from 1861—1863. It is, however, very fugitive to light, but treated with fuming sulphuric acid produces yellows which are the most stable towards light of any of the yellow acid dyes. The simplest monoazo dyestuffs are greenish-yellow to yellow, but as the molecular weight increases the colour changes to orange, violet, and blue in succession. The preparation of lake and pigment colours for basic dyestuffs was of considerable interest, as methods similar to those employed in the dyeing of textile fibres were employed. Certain natural bases, such as green earth and china clay, had the property of attracting and fixing basic dyestuffs in the same manner as the animal fibres, wool, and silk, and colours struck on green earth were not only faster to light, but had the property of resisting the action of lime. The preparation of lakes, however, depended on three factors—viz., the dye itself, the precipitating agent, and the base on which the lakes were struck, the inert base serving the purpose of either increasing the body of the lake, as well as of modifying or toning down the shade. At the same time it reduced the cost. The first acid dyestuffs were produced in 1877 by Griess and Witten in England and Roussin in France under the names of Orange I. and Orange II., in which α and β naphthol were used for the first time. Orange II. is largely used in connection with wall-paper staining, but is not used to any great extent as a pigment colour. From 1877 the number and variety of monoazo dyes rapidly increased, the sulphonic acids of various amines were diazotised and coupled with numerous isomeric sulphonic acids of the naphthols and naphthylamines.

PIGMENT LAKE DYESTUFFS.

Of far greater importance to the colour manufacturer, however, are the pigment lake dyestuffs introduced about 1900 by the German aniline colour manufacturers, specially for the manufacture of pigment colours. They are, said Mr. Allsebrook, sold under a variety of fancy names, which tell nothing as to what they are made from or how they are made, coming on the market generally in the form of 20 per cent. pastes, requiring either only to be ground with suitable bases or mixed

with water to a thin consistency with the base, and developed sometimes by boiling with certain metallic salts such as barium, lead, magnesium, or calcium, usually the chlorides, which give variation of colour to the lakes so treated. The application of the new pigment lake dyestuffs was soon recognised, with the result that a constantly increasing number were produced which not only superseded the old lakes made from natural dyestuffs, but in many cases had proved cheap and efficient substitutes for many natural pigments. How essential this class of colouring matter was to the so-called aniline colour manufacturers in this country was fully realised towards the end of 1914, and it was no secret now that one English colour house alone was buying over 100 tons of lythol red paste per annum. It was true that to-day English-manufactured lythol red R. was on the market, but it was not in sufficient quantities to meet the demand. Lake red was also on the market, but of greater interest to lake makers was the fact that its intermediate product, of English manufacture, was now for sale. The intermediate products required could be produced by the large dye concerns in this country, and if members of the association interested in the production of pigment lake dyestuffs collectively demanded a certain intermediate, they would stand some chance of getting the product at a reasonable cost, and thus be enabled to produce the finished dyestuff at a competitive price.

CHROME COLOURS.

Although the lead chromes hold the field on account of their excellent covering power and brilliancy, certain monoazo yellows, such as Hansa yellows, have the advantage of not becoming discoloured by the action of sulphuretted hydrogen, resisting the action of lime, and are not poisonous. They are as fast to light, and although more expensive than the lead chromes, have considerably greater staining power. How soon such yellows would be able to compete in price with the lead chromes the author did not care to forecast, but he pointed to the fact that pre-war monoazo oranges had been able not only to compete with the oranges produced from basic lead chromate in price, but had the advantage of withstanding heavy grinding, and gradually taking the place of orange chromes in the floorcloth and linoleum industries. Zinc chromes might have certain advantages over lead chrome as regards resisting the action of lime and sulphuretted hydrogen, but they found only a limited use when lake yellows were obtainable, which possessed six times their strength, and when mixed with blues gave more brilliant greens. Genuine vermilion had been completely replaced by the fast reds, which not only could compete in price, but excelled in fastness and staining power, and were also compatible with lead compounds. Given highly manufactured intermediate products the author is satisfied that colour chemists will produce pigment lake dyestuffs in quantity to meet the full demands of this country.

Finally, he hinted to the lake dyestuffs manufacturers that they must suitably reward those who worked diligently for them in assisting to protect the chemical industries, the key to which was cheap intermediate products.

DISCUSSION.

The Chairman (Mr. W. J. Palmer) said the paper was a comprehensive review of the mono-azo pigment dyestuffs. It had taken them right through from the early stages of azo-dye manufacture to the simpler soluble dyes more par-

ticularly of interest to textile dyers, and then gradually brought them down to the present day more complex mono-azo dyes, including those of an insoluble nature which were of more interest to the members of the Association as pigment manufacturers and pigment users.

Mr. A. Molteno said the preparation of beta naphthylamine sulphonic acid was a matter he had been trying to find out for a long time, but had not been successful. The important point in connection with lakes and so on was fastness to light, and he would like to know whether the dyestuffs of the mono-azo group varied in fastness according to the number of the nitrogen atoms.

Miss F. M. Merrick asked for the working proportions of a lythol red using alcohol or methylated spirit, and wished to know whether there was any recovery of the alcohol used. It seemed to her rather an expensive form of manufacture.

Mr. E. S. Haynes said there was one point upon which he would like enlightenment. In the use of lythol red, particularly the yellow shades, he had noticed repeatedly that British-made dyes were extremely solvent in water. That was not the case with German dyes, and it was giving trouble in the printing-ink trade owing to the fact that some of the colours were used in lithographic work, where the material came into contact with water. He presumed it had something to do with the purity of the preparation. That was a point to which British manufacturers should give attention.

The Chairman emphasised the point that pigment manufacturers in this country should aim more at obtaining their own intermediate products and producing from them their own dyes. It would allow of more scope for individuality in obtaining colours, and probably lead to better results. The main point was to obtain a pure intermediate, but up to the present he was afraid that that had been one of the great difficulties. He did not agree with the author that certain of the reds mentioned in the paper were much superior to, say, vermilion. It might be so in many cases, but the fastness was not so reliable as in tints and reddish shades using zinc, lithopone, or white lead as were often required in paint and enamel manufacture. Whilst Hansa yellows and similar products might replace lead and zinc chromes in many cases, he thought that the question of body, from the point of view of the paint and enamel user, was an important consideration. Hansa and similar yellows always had a certain amount of body, but they wanted bolstering up with some base having considerable body; and not only was the dyestuff itself expensive, but when taken into account with the point he had mentioned it resulted in an expensive product, and he was afraid it would be long before it would be a serious competitor with zinc and lead chromes.

Mr. Tyson asked if the author had had any experience of the manufacture of certain cheap colours by the pan mill process, and if he considered that the development of such colours as lake red B and lythol red in a pan mill would have the effect of deteriorating the colour, and also whether the same effect could be obtained as when using a vat.

Mr. O. Wilkins thought it would be interesting if he stated that the British Dyes Corporation was now larger than any one of the individual firms in Germany as they existed before the war. Seeing that they had only had a few years in which to get into that position, he thought it spoke very much for the results which had been obtained. He had seen samples of lythol red which were quite equal to the German pre-war stuff, and he believed it would be on the market in quantities in a few weeks' time. He was certain that there was a great future for the aniline dye industry in this country, and during a recent visit to the works of the British Dyes Corporation he had been surprised at the extension and development which had taken place. Dr. Levinstein had assured him that there was not a dye product in the whole of the German pre-war selection which they could not make when they had had sufficient time to collect the plant together. He believed that the solution of the dye industry in this country, however, was not for it to be concentrated in one or two large corporations, but for the gas companies and other people to carry their crude products to the intermediate stage, and allow colour-makers in this country to be the real colour-makers, and not mere grinders in pan mills. At Huddersfield a few years ago they brought out a lake red B, but it was rubbish. It had been put right since, but if the colour-makers had been able to obtain suitable intermediates there would not have been the delay that there had been. Instead of there being only one man at work producing colours, as there was when the work was concentrated in one large corporation, there would be many men scattered

over the various colour-makers' works, and he felt very strongly that that was one of the solutions from the colour-maker's point of view.

The author, replying to the discussion, said that the fastness of many of the mono-azo dyestuffs was fairly good, and many of the later ones, such as the oranges, were absolutely fast to light. A paper which would deal with this subject more fully, however, was to be read later in the session. Answering Miss Merrick, he said that one of the Badische specifications dealt with the manufacture of lythol red, using alcohol. He himself, however, had had no experience. With regard to the purity of dyestuffs, mentioned by Mr. Haynes, he believed the trouble was in coupling the sodium salt. He had never been able to make a lythol red R equal to the German product according to the original German specification, but he had been able to do it by dissolving beta-naphthol in caustic soda and throwing it into a fine state of division with phosphoric acid. He believed the pan mill development of lythol red, mentioned by Mr. Tyson, was on the right lines. Lythol red R could be made more brilliant by concentrated solutions than by weak solutions. He agreed with all that Mr. Wilkins had said with regard to intermediate products. With regard to the chairman's remarks on the body of dyestuffs, he believed these dyestuffs would be produced with a good body. The German dye people had set themselves out to do this business right, and they had done it right in many ways. Even zinc and lead chromes were not all they should be sometimes. Just as the war began the Bayer Company had some products which had a very good body indeed.

A hearty vote of thanks was accorded the author at the conclusion of the paper.

ROYAL COLLEGE OF SCIENCE CHEMICAL SOCIETY.

AT the Royal College of Science, South Kensington, on Friday (November 14), Professor F. G. Donnan opened the Session of the College Chemical Society, with an address on "The Nitrate Industry of Chili." Professor Donnan, who is head of the Chemistry Department at University College, has recently returned from Chili, where he has been recuperating after a serious breakdown in health. Although ordered there for a "complete rest," he spent his time in making an exhaustive examination of the nitrate industry. In his lecture he spoke of the mining and manufacturing processes in some detail, and concluded with a short discussion of the relative merits of several theories which have been advanced to account for the formation of the nitrate beds. The lecture was illustrated with about thirty lantern slides, and various specimens of the deposits constituting the beds.

The society is this year commencing what promises to be one of the most successful sessions in its history. During the latter part of the war it was almost non-existent, but, in the hands of a competent committee, it bids fair to make up for lost time. Most of the papers are read by the students themselves. The society also aims at making its members acquainted with technical processes, by arranging visits to factories; quite a number of such excursions have already been arranged.

EXPORTS TO AMERICA.—The American Chamber of Commerce in London is opening an information section through which it hopes to assist British manufacturers to sell their goods in America. The ultimate object is a British-American reciprocal information service, but in view of the present rate of exchange it is proposed for the time to confine the work to ascertaining the market for British goods in America. For the present, too, it is proposed to deal only with proprietary and trade-marked articles. British manufacturers of proprietary or trade-marked goods who have supplies of their goods for export are invited to ask the American Chamber of Commerce for information about the present and prospective demand for them in America.

ALSATIAN POTASH DEPOSITS.

THE potash deposits of Alsace have been investigated by Mr. F. K. Cameron, of the Minerals Investigation Department of the United States Bureau of Mines, and are the subject of a recent report. The physical and chemical characteristics of the Alsatian deposits, it is said, are quite different from those of Stassfurt, in Germany. At an average depth of about 1,800 feet lies the lower layer or bed, practically (though not strictly so, because of faulting) a continuous stratum of a mixture of potassium and sodium chlorides of an area known to be upwards of 77 square miles and of an average thickness approximating 11.5 feet. This layer is not far from horizontal throughout its extent, with a dense, compact roof and floor of dry clay, so that mining difficulties are of minimum importance. About 20 feet above lies the parallel but less extensive upper bed about 4 feet thick. The lower bed is now being worked, the less important upper bed being exploited in a few places only, and being regarded as a reserve for future operations. The cubic contents of the two layers is estimated to be upwards of 1,350,000,000 cubic yards, containing approximately 1,500,000,000 tons of salt or (a rough approximation) 275,000,000 tons of potash (K_2O), enough to supply the world's probable demands for two centuries.

POTASH CONTENT.

The average potash content of the Alsatian salt mixture is certainly 18 per cent. K_2O , and possibly three or four per cent. higher, while the average for the salt as mined in Stassfurt is probably about 12 per cent. K_2O . In both regions individual samples may show wide variations, but the average for the run-of-mine is astonishing, even for the Alsatian product. Since the soluble salts in the Alsatian product are potassium and sodium chlorides alone (other salts being entirely absent or present in very small and negligible quantities), the preparation of pure potassium chloride is effected very easily and cheaply by a simple fractional crystallisation, whereas the presence of sulphates, or more especially magnesium salts, in the Stassfurt salts makes the preparation of a pure grade of potassium chloride a matter of appreciable expense and involves more or less complex technology. On the other hand, there is no production of the commercially desirable high-grade potassium sulphate in Alsace.

FRENCH MINES.

There are in Alsace nine potash mines, each with two shafts. Two of these mines, with their four shafts, belong to a French company, the Sainte-Therese, with a main office at Mulhouse, although the ownership is mainly at Nancy. Production had just begun when the war opened. All four of these shafts were flooded during the latter period of the war. Very little damage was done by the flooding, which seems to have occurred through carelessness and not by any malicious intent of the Germans. It is believed the shafts can soon be brought into operation (one has been pumped out), and it is worthy of note that because of the physical characteristics of the deposits in Alsace, the flooding of a mine does not involve necessarily its permanent abandonment, as appears to be the case at Stassfurt. These French mines being the latest in the field, their equipment is on the whole better in character and more complete than at the other mines. For instance, they are provided with magnetic separators to remove iron fragments from the crushed ore and prevent damage to machinery, and the details of arrangement are better

worked out. Refineries have been designed for these mines, but little in the way of reconstruction upon them has yet been done.

GERMAN-OWNED MINES.

The other shafts, 14 in number, were all owned by German companies before the war, but are now in the control of the Sequesterar, an official whose function is that of a Custodian of Alien Property. Seven shafts are being operated by French army engineers, and others will be gradually brought into shape for operations. The oldest mine in the region comprises shafts Amelie I. and II., near Wittelsheim. In 1913, Amelie was the third or fourth largest producer under the Kali Syndikat, largely because of the very high grade of its product, for which there was a special demand. There is a large plant at Amelie for the recovery of high-grade salt, which was more or less damaged during the war, mainly by neglect, and possibly to some extent by malice. It is now being put into shape and is producing. The Reichsland, situated just west of Wittenheim, is at present in better shape both in mine equipment and refinery, and is producing more than any other mine, about 800 tons of raw salt and 80 tons of refined salt daily. It has a private switch connection to the main line at Reichwiller, and a railroad warehouse. It is noteworthy in having a steam plant with the highest chimney in Upper Alsace, and generates its own power, whereas the other mines all purchase their power from the Oberrheinische Kraftwerke at Rheinfelden, although several of them have steam plants and generators which they hold in reserve. The mine Theodore, near Wittenheim, with the shafts Theodore and Prinz Eugen, is connected by switch to the main line at Reichwiller. The mine is in rather bad condition, as the Germans proceeded to gut it and take out as much as possible of the best salt in the last few months of their tenure, disregarding timbering and like precautions. The refinery at this mine is of very special interest, since the French army engineers in charge of operations are using the plant for large-sized experiments to determine the best practice. The results should be of the greatest importance for the future of the industry. Although commercial production is not at this time the first consideration at Theodore, nevertheless it stands next and near to Reichsland in this regard.

COST OF PRODUCTION.

From notes of rough estimates on the ground, the following figures are submitted by Mr. Cameron as fair approximations of the present actual cost of putting Alsace potash at Havre, Antwerp, or Rotterdam:—

1.—For potassium chloride averaging 18 per cent. K_2O or better:

Operation.	Cost per Ton.
Mining.....	4.00
Milling.....	0.85
Bagging.....	1.50
Renewals and repairs.....	1.00
Office and supervision.....	0.75
Interest.....	1.00
Freight.....	2.00
Total.....	11.10

Cost per unit of K_2O 0.617

2.—For potassium chloride averaging 45 per cent. K_2O or better.

Operation	Cost per Ton.
Mining.....	10.00
Milling.....	4.12
Bagging.....	1.50
Renewals and repairs.....	4.50
Office and supervision.....	1.88
Interest, etc.....	3.75
Freight.....	3.00 (1)
Total.....	28.75

Cost per unit K_2O 0.639

To these figures must be added a charge for amortisation, profit, taxes, and ocean freight. On the other hand, Mr. Cameron states that it is reasonable to expect some of the above figures to be modified downward with further experience and development of trained and ample working forces. The present freight rate on crude salts from the mine is 20 francs to Havre, 18 francs to Antwerp, and 16 francs to Rotterdam, but there is good prospect for early and substantial reductions, especially in the rate to Havre. In April of this year the production of the Alsatian mines had reached about 2,500 tons of raw salts daily. There was on hand ready for immediate shipment to any purchaser about 150,000 tons of kainit, averaging at least 18 per cent. potash, K_2O , and 400 to 500 tons of concentrated salts, averaging probably 50 per cent. potash, K_2O .

FUTURE POSSIBILITIES.

One thoroughly equipped shaft of a potash mine is supposed to be competent for bringing to the surface at least 800 tons daily, and if both shafts be fully equipped twice this production could be realised. In other words, if all the existing shafts in the Alsatian field were put into maximum producing condition the field should produce about 15,000 tons daily of crude salt. Such a production would correspond in round numbers to one million tons of actual potash annually, about the pre-war demand for all the world, including Germany.

SCIENCE AND KEY INDUSTRIES EXHIBITION AT GLASGOW.

CHEMICAL EXHIBITS.

GREAT interest is centring upon the British Science and Key Industries Exhibition which was opened on Monday afternoon in the Kelvin Hall of Industries at Glasgow, and it is anticipated that this will be visited by many experts from all parts of the kingdom during its fortnight's run. The Kelvin Hall of Industries is now the largest building of its kind in the kingdom, and the result is that the promoters—the Glasgow Corporation—have been able to allocate space to a great many firms who in a smaller building would not have had the opportunity of showing their specialities. A number of the stands are concerned with the chemical and allied industries, and these are sure to attract great attention from visitors.

Messrs. John W. Leitch and Co. (Milnsbridge Chemical Works, near Huddersfield) have an interesting show devoted to benzole, toluol, xylol, solvent naphtha, and Glauber salts. Messrs. Brunner, Mond and Co., Ltd., (Northwich), are showing ammonium nitrate produced from nitric acid made by the catalytic oxidation of ammonia; while they are also showing synthetic phenol produced by the sulphonation of benzene and subsequent caustic-soda fusion of the sodium benzene sulphonate, with treatment of the resulting sodium phenate by carbonic acid. Messrs. The Gas Light and Coke Company (London) have an exhibit comprising products of coal-tar distillation and of coal-gas purification, and these are displayed as marketed. Some of the applications of these products are also admirably illustrated. Messrs. R. Graesser, Ltd. (Ruabon), are showing phenol from coal tar, and other chemicals in which they specialise. This is an exhibit of great variety, and shows to advantage the different specialities of this firm. Messrs. The Koppers Coke-Oven and By-Product Company (Sheffield)

show a series of photographs illustrating, among other things, tar stills at the Cadishead Works of the British Tar Products, Ltd. (erected by this company); the firm's patent system of recovering tar and ammonia direct from coke-oven gas; and also their system of recovering benzole from coal gas.

Messrs. W. J. Bush and Co., Ltd. (London), have an exhibit consisting mainly of fine organic chemicals prepared synthetically. This firm claim to be well equipped to meet German competition, and a special point is made of the purity of all their manufactures. Messrs. The British Drug Houses, Ltd. (London), show fine pharmaceutical chemicals, as well as specimens of dyes in dry form and in solution. Messrs. Thermit, Ltd. (London), show their speciality and all its compounds in an interesting manner. This exhibit is divided into three main sections: Pure carbon, free metals, and alloys; Thermit compounds for various purposes, with explanation of their uses; and the Thermit process of welding. Mr. J. Arthur Greene (London), in collaboration with the technical advisors of the Committee on the Production of Oil and Coal, etc., shows an exhibit of raw materials, crude oils, and refined products, embracing fifty samples of carbonaceous material from various deposits in Great Britain, and also including samples of lignite from Devonshire, and shales from Scotland and Dorset. Messrs. The Lennox Foundry Company, Ltd. (London), show photographs of chemical plant for the production of drugs, dyes, and heavy chemicals.

Messrs. The United Alkali Co., Ltd. (Liverpool), have a very important selection of chemicals on exhibit. They are showing, among other varieties, aluminium chloride, benzoic acid (sublimed and technical), caustic potash, copper sulphate, magnesium chloride, nitric acid (pure), salammniac, soda crystals, etc. Messrs. Brotherton and Co., Ltd. (Leeds), show metachrome colours for the production of the large range of fast shades on wool; acid chroming colours; acid colours suitable for dyeing wool, silk, jute, paper, and leather; colours for lake-making; and other specialities, such as zinc formosul, liquid ammonia (all strengths), benzole, etc. Messrs. The British Dyestuffs Corporation, Ltd. (Manchester and Huddersfield), have an exhibit primarily designed to illustrate the manifold application of coal-tar dyes, and thereby to indicate the extent to which an industrial country is dependent upon the colour industry. Special sections of this exhibit are also devoted to synthetic indigo and its derivatives, and also to duranthrene and durindone dyes (vat dyestuffs), and other colours of exceptional fastness.

Messrs. The British Oil and Cake Mills, Ltd. (London, Glasgow, etc.), illustrate in their exhibit seed crushing (oils expressed from linseed, cottonseed, rapeseed, etc.); oil extracting (oils extracted from rapeseed, palm kernels, soya beans, etc.); and other of their specialities. Messrs. The South Metropolitan Gas Company (London) have an exhibit comprising examples of chemical preparations representative of the firm's manufactures in various branches of the chemical industry, and also illustrating the extensions made in these branches during the war. The products are divided into two groups—those which were being manufactured before the war, and are still being manufactured; and products which have been manufactured since the war.

Such, in brief, are the specialities being shown by the various firms connected with the chemical and allied trades who have either stands or show-cases at this important Glasgow exhibition.

SELECTIVE ADSORPTION AND FROTHING REAGENTS.*

By H. L. SULMAN.

OF two solutes in the same solvent, that which is the more strongly adsorbed (lowers surface-tension more) tends to displace the other from the surface-layer. Professor C. V. Boys found that a trace of soap added to a saponine solution destroys the characteristic properties of the latter; the attraction of the water molecules for saponine molecules is apparently less than for those of soap, which therefore is selectively adsorbed: in support of this, we find the surface-tension of soap solution to be less than that of saponine. Fragments of gold-leaf, powdered metals, graphite, and metallic sulphides floating by tension effect at a water-surface are immediately sunk by the addition of sufficient saponine or soap. Because of its pronounced adsorption at a water/solid interface, soap is selectively adsorbed at and consequently detaches oil and grease from surfaces already oiled. Selective adsorption thus accounts for the detergent properties of soap; it is intimately concerned with the phenomena of dyeing and other technical industries.

A glass surface exposed to the air becomes contaminated with a minute grease-film; when moisture condenses on such a surface it does not form a continuous water-film, but a congeries of minute hemispherical droplets: hence preparations of soap, saponine, or ox-gall, which displace the grease-layer and lower σ (surface tension) for water, prevent the "dimming" of eye-glasses and cause raindrops on the wind-screen of a car to coalesce into a film. Saponine excludes the minute globules of an oil-emulsion from a water surface; they are observed to form a layer at a minute yet visible distance beneath it.

Facts relating to the adsorption of certain gases from gaseous mixtures by porous solids are beyond our immediate province, but similar selective reactions occur in many instances.

Many types of selective adsorption are concerned in the production of a mineralised froth, as for example those occurring—

- (a) between the various solutes at an air/water interface;
- (b) " solute and mineral slimes at such interfaces;
- (c) " immiscible oil and water/mineral interfaces;
- (d) " immiscible oil and solute at the oil/water interface;
- (e) " acid and alkali solutes and certain sols, and gangue/water interfaces

—to mention only the more readily appreciable reactions. A host of similar adsorptions happen contemporaneously in regard to differential flocculation, and, as they arise from the interaction of the same molecular forces, the overlapping effects of flocculation and adsorption cannot be sharply differentiated from each other.

In arriving at a stable froth-equilibrium in any given case, from so complex a system of interfaces whose possible molecular reactions are very great, a not inconsiderable time-factor is demanded. It will also be appreciated that, as such an equilibrium may depend upon a somewhat narrow balance of many contributive causes, a comparatively small increase or decrease in the range of but one factor may produce a quite different equilibrium.

An adsorption of mineral particles does not alone confer sufficient elasticity upon a water-film, yet a stable and extensive bubble-film area must be provided to

contain the mineral; this is secured by the addition to the water of a substance whose particles or molecules are adsorbed to an extent sufficient to yield an elastic and conformable film, yet not so strongly adsorbed as to displace the mineral from the film, a *joint* adsorption being required. An elastic film of but partially reduced energy can adsorb mineral particles, which now confer increased stability.

Soap, saponine, and tannic acid being readily soluble (or yielding high aqueous concentrations), and substances, moreover, which are strongly adsorbed at an air/water interface, their employment requires careful quantification; otherwise ore-suspensions shaken with solutions which so greatly reduce the surface-energy of water may yield barren, or "air-water" froths, all the mineral remaining sunken; while many other less strongly adsorbed substances permit the formation of well-mineralised froths.

Thus, amyl alcohol in low concentration in an ore-pulp—e.g., from 1 part in 5,000 to 1 in 20,000, or from $\frac{1}{2}$ to 2 lb. in a pulp consisting of 1 ton of ore and 4 tons of water—has been extensively used as a frothing agent, though later superseded by cresol in like or slightly larger proportions. The water-soluble portion of several fixed and many essential oils answers the same purpose. Since a minute amount of an insoluble oil adsorbed at the mineral surfaces will decrease their adhesion for water, a single oil may act both as a frothing agent and in enhancing the flotability of metal sulphides.

If an oil, alone, be used, it must be such as will yield a sufficiency of aqueous solute; eucalyptus, pine-oils, turpentine, the terpenes and their hydroxy-compounds, camphor-oils, and a host of other compounds and derivatives both aliphatic and aromatic, conform to this requirement. Thus many distillation products containing phenyloid bodies (phenols, cresols, creosotes, etc.), such as furnace-oils, wood-tar-oils, and the lighter tars, are widely used. Very dilute solutions of ethyl alcohol, and acetic acid, will produce mineralised froths, and the almost insoluble oleic acid of commerce yields a solute capable of producing a weak one; the latter instances are less of practical than of theoretical interest.

The constitution of an oil-solute is often very complex; eucalyptus-amygdalina solute contains aromatic alcohols (eucalyptol and geraniol), several aldehydes, ketones, oxidised terpenes, etc.; various samples of this oil when suspended in water, in the proportions used in practice, have shown the amount of the soluble fraction to vary between 6 per cent. and 9 per cent. of the oil; all the dissolved substances proved to be more or less useful as adsorptions. The insoluble portion contained the terpenes phellandrene and pinene (mainly the former), camphors (stearoptenes), and resinous bodies. Analytical scrutiny of either solute or immiscible portion, though of interest, is not essential, and may be misleading; the quicker and more reliable method is a small-scale trial of the oil in question with the particular ore it is desired to treat.

Sulphonated derivatives of oils ("soluble oils") have been employed with more or less success. These are of two types; those dissociated on contact with water into an immiscible oily-product and free acid, which thus give rise to the effects due to both dissociation products; and those not so hydrolysed, which function mainly as frothing agents.

It follows that choice of oils for both purposes, and even in regard to certain of their more specific applica-

* Extract from paper entitled "Contribution to the Study of flotation," read at a meeting of the Institution of Mining and Metallurgy in London on Thursday.

tions for particular minerals, is very varied. In some cases where the more usual oils have been difficult to obtain, local shrubs have been distilled, whose oily products have answered so well as thereafter to be widely recommended as specifics. Suitable mixtures are many: vegetable with mineral oils; mineral-oils with cresol, wood-tar, etc. Patent and other literature on the subject is already voluminous. Thus considerable business in "flotation oils" has developed, with a nomenclature sometimes fanciful. The oils recommended are doubtless useful and efficient, but ore-constitution and the nature of the mineral occurrence vary so greatly that none can claim to provide an infallible specific; an oil-mixture which answers admirably for a particular ore is by no means certain to yield identical results upon apparently similar ores elsewhere.

Summarising the foregoing paragraphs, a satisfactory froth-forming solute must provide an adsorption which, in nature and concentration, will show a balance of advantage in the directions of:—

- (1) Production of a large bubble-surface; and
- (2) Leaving the bubble-film with sufficient mineral-adsorptive energy.

This definition rejects oils which if used alone do not yield a solute, and solutes that do not froth with water; it coincides with a comparatively small reduction of σ for water. The mineral adsorptions which also take place at the film-surfaces further reduce the tension, and by their mutual adhesions again increase film-stability.

Nevertheless, in the absence of any traces of immiscible oil, cresol, amyl alcohol, and other true solutes do not yield very dense or coherent mineralised froths, although these for a while may be voluminous. The further stabilisation of a mineralised froth is secured by the adsorption of a minute film of immiscible oil at the interfaces of the mineral particles and the liquid.

PARLIAMENTARY NEWS.

Fertilisers and Feeding Stuffs.

In the House of Commons, Mr. Sith asked the Parliamentary Secretary to the Board of Agriculture whether his attention has been drawn to the last report issued by the chemical department of his board, wherein certain feeding stuffs, fertilisers, and other materials required in agriculture have been proved on analysis by Dr. J. A. Voelcker to be more or less valueless for the purpose they are advertised and sold to serve, and that in one instance alone the cost was more than four times what the material was worth?

Sir A. Boscawen: There is no report issued by the Board of Agriculture of the kind referred to by the hon. member. The results of analyses made by Dr. Voelcker of certain feeding stuffs and fertilisers are published annually in the *Journal of the Royal Agricultural Society of England*. Protection against fraudulent sales of fertilisers and feeding stuffs is provided by the Fertilisers and Feeding Stuffs Act of 1906. Under this Act, sellers are required to give a description of these materials where necessary, indicating their agricultural value. A false description to the prejudice of the purchaser constitutes an offence under the Act. The Board are now considering to what extent the Act should be amended with a view to giving greater protection to the farmer. The Board have repeatedly warned users of manures against the purchase of inferior or worthless articles at excessive prices, and have published a leaflet on the subject. Prices of fertilisers are not controlled by law; prices and distribution of feeding stuffs continue for the present under the administration of the Food Controller.

Restrictive Duties on Vegetable Oils.

Lieut.-Commander Kenworthy asked whether the present restrictive duties on the export of raw materials for vegetable oils will be applied to the mandatory areas granted to this

country under the covenant of the League of Nations; if so, whether this House will be given an opportunity of discussing this departure from the historic policy of Great Britain of recognising the rights of native races to sell their produce in the open markets of the world; whether the League of Nations aspect of this question has been fully considered; and whether an appeal by dissatisfied producers in these mandatory areas to the Council of the League of Nations will be permitted by His Majesty's Government?

The Under-Secretary of State for the Colonies (Lieut. Colonel Amery): The hon. member is incorrect in his assumption that there are restrictive duties on the export of the raw material for vegetable oils generally, but I presume he is referring to the special case of palm kernels exported from the West African Colonies, on which product there is a differential export duty of £2 a ton on kernels exported outside the Empire. In any case, the answer to the first part of his question is in the negative; the rest consequently does not arise.

Restrictions on Lithopone Imports.

Mr. Wallace, on Monday, asked what restrictions are at present imposed on the importation of lithopone, and for what reason the restrictions are continued?

Sir A. Geddes: The importation of lithopone is prohibited except under licence. As a general rule licences are granted to firms who imported it during the three months preceding September 1, allowing them to import it now at the same rate as during that period. Licences for importation of further quantities, however, are granted if producers in this country are unable to supply the demand. The restriction is intended to shield this "unstable key industry" from excessive foreign competition.

Mr. Wallace: Why are these licenses so difficult to obtain? Is the right hon. gentleman aware that one important firm's business has been almost brought to a standstill on account of the lack of this raw material, and how can manufacturers who are asked to increase our export trade do so under restrictions which make this impossible for want of raw material?

Sir A. Geddes: I was not aware that there was any difficulty with regard to getting licences, but if the hon. gentleman will bring any cases of that kind to my notice I will look into them.

German Dyes.

Major McKenzie Wood asked the President of the Board of Trade whether he is aware that German dyes are moving freely into France, Belgium, Holland, and the United States, and that British dye-users are losing trade to foreign competitors through being compelled to import their dyes through the Government Department?

Sir A. Geddes: The export of dyes from the occupied territory of Germany, in which the German dye-making works are chiefly situated, is allowed only under licence from the Inter Allied Rhineland Commission. The importation of German dyes into France and the United States is permitted only under licence. As regards importation into this country I would refer the hon. member to the announcement which appeared in the Press on November 13 as to the steps which are being taken to safeguard the interests of consumers.

Carbonisation of Coal.

Mr. Atkey asked the Parliamentary Secretary to the Ministry of Munitions whether he is aware that the Director of Steel Production compiled statistics showing the amount of coal carbonised both in patent by-product ovens and in bee-hive ovens in the years 1917 and 1918; and whether he would now publish these figures for each method of carbonisation?

Mr. Hope: The only figures available are those for the production of metallurgical coke for the years 1916, 1917, and 1918; these will afford some indication of the amount of coal carbonised in coke ovens during those years. The figures are as follows: 1916, 13,422,195 tons; 1917, 13,801,607 tons; 1918, 13,277,007 tons. The subdivision between by-product bee-hive, and retort ovens can only be given for the year 1917 and is as follows: By-product, 10,866,673 tons; bee-hive, 2,411,244 tons; retort, 523,690 tons.

ELECTRO BLEACH AND BY-PRODUCTS, LTD.—An interim dividend on the ordinary shares in respect of the half-year ended June 30, of 7½d. per share (less income-tax), being at the rate of 12½ per cent. per annum.

BRITISH ASSOCIATION OF CHEMISTS.

"If we don't hang together we shall assuredly all hang separately."
—JOHN HANCOCK, when signing the Declaration of Independence.

Hon. Registrar: DR. FRANCIS W. KAY,
Chemical Department, The University,
Liverpool.

NOTICES.

NOTICES and reports from secretaries of local Sections and articles and correspondence for these pages should be sent to the Hon. Editor, Dr. E. H. Rodd, 7, Mauldeth Road West, Withington, Manchester, and not to the *Chemical Trade Journal and Chemical Engineer*.

The Hon. Editor will be glad to receive short articles on the views of members with respect to the B.A.C., its aims and aspirations, for publication in these pages. Such articles should be accompanied by the name and address of the writer, not necessarily for publication.

Applications for membership of the B.A.C. should be sent to the Registrar, Dr. F. W. Kay, not to the Hon. Editor.

PROCEEDINGS OF THE ASSOCIATION.**THE COUNCIL.**

A meeting of the Council was held on November 15 in the Victoria Hotel, Manchester, at 1.30 p.m., the proceedings being necessarily brief on account of the annual general meeting following at 3 o'clock.

Treasurer.—Dr. E. P. Hedley announced that, to his great regret, he was compelled through unavoidable circumstances to resign from the post of treasurer. This intimation was received with expressions of the deepest regret by the Council. As successor to Dr. Hedley, it was resolved to recommend to the annual general meeting Mr. A. G. C. Paterson for election. A Finance Committee of three was elected, consisting of the treasurer, Mr. W. E. Kay, and Dr. F. W. Kay.

Association Offices.—The President announced that he had secured a room, admirably suited to be the offices of the Association, in Bedford House, York Place, London, W. 1. He had also purchased a typewriter, a duplicator, and other essentials. A vote of approval was carried unanimously, and the president was authorised to purchase other necessary articles of furniture.

Nominations Committee.—The election of a number of candidates approved by the Nominations Committee was confirmed, and a gentleman of Italian nationality was, according to the regulations, declared elected by a special resolution. In this connection, Dr. Walpole emphasised the desirability of electing as many allied chemists resident in this country as possible as a safeguard against a possible influx into this country at a later date of chemists of enemy origin prepared to work for small salaries.

Federation of Scientific and Technical Workers.—The payment of an entrance fee of £10. to this Federation was approved.

The remainder of the limited time at the disposal of the Council was devoted to making the necessary arrangements for the annual meeting which followed.

ANNUAL GENERAL MEETING.

The annual general meeting of the Association was held at the Victoria Hotel, Manchester, on Saturday last, Professor J. W. Hinchley, the president, occupying the chair. In his address, the Chairman said that during the past year the British Association of Chemists had passed through a great experience, and had come through it with increased strength, absolutely united, and full of energy for the coming year. An enormous amount of work was entailed in running the Association, and it was impossible for any man who earned his living by the practice of chemistry to do it. The Association had only been carried to its present position by the self-sacrifice of the men who had done the pioneering work. They had been compelled to appoint a paid official, and he (the speaker) hoped that, as time went on, still further assistance would be necessary. Describing the manner in which the work of the Association was carried on, the President said that most of the work was done in the local sections. The work of the Council consisted mainly in securing unity by hearing the opinions of the delegates from the local sections. They had thus achieved a degree of unity which was incomprehensible in societies that were ruled by an elected council.

Things were thoroughly discussed in the sections before going to the Council, and, as a rule, the agreement was very remarkable. They were all united in getting business done, and in getting it done in the best way. With regard to registration, the draft rules were actually in print, and were in the hands of the local sections. When these had been thoroughly discussed, the Council would be ready to proceed with the registration of the Association.

It was better for me to be certain that the rules would work than to register hastily for the sake of saying that they were registered. They had taken their time, and not a single member of the Council regretted the time that had been spent in bringing about unanimity. There was not a member of the Association who was not thoroughly qualified and competent, and that was a very desirable position to be in. They were getting a number of head chemists into the Association, and they intended to make full use of them to help the Association to secure the high standard of comfort necessary for the members of the profession. Through the Labour Party, certain questions had been raised in Parliament, and he hoped that eventually some return would be obtained for those chemists who had been so badly treated during the war. The Parliamentary work would be continued. He regarded it as extremely likely that before long members of Parliament of all parties would be tumbling over each other to do the Association's business in the House of Commons. In conclusion, he would like to say that the membership of the Association was increasing, but not so rapidly as it should. He hoped that the Council would have the full support of each member in their efforts to make the Association a real force in the country and in securing adequate remuneration for the chemist.

The Hon. Treasurer (Dr. E. P. Hedley), in presenting his report, said that the excess of income over expenditure for the year was £381., and, after deducting the deficiency of £40. on account of the preceding year, there was a balance of £341. He drew attention to the deposit account which had been started to form the nucleus of a Legal Aid Fund for the benefit of members. The Council proposed to invite from all the sections specimens of agreements made between different firms and the chemists employed by them, and to obtain legal opinion as to their value. It would probably be found that most of these agreements were worth nothing at all. The speaker pointed out that what chemists needed more than dollars was unanimity, and this they must have if they were going to make the B.A.C. worth anything. Class feeling amongst chemists, of which there was too much, must be eradicated. The Guarantee Fund which had been inaugurated had been very successful, and, with the amount already promised, they were in a position to go on with their programme. He emphasised the need for every member to endeavour to bring into the Association those chemists who were not already members. Unless they had every chemist inside they would not fully attain their ends. The financial report was adopted unanimously. The President stated that it had been impossible yet to send acknowledgments to those members who had promised to contribute to the Guarantee Fund, but these would be sent out in a few days.

Referring to the work of the Nominations Committee, Dr. F. W. Kay said that, for unavoidable reasons, the work of the Committee had been handicapped, but it was now hoped that applications for membership would be dealt with more expeditiously. Increase in membership must depend largely upon personal canvassing, and he urged them to use their influence in bringing in as many members as they could.

Dealing with the work of the Whitley Council's Committee, Mr. W. E. Kay said that early in the history of their attempts to find fields of activity for the Association, it was felt by the Council that the opportunities presented by the Whitley scheme should not be lost sight of, and a committee was formed to follow up this line of action. The first step of the Committee was to try to get the interest of chemists focussed upon the subject. To this end they had a very interesting lecture from Mr. Samuel Todd, of the Ministry of Labour. The Committee felt that it was not sufficient to interest chemists only, and at the close of the meeting a resolution was passed instructing them to get into touch with other organisations. Eventually, at a meeting in London, a Federation of Scientific and Technical Organisations was formed. That body, on which seven societies were represented, was now in the embryo stage of its existence, and he hoped that when it was in running order it would be of invaluable assistance to technical men. In formulating schemes for the work of professional men upon Whitley

Councils, the Committee had submitted right through that the councils should consist of three classes of men. Up to now the Whitley Councils only recognised the manual workers and the masters. The Committee wanted brain workers to have an independent existence on these councils. The Federation had been formed mainly for Whitley Council work, and at the start would work through its constituent societies in the same way as the B.A.C. works through its sections. They hoped that something very useful would come out of it.

The Chairman announced that the treasurer, for business reasons, was compelled to relinquish his post, and a resolution regretfully accepting his resignation was adopted. The following officers of the Association were elected: President, Professor Hinchley; vice-president, Mr. W. E. Kay; hon. registrar, Dr. F. W. Kay; hon. secretary, Mr. S. E. Price; hon. treasurer, Mr. A. G. C. Paterson; hon. editor, Dr. E. H. Rodd.

The Chairman, replying to a number of questions, said that a committee in London was sitting upon the question of income-tax payable by chemists, and a report would be issued shortly. It was hoped that chemists would be able to deduct from their incomes charges for the cost of books, subscriptions to learned societies, and the like. Regarding the formation of an Employment Bureau, the work would go forward rapidly now that a paid assistant secretary had been appointed. As regards salaries, it was neither possible nor desirable to fix a standard rate for chemists, but they had already expressed the pious opinion that no chemist should work for less than £350. per annum. If the lower-paid men all attained the minimum, then the higher-paid men would get still more.

ANNUAL DINNER.

Following the annual general meeting, a highly successful dinner was held in the Victoria Hotel, some sixty members attending the function. The informal nature of the proceedings was so much to the taste of the company that a general desire was expressed that the dinner should be made an annual event. In all probability, both meeting and dinner will next year be held in London. After the loyal toast had been honoured, several musical members of the company contributed songs, and a surprisingly large number shone in the rôle of *raconteur*. More serious in character were the speeches of Mr. Tutton (of Huddersfield) and Mr. Redgrove (of Liverpool), who spoke of the progress of the B.A.C. in their respective districts, and indicated the path of future progress. The feature of the evening was, perhaps, Dr. Walpole's address, in which he gave a vivid picture, from personal knowledge, of the state of occupied Germany at the present time. One little anecdote of Dr. Walpole's is worth recording. Surprised at seeing a bed of roses planted in close proximity to a sulphuric-acid plant, he inquired the reason. "Because," was the reply, "if those roses die, we know that somebody is wasting sulphuric acid." In Dr. Walpole's opinion, German chemists will not stay in their own country if they can possibly get out of it. We must be prepared for an invasion, and the B.A.C. must see that they are prevented from coming to this country and cutting out our own chemists with cheap labour.

COMING MEETINGS.

Liverpool Section.—Secretary, Dr. F. W. Kay, The Chemical Department, The University, Liverpool. A meeting will be held on Thursday, December 4, at the "Coffee Pot," Renshaw Street, at 7 p.m.

Huddersfield Section.—Secretary, Mr. H. R. Tutton, 1, Wentworth Street, Huddersfield. A smoking concert will be held on Friday, December 5, at the Queen Hotel, at 8 p.m.

Leeds and Bradford Section.—Secretary, Mr. H. Jennison, 8, Selborne Villas, Manningham, Bradford. A special meeting, which will be addressed by Professor Hinchley, Dr. Forster, Dr. Hedley, and Mr. Schofield, will be held on Tuesday, November 25.

HOLTON HEATH CORDITE EXPLOSION.—Early on Saturday morning an explosion occurred at the Royal Naval Cordite Factory, Holton Heath, near Poole, as the result of which a workman, Jesse Orchard, of Poole, was killed. He was engaged on an acetone recovery stove in the cordite section when it suddenly ignited. Orchard was terribly mutilated, and was killed instantaneously. The flames were visible for miles around.

NEW COMPANIES.

Savalot (1919), Ltd.—Private company. Capital £2,500., £1. shares. Object: To take over the business of soap manufacturers carried on by G. F. Cripps at 59, Ingrave Street, Battersea, as "Savalot and Co." Registered office: 59, Ingrave Street, Battersea, S.W.

Thermal Industrial and Chemical (T.I.C.) Research Company, Ltd.—Private company. Capital £7,500., £1. shares. Objects: To acquire and turn to account certain inventions of J. S. Morgan, and to secure his services as technical director of the company, to carry on researches, investigations, and experiments relating to the distillation, fractionation, deposition, or treatment of solid, liquid, or gaseous matter, etc. Solicitors: Holmes, Sons and Pott, Capel House, New Broad Street, E.C.

Nonporo Cement Company, Ltd.—Private company. Capital £15,000., £1. shares. Registered office: 80, High Street, Belfast.

Scientific Colour Company, Ltd.—Private company. Capital £10,000., £1. shares. Object: To adopt an agreement with K. B. Benham. Manufacturers of and dealers in potters' colours and materials, oil for belt-dressing, to prevent slipping, etc. Secretary: Miss M. Stapleton, Gaol Square Motor Garage, Stafford.

Greenwell and Irwell Rubber Company, Ltd.—Capital £800,000., in 400,000 ordinary and 400,000 7½ per cent. cumulative preference shares, all of £1. each. Object: To acquire the businesses of I. Frankenburg and Sons, Ltd., and the Irwell and Eastern Rubber Company, Ltd. Registered office: Greengate Rubber Works, Salford.

Maidenhead Rubber Plantations, Ltd.—Capital £25,000., 2s. shares. Object: To acquire certain estates in the F.M.S., or any interest therein, and to enter into an agreement with a company of the same name (incorporated in the F.M.S. and now in liquidation). Office: 30, Mincing Lane, E.C.

Excelsior Products Company, Ltd.—Private company. Capital £100., £1. shares. Object: To take over the business of Sir James Hacking and J. L. Cumpstey, carried on by them as the "Excelsior Products Company," at Barton Street, Blackburn. Dealers in indigo, manufacturers, importers and exporters of edible fats, etc. Office: Barton Street, Blackburn.

Fachwen Barytes Mines Company, Ltd.—Private company. Capital £10,000., £1. shares. Object: To take over the business of a quarry proprietor carried on at Fachwen, near Newtown, Montgomery, by F. J. Somerville. Registered office: 2, King Street, Liverpool.

Jay, Metliss and Son, Ltd.—Private company. Capital £2,500., £1. shares. Manufacturers and sellers of balata cement, etc. Registered office: 192, Ball's Pond Road, Islington, N. 1.

K. L. Allan and Co., Ltd.—Private company. Capital £10,000., £10. shares (400 preference). Export and import merchants, chemical brokers, oil refiners and blenders, etc. Registered office: 42, Stanley Street, Liverpool.

Lowestoft Fish Products Company, Ltd.—Private company. Capital £10,000., £1. shares (8,000 A. and 2,000 B.). Manufacturers of and dealers in fish meal and fish oil, etc. Registered office: 91, Queen Victoria Street, E.C.

Rhadley Mines, Ltd.—Private company. Capital £4,000., £1. shares. Object: To acquire leases of the Rhadley Mining Sett Cefn y Guntly Mining Sett in More. Salop, from C. McNeal and W. P. Jones, for the purpose of mining and treating sulphate of barium, carbonate of barium, lead, zinc, calcite, or other minerals, etc. Registered office: Lloyds Bank Chambers, Fenton, Staffs.

Rochdale Cake and Corn Mill Company, Ltd.—Private company. Capital £5,000., £1. shares. Object: To take over the business of cattle food cake manufacturers, corn millers, and manufacturers of and dealers in all kinds of fertilising compounds, etc., carried on by H. Kirk and R. M. Robinson at the Borough Mills, Rochdale. Registered office: Borough Mills, Rochdale.

Alex. Robertson and Sons, Ltd.—Private company. Capital £78,600., £1. shares. Wholesale and retail manufacturing chemists. Registered office: 26, Stafford Street, Oban.

Snow White Lead Company, Ltd.—Private company. Capital £5,250., in 5,000 preferred ordinary shares of £1. each and 5,000 deferred ordinary shares of 1s. each. Manufacturers of and dealers in mineral distillates of definite composition, and dealers in metals and metal products of all kinds, etc. Registered office: 149, St. Vincent Street, Glasgow.

LEGAL INTELLIGENCE.

Koppers' Coke-ovens and By-products: Ownership of Patents.

An action to determine the ownership of certain English patents standing in the name of Heinrich Koppers, a German, was heard by Mr. Justice Russell in the Chancery Division on Monday. The action was brought by Mr. Albert Victor Derry against Mr. Charles Rudolf Altenheim and Mr. Koppers for a declaration that on August 4, 1914, when war broke out, the patents were in equity the property of a partnership, of which he and the two defendants were the members.

Mr. Terrell, K.C. for the plaintiff, stated that the partnership was known as Koppers' Coke-ovens and By-products Company, of Sheffield. The plaintiff was the only member who was a British subject. His name was originally Koch, his father or his grandfather being German; but Mr. Derry was born and educated in England, and was a British subject. He changed his name to Derry by proper procedure during the war. Mr. Altenheim was born in Germany, but came to this country as a young man, and had been domiciled here ever since, so losing his German nationality. Mr. Koppers was a German residing in Germany. Prior to 1902, Mr. Derry and Mr. Altenheim were in partnership together as engineers, their particular business being connected with colliery plant and machinery. Mr. Koppers was an engineer who had devoted himself to the manufacture of coke-ovens and the by-products plant to be used in connection therewith. Shortly before the war, and principally during the war, the erection of these coke-ovens formed an enormous industry, and what was formerly treated as waste was by the aid of them and the by-product plant now the most important part of the business. Koppers had taken out a number of patents for coke-ovens, which were now known throughout the world as Koppers' coke-ovens, as well as for by-product plant. In 1901 and 1902 negotiations took place with the object of Mr. Derry and Mr. Altenheim, who were trading as Koch and Co., entering into partnership with Koppers with a view to introducing his patents into the United Kingdom and to carry on the business of making and working the ovens and plant. An agreement was prepared in English, translated into German, and sent to Mr. Koppers in Germany, and afterwards retranslated into English. This was what had given rise to the difficulties the Court had now to solve. The agreement as eventually signed was in German. When the war broke out the business was a very considerable one, and Mr. Derry and Mr. Altenheim found great difficulty in obtaining payment of the monies due to the partnership. There was over £100,000. payable to the partners, but having regard to the Royal Proclamation and the fact that Koppers was an alien enemy, it was believed that payment would be a breach of the law. The difficulty was got over by the Board of Trade at the instance of Mr. Derry obtaining an order appointing Mr. Shuttleworth controller of the business under the Trading with the Enemy Act. With the sanction of the Court, Mr. Derry and Mr. Altenheim were appointed managers under Mr. Shuttleworth. Mr. Altenheim was subsequently interned, and during his internment Mr. Derry carried on the business. Considerable litigation had ensued, throughout which Mr. Derry had always insisted that the patents, although standing in the name of Koppers, were not his separate property, but that they were in equity the property of the partnership. In the course of the proceedings, the benefits of the patents were vested in the Public Trustee. Counsel urged that although there was no express term in the agreement that the English patents should belong to the partnership, it was clear that this was the intention. It was proved by the provision that Koppers was to devote all his present and future experience and improvements to the partnership. Koppers did make improvements, and he also made inventions in connection with gas for illuminating purposes, and on this a question arose as to whether the partnership was also entitled to the patents for these gas-producing inventions. That implied that there was no question that the partnership owned the coke-oven and by-product patents. Koppers said the new gas-lighting patents were a different matter, and were his own.

Mr. Derry gave evidence in support of counsel's statement.

Cross-examined by Mr. Austen-Cartmell, for the Public Trustee, he agreed that neither he nor Mr. Altenheim put any capital into the alleged partnership, but said that the capital was ready if it had been required. Nothing was brought in by Mr. Koppers except the patents. All applications for

improvements were made in Koppers' name. The patents did not appear in the balance-sheets of the company, nor were they treated as an asset in the books.

Mr. Claud Barker, a Sheffield solicitor, who had acted for the parties from time to time, said he always understood that the patents were vested in the partnership.

Mr. Altenheim said he endorsed the evidence given by Mr. Derry. He declared that the patents were included as part of the partnership assets, and that so far as he knew Koppers had never objected to this.

The hearing was adjourned.

Mr. Austen-Cartmell, on Tuesday, submitted that the whole facts were inconsistent with the idea of the patents being vested in a partnership. If it had been the intention it would have been so stated in the agreement. It was an adventure to work the patents, and so long as it lasted it was immaterial who owned the patents. No question arose until the sledgehammer of the war descended. This claim was being defended by the Board of Trade on the direction of Mr. Justice Younger (now a Lord Justice of Appeal), who thought it necessary that the matter should be thoroughly sifted.

Mr. Terrell, in reply, contended that although the contract did not in express language set out the arrangement between the parties, it was evident from the carrying out and working of the agreement that the patents were included in the partnership.

Mr. Austen-Cartmell stated that during the war the Public Trustee had made huge profits out of these Koppers patents.

His Lordship, giving judgment, said he accepted the evidence of the parties that in their view the patents were the property of the partnership, and that what they contemplated was a lasting amalgamation of their interests. He had no hesitation in coming to the conclusion that the patents and subsequent improvements, although standing in the name of Koppers, were in equity the property of the partnership. There would be liberty to apply in Chambers for accounts and inquiries, and the costs would be paid out of the assets in the hands of the custodian.

Quality of Cream of Tartar.

A prosecution of considerable interest to the chemical trade came before the Sheriff Court, Glasgow, last week. Mr. William Weir, sanitary inspector, Rutherglen, entered a complaint against James Buchanan, grocer, 16, Main Street, Rutherglen, that on August 1 he sold cream of tartar which contained 0.003 per cent. (one-fifth grain per lb.) of lead, whereas genuine cream of tartar should not contain more than 0.002 per cent. (one-seventh grain per lb.) of lead. The case was brought under Section 6 of the Sale of Food and Drugs Act, 1875. Respondent pleaded not guilty.

Evidence of the purchase having been given by an assistant inspector, the complainer said he took proceedings against respondent because the burgh analyst advised him there had been a contravention. The Local Government Board instructed him some time ago that should a sample show an excess of lead he was to bring the matter into Court. There was, he admitted, no limitation of the percentage of lead in cream of tartar laid down, and accordingly there was no limit or definition of the amount to go upon of lead permissible in the article. The respondent had informed him that he sold the cream of tartar as delivered to him that day. He added that he sold only cream of tartar which had a 98 per cent. purity.

Professor John Glaister, Glasgow University, said pure genuine cream of tartar should contain no lead, but he agreed that no limit had been laid down by any Commission. There was no statutory limitation, but 0.002 per cent. as recommended in Dr. MacFadden's report on impurities was, to his mind, a reasonable standard.

Dr. Ebenezer Duncan said the percentage of 0.002 of lead should not be exceeded in cream of tartar.

Mr. R. Tatlock Thomson, analyst for Rutherglen, stated that up to 1908 he analysed over 100 samples and the average was 0.005 per cent. In 1907 he got one which was 0.007. Since then, however, there had been a great improvement. In recent years, of 98 samples all had conformed to the standard of 0.002 per cent. save two recent cases. The exceptions were very much out—one showing one grain per lb.

Professor Stockman, Glasgow University, called for the defence, said he knew "purified" cream of tartar very well; it was absolutely pure. In small quantities lead was not deleterious to the system. If given more than the body could expel it became cumulative, but the infinitesimal quantities contained in a baking of scones would be absolutely beyond

any deleterious effect that was known. Witness warned people against buying cream of tartar at the grocer's, but by no manner of means could a man receive any bad effects from stuff at 0.003 per cent.

In cross-examination the witness said he would put up the percentage to 0.004.

The Sheriff: So you think we are quite safe eating our scones with 0.003 per cent. of lead distributed in particles throughout them?

Witness: Yes, and far more. Cream of tartar was mostly always contaminated with lead unless you paid a very high price for it. To his mind, it was ridiculous to think that lead in minute quantities could be deleterious and dangerous in food.

The respondent stated that he got no warranty for the stuff, which he purchased from a firm of wholesale grocers. It was an understood thing that he should get it at 98 per cent. purity, but someone had informed him that a mistake had been made in delivering 92 per cent. instead.

James Nicholson, senior partner of Arthur and Hinshaw, chemical merchants, Glasgow, said his firm dealt largely in cream of tartar, of which their turnover was 60 tons per month, and 700 tons a year. The bulk went to wholesale grocers and to bakers, and lesser quantities to chemists. They sold two qualities—92 and 99 per cent., but there ought to be no more lead in the one than in the other. If to a chemist, they must send the 99 per cent. article, if to the others it was a matter of taste which they had to send.

After hearing parties, agents, his Lordship adjourned the diet to Thursday, when he would pronounce his decision.

A Bankrupt's Big Salary.

At the London Bankruptcy Court on Friday last week, before Mr. Registrar Francke, the public examination was held of Alfred Robert Harvey, of 8, Waterloo Place, Regent Street, S.W., against whom a Receiving Order was made in November, 1916. The statement of affairs filed by the debtor showed liabilities amounting to £34,281., and assets showing a surplus of £162,000. after payment of all debts. The principal assets were 22,000 shares in Oil Processes Limited, and 4,636 100dol. shares in Flax Limited.

In reply to the Official Receiver debtor stated that he formed Flax Limited with a nominal capital of one million pounds, and he was entitled to 9,000 £20. shares in the company in consideration of his transferring to them certain patent rights. In December, 1913, Flax Limited agreed to purchase three secret processes relating to the transformation of kerosene in petrol for £50,000. in cash and £60,000. in shares of a new company to be formed under the style of Oil Processes Limited. That company was formed in Canada in December, 1913, with a nominal capital of £1,400,000. Witness was appointed as managing director of the companies at salaries aggregating £23,000. per annum. He acted in that capacity until both companies went into liquidation. He attributed his failure to the stoppage of his salary through the liquidation of the companies brought about as a result of the war.

The examination was closed.

A Tar Contract Dispute.

The Court of Appeal last week dismissed an appeal by Messrs. Brotherton and Co., of Leeds, against the refusal of a Judge in chambers to stay an action under the Arbitration Act brought against them by the Allerdale Coal Company, of Workington. The dispute related to the delivery of coal tar; and the point was whether certain tests should be made at the defendants' or the plaintiffs' works. The Act provides for the settlement of these questions; and defendants asked that this should be done.

Alleged Damage from Picric-acid Fumes.

On Thursday (November 13), before Mr. Edward Pollock, sitting at the Leeds Town Hall as Official Referee of the Supreme Court, the arbitration proceedings were resumed in a case in which the trustees of the late Mr. Richard Kershaw, of Crownest Park, Lightcliffe, claimed £13,400. as damages from Brookes Chemicals (Limited), in respect of alleged depreciation in the value of the estate owing to fumes from the defendant company's picric acid works.

Evidence was given by Mr. J. H. Hanson, land valuer, Huddersfield, who had made an examination of the estate. He

said that all vegetation had suffered because of the fumes, and the enjoyment of the occupation of the house was seriously interfered with. He could not imagine any one going voluntarily to live at a house which was liable to fumes from picric acid works. An estate that was liable to clouds of that character would be difficult to sell, particularly as acid in the stream would render it unsuitable for cattle. A yellow lake might be novel, but it would neither be attractive nor desirable, and would be calculated to destroy the residential value of the estate. In estimating the value of the estate, Mr. Hanson said he computed it to be worth as a whole £28,600. At the sale the property realised £15,000., and the claim was for the difference between that figure and £28,600.

Mr. C. F. Lowenthal, in opening the defence on November 14, said the fumes had entirely ceased since the armistice, and the quantity of acid now remaining in the lake and beck on the estate was altogether negligible. The works were now in process of being dismantled. From a residential point of view, added counsel, these large houses were a dead letter and a drag on the market.

Edward John Silcock, civil engineer, Leeds, said he had examined the estate on several occasions, and whatever may have happened before he went, he could certainly find little damage by fumes. The witness later said that even if the house could be removed to the country, it would be doubtful if a tenant could be found. He was of opinion that the amount secured for the estate was quite as much as it was worth.

When the court adjourned it was announced that the further hearing of the case would be resumed in London early next month, on a date to be fixed.

Profits on Glauber Salts.

The Cheltenham Profiteering Tribunal on Thursday (November 13), investigated a complaint by Miss Harrison that she had been charged by Messrs. Nathaniel Smith and Co., chemists, of High Street, 4½d. for a quarter of a pound of Glauber salts, whereas she could purchase the same sort of salts at another chemist for 1½d. per quarter pound, and at yet another chemist's for 2d.

For the respondents it was shown that the present wholesale price of Glauber salts is 5d. per lb. (against 4d. prior to the war), and that whereas this rise had taken place in the price charged to the firm, they retailed it at 1½d. per quarter lb. less than before and during the war, when it was sold at 6d. per quarter pound. It was admitted that on this basis a gross profit of 325 per cent. was still made; but it was contended that no charge of profiteering under the Act would lie because instead of making a larger profit by enhancing the price to customers, the exact opposite was the case here, the gross profit on the article before the war being 500 per cent.

In the course of the inquiry evidence was also given that before the war Epsom salts, purchaseable wholesale at 1½d. per pound, were almost universally sold at 2½d. per quarter pound, or a gross profit of 800 per cent.

Two witnesses were called to prove that at other chemists' shops in Cheltenham the price of Glauber salts before the war was 6d. and 4d. per quarter pound, that in one case 6d. was still charged, and that in the other the price was 3d.

The tribunal found there had been an overcharge, and ordered the respondents to refund 1½d.

Royal Commission on Inventions.

Message-carrying rockets as used during the war were the subject of a claim before Mr. Justice Sargent and the Royal Commission on Inventions on Monday. The claimant was Mr. E. H. Brittain, a chemist engaged at the Government Experimental station at Claremont Park. He said he made no claim in respect of the mechanical propulsion of the rocket, but owing to its velocity the inventors were unable to discover a flare which would remain unextinguished during flight and so enable the rocket to be seen. Without such a flare the rocket, which travelled to the height of about 4,000 feet, would have been useless in the field. Very soon after he went to the experimental station at Claremont Park he discovered the particular chemical proportion that produced a flare which burst regularly and with satisfaction. In addition to the flare the device required a composition which would emit smoke when the rocket alighted and so enable it to be recovered. In respect of that requirement Mr. Brittain claimed the invention of a particular method of packing which prolonged the emission of the smoke by 100 per cent.

Counsel for the Crown stated that the claimant dealt with an old smoke composition, but in order to make it burn longer he took the risk of melting it into a stick. With regard to the flare, it was submitted that the claimant worked on the analysis of a known powder, and there was nothing which he did which did not come within the ordinary work of a chemist.

The Chairman intimated that the claim would be considered.

Colnbrook Chemical and Explosives Company.

The Official Receiver in the Companies Winding-Up Division of the High Court of Justice has just issued his report under the liquidation of the Colnbrook Chemical and Explosives Company, Limited, of Colnbrook, Middlesex, and 1, Queen Victoria Street, E.C. The company's business had been taken over by a Receiver for the mortgages under the Defence of the Realm Act, and the meeting of creditors is to be held next week at Bankruptcy Buildings, W.C.

The statement of affairs showed as regards creditors, gross liabilities amounting to £95,716 14s. 4d., of which £48,886 2s. 10d. is expected to rank against the estate for dividend. The assets are estimated to produce £56,757 16s. 7d., from which £244 10s. 9d. has to be deducted for the claims of preferential creditors payable in full, leaving the assets at £56,513 5s. 10d. After deducting £46,586 0s. 9d. for the claims of debenture-holders, the net assets are returned at £9,927 5s. 1d., thus leaving a deficiency of £38,958 17s. 9d. With regard to the contributories, the paid up capital is £15,506., to which has to be added the above deficiency of £38,958 17s. 9d., thus showing a total deficiency of £54,464 17s. 9d.

The company was registered on July 20, 1915, with a nominal capital of £21,000, divided into 20,000 ten per cent. preferred ordinary shares of £1. each, and 20,000 management shares of 1s. each, for the purpose of carrying on business as manufacturers of guncotton, explosives and munitions of war; its primary object was to acquire from O. R. Mounsey the benefit of a contract with the War Office for the supply of 200 tons of guncotton and to carry out a contract with the representatives of the Belgian Government for the supply of a minimum quantity of 300 tons of guncotton. The company was promoted by Mounsey, who may have been assisted by others.

The failure is attributed to various causes including incorrect estimates of the company's engineers, late delivery of machinery and further capital expenditure on plant required to meet the demands of the Ministry of Munitions.

ELECTRO BLEACH AND BY-PRODUCTS, LTD.

LARGE CAPITAL INCREASE.

AN extraordinary general meeting of Electro Bleach and By-Products, Ltd., was held in Manchester on Friday, of last week, Mr. H. J. Mackinder, M.P., (chairman), presiding.

It was proposed to increase the capital of the company to £480,000. by the creation of 200,000 7 per cent. participating preference shares of £1. each, and a like number of ordinary shares at 10s. each, while it was proposed to issue 80,000 shares of each class.

Mr. Mackinder, in proposing the resolution, remarked that he was leaving the country very shortly for Russia on an important mission which had been entrusted to him by the Government. He hoped the meeting would agree to the resolution and put the directors into a position to crown and complete the policy which they had been pursuing through fair weather and foul for the last six years. He did not intend resigning his chairmanship, as the board had given him a leave of absence for a few months to visit Russia. The directors at a meeting that afternoon had decided to declare an interim dividend on the ordinary shares for the half-year ended June 30 of 7½d. per share, less income tax at 6s. in the £1.; being at the rate of 12½ per cent. per annum. Referring to the proposed increase of share capital, Mr. Mackinder said he would dispose at once with one obvious criticism which might be levelled against one paragraph dealing with profits during the four succeeding years 1915, 1916, 1917, and 1918. In round figures the profits were £30,000., £50,000., £50,000., and £60,000. During these four successive years it might be said that these results were no guidance for the future in that they referred to war profits. In 1915 the profits were

made under adverse circumstances, in that owing to the war it was impossible to establish economies in the manufacture which had been contemplated, and the same applied in a little less degree to the next year. Then during 1917 and 1918 they were a controlled firm, and were selling to the Government at fixed prices. Strictly speaking, they were selling at a censored profit, and over and above that they were never able to establish the economies intended.

Mr. Mackinder next dealt with the way the directors proposed to use any funds which resulted from the new issue. There were three items, and with regard to the £35,890. due to the Government, he dealt with that at the last ordinary general meeting. It was in respect of plant, buildings, and machinery erected for greater output, and the sum stated still remained to be paid to the Government. A certain amount had already been paid to the Government out of the general reserve fund of the company, and the feeling of the board was that they would like to be masters in their own house, and it would be very undesirable that for a term of years any Government Department should have a claim upon the profits. With regard to the item of £10,000., over and above the plant, machinery, and buildings for which the Government advanced, the Government set up as their own property upon the works certain plant, machinery, and buildings which were left, though Government property, upon the company's land at the conclusion of the war. Such mixed ownership was inconvenient. A bargain had been struck which pleased both parties, and for £10,000. the company had a property which was available for manufacturing purposes. The third item was one of £50,500., with which the directors proposed to redeem the whole of the outstanding Debentures. From the point of view of capital, the company was a relatively small one, and in difficult times and commercial crises it was always well to feel that they had deep water beneath them. From the revenue point of view a small company such as this was better credited in the open market if it was able to say that it had no debentures. That meant they could do better business when they went into the market with their credit in their hands. It was far better at the present moment to give credit than to ask for it. At this moment a firm which was able to give credit in foreign countries in establishing new markets was the firm which was planning well for the future, obtaining goodwill for the future, and they were anxious to lift the company into the top tier of manufacturing companies—companies that can give credit and not have to ask for it. They wished to enjoy the advantage of a company which could say this—No Debentures. The items enumerated roughly came to £96,000., and if they sold their preference and ordinary shares at par there would be left available for extension and developments something like £24,000. The money required to pay dividends of 7 per cent. on the 80,000 new preference shares and 12½ per cent. on the 80,000 new ordinary shares was £10,600. The repayment of the Debentures would mean a saving in Debenture interest and sinking fund of £6,000. per year, and the repayment of the loan from the Ministry of Munitions would mean a saving of interest amounting approximately to £2,150. per annum, leaving therefore a balance of only £2,450. to be found out of the profits.

Mr. Mackinder, proceeding, said they had been able to sell the whole of the issue on favourable terms. The directors had made it a condition that present shareholders in the company should have a preferential right to take shares, provided that they gave notice of their requirements. After all expenses had been paid there would be a considerable margin in the way of premium to the advantage of the company, and that premium would be available to be put in the reserve fund. Referring to the profits of the company during the past four years, the Chairman said these profits had not been obtained at the expense of those whom the company employed. Both the wage-earners and the staff which was paid salaries had had their position steadily improved during the war, and he had no hesitation in saying that the staff and the men were one of their great assets.

Mr. Hutchins, managing director, seconded the resolution, which was unanimously carried.

The meeting then gave their sanction to the necessary alterations in the articles of association.

A special general meeting of shareholders immediately followed, after which came a meeting of Participating Preference shareholders, and both these meetings confirmed the adoption of the resolutions.

The Chairman announced that a further extraordinary general meeting of the company would be held on December 5 to confirm the special resolutions passed.

FERTILISER NEWS.

(SPECIALLY CONTRIBUTED.)

Nitrate of Soda.—There is, of course, no agricultural demand for the Chilean fertiliser at this time of the year, and that for other purposes has been to such an extent checked by the present excessive prices that the European deliveries in the past four months are estimated at only about 90,000 tons; this is just the quantity delivered from all ports (United Kingdom and Continent) in October, 1913, when nitrate was offered at considerably less than half the present prices. These are high enough in all conscience here, but owing to the extraordinary depreciation of the French, Belgian, and Italian currencies (let alone the German mark, which has almost reached the vanishing point), they compare very favourably with those asked abroad, and it remains to be seen whether the foreign farmer will next spring use nitrate of soda on the expected large scale when offered substitutes on much more reasonable terms. The people who have paid 9s. per quintal upwards for nitrate in Chili, and up to £11. per ton freight, may yet discover that they have mistaken their market owing to the aforesaid vagaries in exchange, in which case the Nitrate Producers' Association will meet with difficulties in the fulfilment of contracts. At all events no further sales are reported on the West Coast, and it is already no easy matter to find the tonnage required to move the large quantities sold for delivery up to the end of March. According to the Board of Trade Returns, only 950 tons of nitrate of soda were imported into the United Kingdom in October, value £19,000., or £20. per ton, compared with 16,600 tons in the same month in 1913, before the war.

Dearer Nitrogen for German Agriculture.—A German correspondent says that the German consumer is about to be charged a considerably dearer price for his nitrate manures. The Ministry interested has agreed to the proposition, it is said, submitted by the Fertiliser Committee to increase the price to the consumers by about 50 per cent.; this after having studied the conditions under which nitrogen is produced. The price hitherto per kilogramme of nitrogen in sulphate of ammonia has been 3.90 marks, in nitrate of lime 3.40 marks, and in nitrate of soda 4.40 marks, all for fertilisers only, whilst nitrogen to be used in industrial processes, which has not been under any legal control, has become very much dearer. The great rise in the price results, it is said, after a careful investigation by the Food Department, from the increased cost of production, in which prices of coal, lime, and electricity play a large part. The decision will take effect retrospectively as from October 1, and the object of it is to increase production, particularly of such works as have been working under unfavourable conditions, and in some cases have been brought face to face with enforced stoppage. It is added in this communication that even after the increased price decided on, the foreign price for nitrogen will still be two-and-a-half times higher, and that its object is rather to let the prices for agricultural produce become higher than to go abroad for foodstuffs and fodder at considerably higher prices. From this it would appear that it must be expected at the very least for next year, that agricultural prices will be considerably increased in order to reconcile the farmers with the increased cost of working.

Sulphate of Ammonia.—Business in this material moves quietly. The export trade is apparently dull owing to lack of supplies. It is declared in one authoritative quarter that no quantities of any importance will be available for export before the end of this year. Export quotations are very nominal and are given as between £25. and £30. per ton. The British farmer is obviously still keen on sulphate of ammonia, despite his grumbles about the price. Further information from America just to hand reports that the scarcity of sulphate of ammonia stocks there continues to "feature" the market. Such lots as appear for resale seem to create considerable interest, with holders experiencing no difficulty in obtaining high prices. There is also a good buying interest in America for material over next year. Quotations for such deliveries have been subject to an advance, as well as higher prices being asked for spot delivery.

Nitrolim.—This fertiliser is not as a rule obtainable as yet. The optimistic views expressed earlier in the year do not appear to have come to anything substantial. Germany is declared to have plenty of this manure, but as it is said to cost there £30. per ton, the German farmers are declared to be turning their attention more to synthetic ammonia. It

will be remembered that nitrolim was rapidly gaining popularity in this country up to the spring of 1916, when supplies were diverted to explosives' manufacture.

Basic Slag.—Orders for basic slag come in freely, and a great deal more apparently could be absorbed than is offered. The price of slag is regarded all the way round as very reasonable, and the chief trouble in the section appears to be in the way of securing ready delivery.

Other Fertilisers.—Movements in bone meals and kindred products remain very quiet owing to shortage of supplies. Pure steamed bone meal at £14. 10s., and dissolved bone compound at £8. 7s. 6d. have been traded in. Pure dissolved bones for manure appear to be practically unobtainable at present. East Indian bone meal is priced as high as £16. 10s. in some quarters. Miscellaneous sorts are very quiet, the need in most makes being more ample supplies. Generally the all-round appreciation of fertilisers in the country is increasing. Propaganda in past years, reinforced by the stern lessons of the war, and what appear to be the almost equally stern lessons of the after-war period, have driven home the need for greater food production, in which the basic factor is, and must be, more and better fertilisers.

Alsation Potash.—The imports of Alsation potash salts for the week ending November 15, were 4,471 tons 14 per cent. sylvinite, and 2,193 tons 20 per cent. sylvinite. Current quotations are: sylvinite, 14 per cent. (French kainit), £7. per ton; sylvinite, 20 per cent. (French potash salts), £8. 7s. 6d. per ton; and muriate of potash, 80 per cent., £19. 7s. 6d. per ton.

SOUTH WALES NOTES.

(SPECIALLY CONTRIBUTED.)

The boom that has been created in the tinplate trade shows no signs of relaxation; if there is any alteration, the demand has increased, and orders for the Continent and the colonies are described as almost insatiable. The temporary cessation of American competition doubtless has much to do with the abnormal requirements of foreign trade, and if co-operation can be strengthened between manufacturers and their employees there can be no doubt that for the next couple of years the trade will be well booked up. If those mills which are now idle could be restarted the increase of production would amount to fully 25 per cent. over the present output. The men are now agitating for a six-hour day, and a vote will be taken on the matter.

There has sprung up a strong demand for corrugated galvanised sheets, and this is having a good effect upon the spelter extractors. All the furnaces are working well, and the production of the metal is on the increase.

The patent-fuel trade has never been so active as it is at present, and manufacturers are besieged with orders both for home requirements and export trade. There are no stocks on hand, and the makes of the various factories are readily disposed of. Very little fresh business is being entertained, so great are the demands of old customers.

Some remarkable evidence was given in a claim for damages arising out of a fatal accident to a man named Keene. The action was tried before Mr. Justice Lush at the Glamorgan Assizes. It appears that some steel drums had been purchased from a Sheffield firm of scrap merchants from the Royal Gunpowder Factory, Waltham Abbey. These were resold to a Mr. John, of Llanelly, who employed the deceased to reduce them to scrap sizes, and while using the oxy-acetylene flame a loud explosion occurred which inflicted fatal injuries. Mr. Arthur Lob, the chief chemist of the Llanelly Steel Works, said it was usual for drums of the kind in question to be cleaned of their deposits before being sent to the steelworks. The civil administrative officer of the Royal Gunpowder Factory (Mr. George Henry Clamp) said the drum had contained acid. They would have warned the buyers had they thought that the drums were dangerous. He had no knowledge of what the scrap merchants did with the drums, and was very much surprised to learn of their practice.

All the coke-ovens are working, and there is no difficulty in disposing of sulphate of ammonia.

Basic-slag grinders are fully employed, and there is a slight improvement in the outputs.

ITEMS OF INTEREST.

CHANGE OF ADDRESS.—Messrs. Reitmeyer, Calburn and Kindersley, have removed their general offices to Crown Court, 64, Cheapside, London, E.C.2. Their telephone number is now City 1835.

ALSATIAN POTASH FOR THE TYNE.—The first full cargo of kainite from the mines in Alsace, since the outbreak of the war, came into the Tyne during the week, and was discharged at Messrs. Stephenson's Chemical Manure Works.

ITALIAN FERTILISER INDUSTRY.—Two large Italian artificial fertiliser companies, Società colla e Concimi and Montecatini-Phosphates (Tunis), have amalgamated. The factories of the two companies and their branch establishments are now in a position to supply Italy with $7\frac{1}{2}$ million d.ctr. of super-phosphates.

AMERICAN PHOSPHATE ROCK OUTPUT.—The phosphate rock marketed in the United States in 1918 was 2,490,760 long tons, valued at £1,643,000. As compared with the production in 1917, which amounted to 2,584,287 long tons, valued at £1,554,000., there was a decrease in quantity of 93,527 tons, or 3.6 per cent., and an increase in value of £89,000., or 5.7 per cent..

APPLIED PHYSICS AT GLASGOW UNIVERSITY.—Principal Sir Donald MacAlister, of Glasgow University, on Tuesday announced the receipt of an offer of £20,000. from Mr. John T. Cargill for the foundation of a Cargill Chair of Applied Physics at the University. Mr. Cargill, of the firm of Milne and Co., East India merchants, of Glasgow, is a director of the Anglo-Persian Oil Company and several other oil and rubber companies.

NOBEL PRIZES.—*Reuter's* Stockholm correspondent states that at a meeting of the Academy of Science last week, it was decided to award the 1918 Nobel prize for physics to Professor M. Planck, of Berlin University; the 1919 Nobel prize for physics to Professor Stark, of Grefswald University; and the 1918 Nobel prize for chemistry to Professor F. Haber, of Berlin University. It was decided to hold over the 1919 Nobel prize for chemistry until 1920.

DISCUSSION ON LUBRICATION.—The meeting of the Physical Society of London, on November 28 (at 5 p.m., in the Imperial College of Science, South Kensington), is to be devoted to a discussion on the subject of "Lubrication." The physical qualities of a good lubricant have long eluded capture, and it is to be hoped that the discussion will throw light on the solution of the problem, and, at the same time, create a wider interest in the subject.

LORD LEVERHULME AND THE PROFIT ON SOAP.—Lord Leverhulme, speaking at Port Sunlight last week, and referring to charges of profiteering in soap making, said the profit on Sunlight soap in 1914 was 11 per cent., and to-day 9½ per cent. He courted inquiry, not only for themselves, but for any soap firm in the United Kingdom. During the war and since, they had made their prices as low as the price of raw material would permit, with the maintenance of high quality of the production.

OBITUARY.—Mr. J. L. Young, a director of Messrs. R. Burland and Sons, Bishopgate, Wigan, chemical, oil, paint, and grease manufacturers, has died at the early age of 36 years.—The death has occurred in London of Dr. David Basil Hewitt, for many years a director of Messrs. Brunner, Mond and Co., Ltd. Dr. Hewitt became associated with the firm in 1884, as managing director.—Mr. H. E. Stonier, the managing director of the Vacuum Oil Company, Limited, Caxton House, Westminster, died on Tuesday at his residence, Ashley Gate, Walton-on-Thames, in his 55th year.

SULPHUR DEPOSITS IN ALASKA.—Many of the Aleutian Islands, which stretch westward from Alaska Peninsula towards Asia, bear deposits of sulphur of the type called solfatarae. Sulphur claims have been located at three places on these islands and on the peninsula, one of them in the crater of Makuhin Volcano, on Unalaska Island. The sulphur deposit is the only part of the crater that is permanently free from snow and ice, being kept so by subterranean heat and by the discharge of hot sulphurous vapour. In this crater 10,000 to 15,000 tons of sulphur may be available for mining. Another deposit of sulphur is on Akun Island. It covers 15 or 20 acres, and contains about 1,200 tons to the acre. Still another is on Stepovak Bay, on the south shore of Alaska Peninsula.

DERBYSHIRE LEAD MINES DEAL.—On Wednesday notice was posted by the owners of the Mill Close Lead Mines, near Matlock, that the undertaking has been disposed of privately. Until the transfer is completed the present owners and the new owner desire that working should continue. The notice denies a statement made that the men now employed are to be replaced by those on strike. The mines are considered in the first three in the British Isles for output of lead ore. In the last two years there have been five strikes of the workmen and there is one now, but the employers have been able, with other help, to run the mines, although the smelting works are closed. The ore produced is now sent away crude for export.

CHILIAN CUSTOMS TARIFF PROPOSALS.—The programme of the Chilean Government includes a measure for the revision of the Customs Tariff, and although no actual Bill has yet been introduced into the Legislature, preliminary steps have been taken by a Government Commission, which has been meeting during the early part of the present year, to examine the various requests for Tariff revision presented by manufacturers and others concerned. Among the items in respect of which increased duties are proposed, the following may be mentioned:—Zinc white and lithopone; acids, various (nitric, hydrochloric, sulphuric); liquid ammonia; magnesium salts (oxide, carbonate, Epsom salts); potassium nitrate and iodide, sodium salts—hyposulphite, sulphate, (Glauber salts), bisulphate, calcined carbonate (soda ash), crystallised carbonate (soda crystals), borate, caustic soda, bicarbonate, iodide, also common salt; iodide (pure) and trichloride. Detailed particulars regarding the Commission's recommendations in respect of any individual class of merchandise may be obtained on written or personal application being made to the Department of Overseas Trade, 73, Basinghall Street, London, E.C.2.

SCIENCE AND INDUSTRY.—The opening address of the 166th session of the Royal Society of Arts was delivered on Wednesday by Sir Henry Trueman Wood, vice-president and chairman of the council, on "Science and Industry." It was certainly not true, he said, that science was ignored by British manufacturers. In certain trades—two, for instance, of the most important of all, the iron and steel manufacture and the great alkali trade, with all its ramifications—scientific research was used to the full, while in numerous others it was gradually becoming more and more important. But our advance was much too slow. Our manufacturers were too reluctant to adopt new methods and to abandon old plant. They hesitated to pay enough to secure the services of highly trained experts. They were reluctant to risk capital in costly researches which might prove unsuccessful. They never dared to establish great laboratories, with highly paid experts in charge, for investigations which might prove unprofitable. The result was that they were surpassed, often superseded, by their rivals in Germany and America, who did all those things, and their business was quickly drawn away, and passed into their rivals' hands. They had had, however, a rude awakening. The process seemed to have been effective, for they had certainly realised their position. So far as the application of science was concerned the nation was thoroughly aroused.

THIRTY YEARS AGO.

From "The Chemical Trade Journal" of November 23, 1889.

The Eight Hours' Day in the Chemical Trade.—At the chemical works of Messrs. Brunner, Mond and Co., Northwich, an arrangement has been come to with the workmen by which, instead of working two shifts in twenty-four hours, the day will be divided into three shifts, at slightly reduced rates. The new arrangement will necessitate the employment of three hundred more hands.

Miscellaneous Chemical Market.—The collapse of negotiations to renew the association of manufacturers in the alkali trade has caused a fall in price of bleaching powder for forward delivery. Prices variously quoted for 1890, £5. 5s. to £5. 10s., but on the spot and for early deliveries £6. 5s. to £6. 7s. 6d., f.o.b., are nearest values. Soda ash unchanged and fairly firm at 1½d. Soda crystals in good demand. Chlorate of potash, 5½d. to 5½d. Muriatic acid has been done at lower prices, but 7s. per carboy may be taken as about the average value at makers' works for 1890. Sulphate of copper still maintains a steady sale. Caustic soda, 70%, £7. 5s. to £7. 7s. 6d. Prussiate of potash firmer, 7½d. to 8d. Tartaric acid, 1s. 3½d. Oxalic acid association of makers dissolved as from the end of this year.

IMPORTS OF CHEMICALS AND ALLIED PRODUCTS.

(Concluded from page 550)

ARTICLES.	QUANTITIES.		VALUE.		ARTICLES.	QUANTITIES.		VALUE.	
	Month ended		Month ended			Month ended		Month ended	
	Oct. 31st.		Oct. 31st.			Oct. 31st.		Oct. 31st.	
	1919.	1918.	1919.	1918.		1919.	1918.	1919.	1918.
OILS :			£	£				£	£
Fish : Train, Blubber, and Sperm tuns	1,729	1,087	125,599	90,564	Soap : Soft Soap cwt.	4	—	12	—
Cnut, Unrefined cwt.	130,740	38,787	605,625	139,252	Household & Laundry Soap, in bars or tablets..... cwt.	10,680	—	24,326	—
Olive tuns	343	90	39,598	16,072	Polish'g & Scour'g ..	25	—	43	—
Palm (not including Palm Kernel Oil), Unrefined cwt.	262,628	213,459	1,051,947	475,985	Powder	1,076	—	1,601	—
Palm Kernel Oil, Unrefined ..	12,850	—	59,817	—	Toilet	2,643	289	24,865	5,985
Total	275,478	213,459	1,111,764	475,985	Unenumerated ..	26,936	—	56,819	—
Petroleum :					STARCH, DEXTRENE, AND FARINA OR POTATO FLOUR :				
Crude gals.	2,710,815	—	97,137	—	Rice Starch cwt.	5,065	1,001	16,696	4,187
Lamp Oils ..	10,827,861	27,398,232	539,189	1,501,862	Other kinds Starch ..	86,506	10,708	165,577	43,601
Motor Spirit ..	20,069,037	6,117,868	1,591,866	569,871	Dextrine and Farina or Potato Flour ..	73,476	56,097	149,029	233,109
Spirit, other than motor spirit ..	298,524	—	25,936	—	Total	165,047	67,806	331,302	280,897
Lubricating Oils ..	6,046,447	8,375,461	635,554	908,578	COPPER :				
Gas Oil	3,036,960	5,166,311	109,227	287,362	Regulus & Precipitate :				
Fuel Oil	27,494,157	74,039,756	437,479	2,411,685	From Portugal... tons	—	779	—	68,435
Total of Petroleum ..	10,382,801	12,109,756	3,436,388	5,679,358	Spain..... "	2,099	308	202,185	23,618
Seed Oil:					U.S.A..... "	—	—	—	—
Castor Oil tons	—	291	—	23,280	Mexico..... "	—	—	—	—
Cotton Seed Oil, Unrefined ..	412	—	20,860	—	Peru..... "	—	10	—	1,200
Linseed Oil:					Chile..... "	69	8	2,396	589
Pure..... "	112	—	11,286	—	Cape of Good Hope ..	—	—	—	—
Not Pure ..	25	—	2,306	—	Other C'tries ..	—	510	—	49,775
Rape-seed Oil ..	333	—	32,102	—	Total	2,168	1,615	204,581	143,617
Soya Bean Oil ..	4,255	—	415,191	—	COPPER ORE :				
Other Seed Oils ..	1,035	291	100,475	25,151	From Spain tons	—	—	—	—
Turpentine cwt.	49,674	10,530	253,840	49,379	Chile..... "	65	4	1,974	240
SOAP STOCK ..	9,924	185	46,336	445	Cape of Good Hope ..	48	—	1,680	—
STEARINE :					Australia ..	773	158	26,822	14,973
From Belgium ..	1,322	—	7,143	—	Other C'tries ..	—	—	—	—
Other C'tries ..	11,461	8,460	79,816	37,744	Total	886	162	30,476	15,213
TALLOW (including VEGETABLE TALLOW), Unrefined :					MANGANESE ORE tons	9,827	29,357	82,305	265,248
From China cwt.	10,798	—	50,924	—	PYRITES OF IRON and COPPER ..	47,979	87,889	148,175	269,889
U.S.A..... "	5,078	—	24,276	—	SILVER ORE val.	—	—	111,107	61,319
Uruguay ..	35,448	—	167,332	—	TIN ORE :				
Argentine ..	29,942	69,430	137,420	242,385	From S. America tons	3,796	3,156	430,088	547,557
Republic ..	4,702	35,182	24,821	122,915	Brit. S.A. ..	—	—	—	—
Australia ..	47,648	24,071	228,739	86,198	Other C'tries ..	763	58	90,632	9,982
New Zealand ..	4,488	435	21,282	1,650	Total	4,559	3,214	520,720	557,539
Other C'tries ..	—	—	—	—	LEAD, PIG and SHEET :				
Total	138,104	129,118	654,794	453,148	From Spain tons	7,058	5,745	230,670	218,062
GUM :					U.S.A..... "	594	16,922	15,755	609,043
Arabic..... cwt.	26,154	6,488	86,832	22,516	Mexico..... "	8,852	4,521	249,692	132,110
Kauri..... "	2,521	274	6,702	870	Australia ..	1,614	871	43,108	20,474
Lac-dye, Seedlac, Shellac, and Sticklac cwt.	19,316	8,327	388,587	60,040	Other C'tries ..	—	—	—	—
ROSIN..... "	252,531	111,378	596,478	264,447	Total	18,118	28,059	539,225	979,689
CEMENT for Building and Engineering purposes..... tons	48	—	1,051	—	QUICKSILVER lbs.	84,000	74,850	23,404	19,960
GLUE, SIZE, and GELATINE..... cwt.	8,049	6,025	73,498	45,899	TIN, in Blocks, Ingots, Bars and Slabs :				
OIL-SEED CAKE, not sweetened :					From Straits Settlements .. tons	3,541	425	991,174	141,800
Cotton-seed Cake tons	28,945	—	645,082	—	Australia ..	45	—	12,525	—
Linseed Cake ..	12,130	—	294,026	—	Other C'tries ..	1,058	20	292,660	7,057
Rape-seed Cake ..	162	—	2,112	—	Total	4,644	445	1,296,359	148,857
Unenumerated ..	42	—	1,033	—	ZINC :				
Total	41,219	—	942,253	—	Crude in cakes] ..	6,470	5,969	265,575	320,376
PARAFFIN WAX cwt.	120,541	80,365	241,280	234,810					

EXPORTS OF CHEMICALS AND ALLIED PRODUCTS.

(Concluded from page 551.)

ARTICLES.	QUANTITIES.		VALUE.		ARTICLES.	QUANTITIES.		VALUE.	
	Month ended October 31st.		Month ended October 31st			Month ended October 31st.		Month ended October 31st.	
	1919.	1918.	1919.	1918.		1919.	1918.	1919.	1918.
OILS, Refined:			£	£	OIL-SEED CAKE, not sweetened:			£	£
Coco-nut cwt.	15	—	86	—	Cotton-seed Cake tons	12	—	244	—
Cotton-seed tons	98	—	9,656	—	Linseed Cake .. "	33	—	795	—
Olive tuns	4	—	1,388	88	Rape-seed Cake .. "	—	—	—	—
Palm cwt.	2,485	—	11,944	—	Soya Bean Cake .. "	—	—	—	—
Palm Kernel .. "	—	—	—	—	Unenumerated.. "	—	—	—	—
Total Val. £	—	—	23,074	88	Total "	45	—	1,039	—
OILS, Unrefined:					PARAFFIN WAX .. cwt.	28,292	—	75,640	—
Coco-nut cwt.	—	—	—	—	SOAP:				
Olive tuns	—	—	36	—	Soft Soap cwt.	9,146	5,067	25,513	12,563
Palm cwt.	707	—	3,390	—	Household and Laun- dry Soap, in bars or Tablets:				
Palm Kernel .. "	300	—	1,125	—	To China "	1,854	1,981	6,282	7,106
OIL, SEED:					" Other Foreign Countries .. "	131,326	19,251	528,448	57,007
To Netherlands tons	1,038	—	77,764	—	" British South Africa "	34	10	117	33
" Belgium "	1,503	—	148,298	—	" British East Indies "	5,694	26,948	21,923	61,055
" Brazil "	42	—	4,918	—	" Other British Possessions .. "	28,393	19,698	83,723	53,793
" Egypt (includ- ing Anglo- Egyptian Sudan) "	84	—	8,419	—	Total "	167,301	67,888	640,493	178,994
" British India .. "	40	—	5,710	—	Polishing and Scouring				
" Straits					Soap cwt.	270	713	623	1,665
" Settlements .. "	22	—	3,327	—	Soap Powder .. "	726	492	1,725	885
" Ceylon "	4	—	466	—	Toilet Soap "	12,112	5,415	124,809	61,859
" Australia .. "	44	2	3,077	132	Unenumerated .. "	340	227	1,474	1,876
" Canada "	500	—	52,779	—	Total of Soap .. "	189,895	79,802	794,637	257,842
" Other C'tries .. "	8,414	3	803,546	167					
TOTAL:									
Castor-seed Oil .. "	176	—	18,698	—					
Cotton-seed Oil, Unrefined "	457	—	27,882	—					
Linseed Oil:									
Pure "	8,557	3	826,140	224					
Not Pure "	301	—	27,597	—					
Rape-seed Oil.. "	2,171	2	205,344	75					
Soya Bean Oil .. "	17	—	1,555	—					
Other Seed Oils .. "	12	—	1,088	—					
Total "	11,691	5	1,108,304	299					
CANDLES:									
To British South Africa cwt.	35	2	268	12					
" Other C'tries .. "	29,818	412	142,803	2,331					
Total "	29,853	414	143,071	2,343					
CEMENT for Building & Engineering purposes:									
To Netherlands tons	6,169	—	20,061	—					
" U.S.A. "	2	—	54	—					
" Brazil "	427	2	2,501	11					
" Argentine Republic .. "	6,153	—	33,729	—					
" British South Africa "	393	1	2,295	18					
" British East Indies "	7,989	4	45,591	120					
" Australia .. "	3	1	30	36					
" New Zealand .. "	10	7	125	81					
" Canada "	13	—	150	—					
" Other C'tries .. "	14,020	5,605	76,529	16,233					
Total "	35,179	5,620	181,065	16,499					
GLUF, Size, and Gelatine cwt.	11,174	1,121	51,708	12,923					

GAZETTE NEWS.

LIMITED COMPANIES.—Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions. Orders, and Official and Other Notices.

Motor Sheet Metal Company, Ltd.—Resolved October 6, confirmed October 21: That the company be wound up. Capt. P. E. Slack, 16, Great James's Street, Bedford Row, W.C., incorporated accountant, liquidator.

Roumanian Oil Trading Company, Ltd., London, E.C.—First dividend (to non-enemy creditors) of 10s., at Official Receiver's and liquidator's, 33, Carey Street, W.C. 2, any day except Saturday between 11 and 2 p.m.

Safety Celluloid Company, Ltd.—Resolved October 22, confirmed November 6: That the company be wound up. W. Barton, liquidator. Meeting of creditors, Abbey Road, Park Royal, N.W., November 24, at 2 p.m.

Stonefold Chemical Company, Ltd., Baxenden.—Resolved October 8, confirmed October 25: That the company be wound up. G. L. Hansford, Parr's Bank Buildings, York Street, Manchester, chartered accountant, liquidator. Meeting of creditors at liquidator's, November 14.

Threlkeld Lead Mines, Ltd., Hull.—J. W. Best ceased to act as receiver April 1.

DISSOLUTIONS OF PARTNERSHIP.
(Note.—When two dates are given in the following announcements, the first is the date of the dissolution. The date in parentheses is that of the official advertisement.)

Seddon Brothers (Wm. Hy. Seddon and Alf. Seddon), Globe Oil Works, Green Lane, Hull: oil, paint, colour, and varnish manufacturers. October 1. Debts by A. Seddon, by whom the business will in future be carried on. (November 7.)

GAZETTE NEWS.

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THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

November 10th to 15th (inclusive).

Manganese or Alloys Thereof. Aktiebolaget Ferrolegeringar. 27,784.
Chromium or Alloys Thereof. Aktiebolaget Ferrolegeringar. 27,785.
Retorting and Briquetting Fuels with Volatile Recovery. Bale, G. F. 27,921.
Preventing Ignition of Combustible Atmosphere by Escaping Products of Combustion. Bohar, V. 27,725.
Preventing Incrustations or Boiler Scale. Bomsel (né Morissens, W.), A. 28,364.
Solutions of Nitrocellulose. Bowles, P. E.; and Titanine, Ltd. 27,797.
Treatment of Ores of Precious Metals. Critchley, T.; and McGhie, T. B. 28,039.
Treatment of Soya Beans for Recovery of Oil. Firth, A. 28,075.
Disazo dyestuffs of Pyrazolone Series. Imray, O. (Soc. of Chemical Industry in Basle). 27,910.
Ore-separating Devices. Jones, A. H. 27,951.
Preparation of Sodium Pentaborate, etc., Direct from Boron Ores. Jones, B. D.; and Kelly, A. A. 28,355.
Purification of Carbazole. Kirby, W.; and South Metropolitan Gas Co. 28,279.
Controlling Temperatures. Lidberg, T. 27,768.
Bottle for Chemicals which Corrode. McMyn, J. W. 28,329.
Gelatine. Malcolm, M. M.; and Townsend, C. S. 27,772.
Containers for Methylated Spirits, etc. Marris, G. S. 27,990.
Carbons, etc. Mellor, J. 28,147.
Electrical Treatment of Gases. Mond, A. (International Precipitation Co.). 28,154.
Converting Higher Molecular Hydrocarbons into Lower Molecular Ones. Naamloze Vennootschap Nederlandsche Lichte Olie Maatschappij. 28,072.
Drying Salts. Parrish, P.; and South Metropolitan Gas Co. 28,278.
Carbonating-apparatus. Pearson, G. 27,897.
Distilling Carbonaceous Material. Perry, W. P. 27,770.
Formation of Briquettes from Disintegrated Peat. Rigby, T.; and Wetcarbonising, Ltd. 28,297.
Expressing Liquids from Peat, etc. Rigby, T.; and Wetcarbonising, Ltd. 28,298.
Recovery of Ammonia as By-product. Serret, A. B. 28,093.
Hydrocarbon Compounds. Stocks, H. B. (Andrews). 27,968.
Solid Ink Compound. Tsutsumi, M. 27,926.
Separation of Metals from Alloys. Walker, T. 28,233.
Running Centrifugal Hydro Extractors. Webster, E. Bullock. 27,841.
Recovery of Ammonia Contained in Gases from Coke Ovens, etc. White, A. E. (Soc. Franco-Belge de Fours à Coke). 28,326.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 6d. in stamps to the Comptroller, Patent Office Sales Branch, 25 Southampton Buildings, Chancery Lane, W.C.

1916.

Removal and Recovery of Sulphur-dioxide from Gases. Norddeutsche Hutte Akt.-Ges.; and Behrens, J. 2,280. 134,555

1918.

Ammonium Nitrate. Partington, J. R.; and Jones, G. J. 1,874. 134,562

Synthetic Shellac, Resin, or the Like. Bindley, W. T. Robinson; Weller, A. W.; and Dulcken, E. 3,501. 134,563

Substitutes for Celluloid, Vulcanite, and the Like. Bindley, W. T. Robinson; Weller, A. W.; and Dulcken, E. 3,502 and 3,503. 134,564 and 134,565

Concentrating Solutions. Welch, H. V. 17,698. 134,593

Decolorising and Purification of Saccharine Materials. Hood, J. J.; Clark, J.; and Clark, P. G. 18,012. 134,607

Measuring Out Charges of Gases. Menzies, S. H.; and Magraith, H. J. 18,114. 134,615

Magnesia. Delage, J. C. 18,335. 134,626

Still-heads. Dufton, S. E. 18,415. 134,629

Catalytic Oxidation of Benzene. Barrett Co. 18,550. 122,167

Recovery of Potassium Salts from Blast-furnace Slag. Bury, E.; Ollander, O.; Smith, T.; and Bainbridge, F. 20,009. 134,665

1919

Separating Liquids from Vapours. Helmer, N. A. 5,044. 125,939

Liquid Fuel. Marks, E. C. R. (U.S. Industrial Alcohol Co.). 10,712. 134,766

COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

1919.

Method of Cooling or for Allowing to Crystallise Fatty Emulsions. Erslev, K. 23,585. 134,815

Roasting of Sulphide Ores preparatory to Leaching. Electrolytic Zinc Co. 24,744. 134,825

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Dyes. F. A. Brassard and Crawford, Wakefield; and A. Singer, Bradford. British Patent, 132,390, of 1918.

Monoazo dyes are obtained by coupling the diazo compound of aminoxytoluphenazine (prepared by oxidising a mixture of *p*-nitrosophenol or *p*-aminophenol with *m*-toluylene-

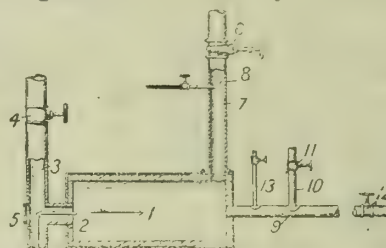
diamine) with phenols, *m*-diamines of the benzene series, or naphthylamine sulphonic acids; phenol, *m*-phenylenediamine, *m*-toluylenediamine, and naphthionic acid are specified as components. The products dye tannin-mordanted cotton yellow to red-brown shades.

Sulphur Dioxide. J. Grayson, Huddersfield. British Patent, 132,387, of 1918.

Sulphur dioxide is obtained free from carbon dioxide by distilling sulphuric acid of 70 per cent. strength, preferably waste acid, with 5 to 10 per cent. of coal-tar pitch or producer-gas tar pitch. The distillation is effected at 170-240° C. until the residual pitch is just liquid enough to be run out.

Distilling Hydrocarbon Oils. L. Clark, Pasadena, California, U.S.A. British Patent, 132,337, of 1918.

Hydrocarbon oils are distilled or converted into products of lower boiling-point by supplying the oil by a pipe 10 into a pipe 9 along which gases of combustion escape from a chamber 1, in which oil or gas from a nozzle 2 is burnt under pressure in a current of air from a pipe 3. The temperature and velocity of the gases are controlled by valves 4, 11, 12 to



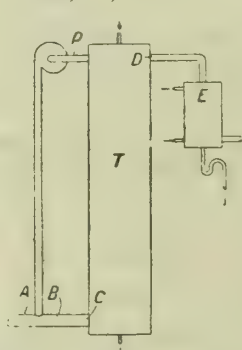
obtain temperatures from 1,050 to 1,800° F. or higher, and velocities from 50 to 6,000 ft. per minute, and may also be varied by introducing materials such as steam, oil, gas, sand, etc., into the pipe 9 through a pipe 13. To start the combustion in the chamber 1, a current of gases is drawn through the chamber by opening a valve 6 in a side conduit 7 and injecting air or steam through a nozzle 8.

Sulphur Dioxide. British Dyes, Ltd., J. Turner, and W. B. Davidson, Huddersfield. British Patent, 132,661, of 1918.

The unoxidised sulphur dioxide contained in the exit gases from contact sulphuric-acid plant is absorbed in milk of lime, sodium carbonate solution, or waste sodium sulphite liquor in a scrubber arrangement, and the resulting solution then heated with waste acid products to liberate sulphur dioxide, which is returned to the contact chambers.

Concentrating Sulphuric Acid. F. W. Howarth, London.

(A communication from Norsk Hydro-Elektrisk Kvaelfabrikationselskab, Christiania, Norway.) British Patent, 132,704, of 1919.



In concentrating sulphuric acid passing down a tower T, by a countercurrent of nitrous gases, the gases in the pipe A direct from the electric furnace—and at, say, 1,000° C—are at B mixed with a portion of the moist exhaust gases drawn off through a pipe P, so that, on entering the tower at C, the temperature of the mixture is 500-600° C. The remaining exhaust gas, having a temperature of about 90° C. at D, is drawn to the nitrous gases absorption system through a condenser E, where most of the moisture is condensed and separated.

Acetic Acid. H. W. Matheson, Quebec, Canada. British Patent, 132,558, of 1918.

Acetic acid is prepared by passing large quantities of air under pressure into acetaldehyde in the presence of a catalyst, the temperature being kept not much below the boiling-point of acetaldehyde under the pressure used, and the vapours from the reaction vessel being condensed under substantially

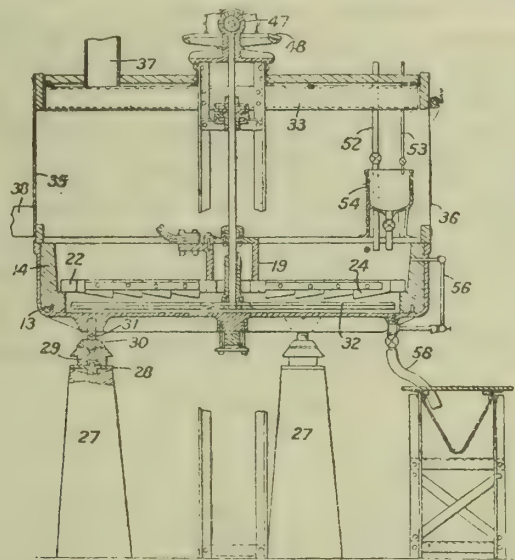
the same pressure as that of the reaction and returned to the vessel. In an example, manganese acetate is the catalyst used, and the initial temperature is 20-25° C., the temperature being raised to 65° C. and the pressure to 75lb. per sq. in.

Decolorising Agents. J. W. Leadbeater, Doncaster. British Patent, 132,572, of 1918.

This invention relates to the treatment of peat to obtain a carbonaceous material for decolorising sugar solutions, oils, waxes, etc. The peat is dried, ground, mixed with ground quicklime, carbonised on trays in a retort or oven, and then washed with a solution of hydrochloric or other acid as described in Specification 122,698. The washed material is mixed with fuller's earth, hydrated aluminium silicate, kieselguhr, diatomite, or other infusorial earth containing nearly pure silica, and is then heated or dried in an oven or retort.

Electrolytic Oxidation of Mercury. H. W. Matheson, Shawinigan Falls, Quebec. British Patent, 132,560, of 1918

In the oxidation of mercury with a continuously agitated electrolyte, the violence of the agitation is periodically increased. A current density of about 55 amperes per sq. ft. of mercury surface is suitable, at 8-10 volts. An acid or alkaline electrolyte may be used—for instance, a 3-10 per cent. caustic soda solution. As shown, a cell is mounted on levelling-screws 31 bearing on blocks 30 which rest on insulators 29 and metal caps 28 surmounting pillars 27. The cell consists of an iron pan having ribs 13 to confine a layer of mercury and to support an insulating-lining 14.



Radiating cathode bars 22 project from a hub 19, and are joined by overlapping inclined blades 24. A stirrer 32, having inclined blades to give an up-and-down motion to the electrolyte, is situated above the mercury anode, and is rotatable at either of two speeds by bevel-wheels 48, 47 connected to a shaft provided with a clutch. The electrolyte is admitted by a pipe 52, and mercury by a pipe 53 leading to a measuring-cup 54. A gauge glass 56 communicates with the electrolyte space and an outlet pipe 58. A hood is provided consisting of a cover 33, a back 35, and a front 36, which may be formed by a roller curtain. Upper and lower outlets 37, 38 are provided for light and heavy gases.

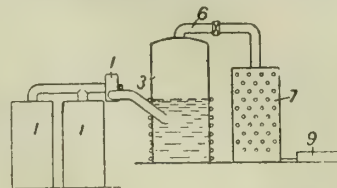
Alkylarylamines. A. Lapworth, and Levinstein, Ltd., Manchester. British Patent, 132,555, of 1918.

N-Monoalkylarylamines are obtained by treating the benzylidene compounds of (1) *p*-substituted monamines of the benzene or naphthalene series, or (2) other monamines of these series which do not form triarylmethane compounds with benzaldehyde, or derivatives of these two types of amines substituted in the nucleus by indifferent groups, with dialkyl sulphates or alkyl esters of benzene sulphonic acid in the absence of alkali, and then hydrolysing the alkyl derivatives

so produced. Examples are given of the preparation of *p*-methylaminophenol, *N*-methyl-*p*-toluidine, and 1-brom-2-methylaminonaphthalene. The Provisional Specification refers also to the use in the process of aldehyde or ketone compounds in general of the above-described amines and of alkylating agents in general.

Potassium Salts. A. Grauel, Toronto, Canada. British Patent, 132,693, of 1918.

In the recovery of potash and potassium salts from silicates, the fume containing the potash from the kiln 1 is pumped into water which is superheated under pressure in the receiver 3, where impurities are deposited, and the potassium compound rises with the vapour and passes through the conduit 6 to the condenser 7. The solution obtained is passed to the evaporator 9. When pure water is used in the receiver 3, potassium hydrate is obtained; a solution of calcium chloride can be used in the receiver for the production of potassium chloride; or gypsum may be mixed with the raw material used in the kiln for the production of potassium sulphate. Other compounds may be introduced for the production of other potassium salts.



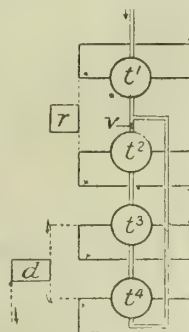
ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Synthetic Resins. Koppers Company, Pittsburg, U.S.A. British Patent, 132,229. Convention date, September 6, 1918.

A light-coloured resin, consisting of polymerised coumarone and homologues thereof and polymerised indene, is prepared from crude solvent naphtha by treatment first with sulphuric acid of strength sufficient only to polymerise the dicyclopentadiene and styrolene present, distilling off the oil containing unpolymerised coumarone and its homologues and indene, treating this with stronger sulphuric acid to resinify the coumarone, etc., neutralising the acid by dilute alkali, separating the oily layer containing the dissolved resin, and finally distilling or blowing off the oils from the resin.

Acetic Acid. Soc des Acieres and Forges de Firminy, Paris. British Patent, 132,529. Convention date, March 13, 1918.

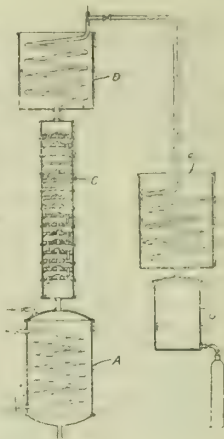
Acetic acid is obtained by hydrating acetylene to acetaldehyde polymerising the aldehyde to paraldehyde, depolymerising this back to aldehyde, and then oxidising the aldehyde to acetic acid. In preparing acetaldehyde, acetylene is passed through a catalysing liquid consisting of aqueous sulphuric acid containing mercury salts together with small quantities of ferric salts and vanadium compounds. The liquid, which gives no sludge during use, is regenerated by electrolytic oxidation. The aldehyde vapour carried along by the excess of acetylene is polymerised by treatment with aqueous sulphuric acid of 15-20 per cent. strength, the paraldehyde is separated and depolymerised by boiling with dilute sulphuric acid. The aldehyde vapours are oxidised to acetic acid by treatment with air or oxygen in presence of a catalyst consisting of copper permanganate or a mixture of copper and manganese salts. Ozonised oxygen, such as that evolved at the anode in reducing aldehyde to alcohol by electrolysis may be used. An apparatus adapted for continuous working comprises a series of towers $t^1 \dots t^4$. Acetylene is passed through the towers $t^1 \dots t^4$ and excess of gas is returned to tower t^2 , being drawn by a fan v . In tower t^1 the spent catalysing liquid is freed from aldehyde prior to regeneration in the tank r . In tower t^2 , aldehyde is formed. The aldehyde vapours are polymerised in towers t^3, t^4 and paraldehyde separated in tank d . The aldehyde vapours obtained from the paraldehyde are oxidised in a fifth tower



(not shown). The catalysing liquid in tower t^2 may be continuously regenerated by arranging a continuous small flow of the liquid through tower t^1 and regenerating tank r .

Liquid Ammonia. Norsk Hydro-Elektrisk Kvaelfstokfaktieselskab, Christiania. British Patent, 132,504. Convention date, September 13, 1918.

Liquid ammonia is obtained from aqueous solutions of ammonia by distillation under pressure. The ammonia solution is boiled in a vessel A, and the resulting vapours are passed through a dephlegmating-column C surmounted by a reflux condenser D. The ammonia gas thus freed from water vapour is led to a condenser F, and the liquid ammonia is collected in a vessel G. Under a pressure of 10 atmospheres, a cooling of the ammonia gas to 25°C . is sufficient to effect liquefaction. The ammonia solution introduced into the vessel A is of 25-30 per cent. strength; the residue from the vessel A is of 20 per cent. strength. The operation may be continuous or discontinuous.



Ammonium Chloride and Sodium Bicarbonate. L'Air Liquide Soc. Anon. pour l'Etude et l'Exploitation des Procédés G. Claude, Paris. British Patent, 131,870. Convention date, August 24, 1918.

Relates to a modification of the process for producing ammonium chloride and sodium bicarbonate from synthetic ammonia described in Specification 130,365. According to the invention, sodium chloride is added to the mother liquor, obtained after separating out the sodium bicarbonate and containing mainly ammonium chloride, in such quantity that it remains dissolved during the subsequent operations, ammonia and carbon dioxide are passed in, and the solution is cooled to separate out ammonium chloride; the solution is then treated with sodium chloride and carbon dioxide to precipitate sodium bicarbonate; these operations are then repeated on the resulting mother liquor to produce more ammonium chloride and sodium bicarbonate. The ammonium chloride produced is heated to nearly 70°C . to destroy any alkalinity. The cooling of the solution to separate out the ammonium chloride may be effected by the evaporation of the liquid ammonia or of the liquid or solid carbon dioxide used in the process.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

(SPECIALLY CONTRIBUTED.)

The arrangement for the exportation of Cumberland coke to the Continent, if it is effected—and there is no reason to believe that such will not be the case.—will come in the nick or time for the plants on the coast. It is evident now that the hematite pig-iron trade will have to become worse before it can become better; and as that has hitherto been the main prop—and, indeed, the only prop—of the coke industry, the outlook would in a very short space of time be distinctly gloomy. It would be idle to pretend that hematite pig-iron makers are not now stocking, and in some cases stocking heavily. The moulders' strike has brought about a pretty state of affairs. The dullness of the steel industry on both the shipbuilding and the rail side means, of course, that the make of ordinary iron for which the local coke is needed cannot be absorbed, and it seems likely that furnaces may have to be dumped down at any moment. East Coast coke supplies this week to West Cumberland are 5,500 tons, and to the Furness district 15,200 tons. The local ovens are working at only a third of their capacity, but there is a hopeful expectation that a contract for 30,000 tons can be fixed up with neutrals on the Continent, in which case, of course, the plants could be maintained in full operation for three months to come. There is a somewhat better feeling in the by-product industry. Benzole and sulphate of ammonia still find a good market, and the stocks of pitch and creosote are being somewhat reduced. There is a better demand for sulphuric acid.

REPORTS OF COMPANIES.

Broken Hill Proprietary Company, Ltd.

The report states that the question of the manufacture of tinplates is well in hand, and the general manager is inquiring fully into the matter in America and Europe, and his report on the subject is now awaited. Owing to the difficulties which the Associated Smelters at Port Pirie have met with in regard to the disposition of their lead output, due to the expiry of the contract with the Imperial Government, they have not been in a position to make the usual advances against products delivered to them, and payments have therefore had to be deferred until realisation is effected. The gross profits for the year to May 31 amounted to £679,957., which, after deducting £27,614. for depreciation, leaves a net profit of £652,342. During the term £530,714. has been expended in construction, the principal item being in connection with the Newcastle Steel Works, which amounted to £527,069. After making due provision for all outstanding liabilities there remain liquid assets, in cash, bullion and other convertible stocks, representing a total value of £1,232,043., which, however, does not include the company's interest of 200,000 shares of the Broken Hill Associated Smelters Proprietary, Limited, and 720 shares of the Zinc Producers' Association Proprietary Limited, but is inclusive of the reserve and insurance funds. The recapitalisation scheme has been carried through in its entirety during the past year and the capital is now as follows:—Authorised capital, £3,000,000. in 3,000,000 shares of £1. each; paid-up capital, £2,100,000 in 2,100,000 shares of £1. each, fully paid up; unissued capital, £900,000. in 900,000 shares of £1. each.

British Oil and Cake Mills, Ltd.

The annual meeting was held in London on Wednesday. Mr. John W. Pearson, who presided, said the Board propose to issue 1,250,000 ordinary shares of £1. each at par. They will be offered to the present ordinary shareholders in the ratio of one new share for each ordinary share now held. The funds are required for working capital owing to the steadily increasing trade and to the higher prices ruling for raw materials, and to pay for new properties. They are at present erecting extensive soap works in Hull, and at Gloucester they are erecting a margarine factory and also a larger refinery. They have arranged with the Greenock Harbour Trust to acquire a site on the James Watt Dock, where they propose to erect at once an oil mill. For the same purpose they are looking for a site in London, where their trade has outgrown their capacity. The report was adopted, and the increase of the capital from £2,000,000 to £10,000,000 was sanctioned.

DIVIDENDS.

CASSTNER-KELLNER ALKALI COMPANY, LTD.—Final dividend of 7 p.c., making with interim dividend 13 p.c. for year ended September 30, 1919.

"SANTAS" COMPANY, LTD.—Interim dividend at rate of 9 per cent. per annum on preference.

LONDON NITRATE, COMPANY, LTD.—Dividend for year ended June 30 of 1s. per share, less tax.

ADVERTISERS' APPRECIATION.

Messrs. MARCUS ALLEN AND SONS, LTD., of Oakley House, Bloomsbury Street, W.C. 1, write under date November 17: "With reference to our advertisement of 'Marelen' Pumps, several hundred inquiries were made from all parts of the country, and also from abroad, within the first three weeks of its appearance in the *Chemical Trade Journal and Chemical Engineer*, and you will be pleased to hear that good business has been the result. As regards our recent advertisement of the 'Monarch' Spray, as you are aware, this has appeared for only one week so far, and we have already had over 200 written inquiries, from which the result has been a sale of over 18 dozen of these sprays, and we are still receiving inquiries about them daily. We have never circularised this spray in any way: the whole result is from the advertisement. We think it only right and fair that you should know of these results from advertising, which we consider are extraordinarily good."

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 4, Queen Anne's Gate Buildings, London, S.W. 1, whence further information may be obtained:—

Australia.

A Melbourne firm, with branches at Sydney, Perth, and Fremantle, are desirous of securing agencies for Australia for tanning, wool-scouring, and refrigerating machinery; machinery for the treatment of fats, etc., evaporators, and condensers. (Reference No. 1022.)

A Sydney firm of agents and indentors desire to secure the representation, in Australia, of United Kingdom manufacturers of oilmen's stores, drugs, and chemicals on a commission basis. (Reference No. 1024.)

Canada.

A firm of manufacturers' agents and commission merchants in St. John's are desirous of representing United Kingdom manufacturers of linseed oil for the whole of Newfoundland. (Reference No. 1031.)

The following inquiry has been received at the Office of the High Commissioner for Canada, 19, Victoria Street, London, S.W. 1. All replies should be sent direct to the foregoing address:—

A firm in the Province of Ontario, interested in the importation of quicksilver in large quantities for mining purposes, wishes to get into touch with producers in the British Empire.

The following inquiry has been received at the Canadian Government Trade Commissioner's Office, Portland House, 73, Basinghall Street, London, E.C. 2, whence further information may be obtained:—

A firm in Montreal would like to represent United Kingdom manufacturers of oils, chemicals (industrial or otherwise), and drugs, and is also prepared to act as buying agent for United Kingdom importers of similar lines.

France.

An agent at Melun desires to obtain agencies, on a commission basis, for British firms, for the sale of chemical products and drugs. (Reference No. 1045.)

Sweden.

A firm of general agents, established in Gothenburg, Stockholm, and Malmo, desire to get into touch with British firms exporting chemicals with a view to obtaining their Swedish or Scandinavian representation. (Reference No. 1055.)

Near East.

A firm of exporters in London, stated to have their own representatives in the Near East, desire to represent in that market United Kingdom manufacturers of oil, paints and colours, chemicals, soap, etc. (Reference No. 1057.)

Asia.

A British mercantile agent wishes to secure the representation of United Kingdom manufacturers of paints and enamels, toilet preparations, and soap of all kinds. (Reference No. 1059.)

MARKET REPORTS.**TAR AND AMMONIA PRODUCTS.****WEDNESDAY.**

Benzole: London, 90%, 2s. to 2s. 1d.; North, 1s. 11d. to 2s.; 50%, 1s. 10d. to 1s. 11d.; North, 1s. 9d. to 1s. 10d., naked; pure, 3s., naked, at works. Carbolic acid, crude, 60%, East and West Coast, nominally 1s. 7d. to 1s. 8d.; crystals, 39-40%, 3½d. to 9d., f.o.b. Crude tar, London, 45s. to 50s.; Midlands, 44s. to 46s.; North, 45s. per ton, ex works. Refined tar, 32s. 6d. per barrel. Pitch, 80s.; East Coast, 70s. to 75s., f.o.b.; West Coast, 62s. 6d. to 65s., f.a.s. Solvent naphtha, naked, London, 90-190%, 2s. 5d.; North, 2s. 3d. to 2s. 4d.; 95-160%, naked, London, 2s. 6d.; North, 2s. 4d. to 2s. 5d. Crude naphtha, naked, 30%, 9d.; North, 8d. to 8½d. Refined naphthaline, £16. to £18.; salts, £6. to £7. Toluol, naked, London, 2s. 6d.; North, 2s. 5d. Creosote, naked, London, 6½d.; North, 5½d. to 5½d.; heavy oil, 6½d. Anthracene, 40-45%, 7d. per unit. Cresylic acid, 95%, 2s. 5d. to 2s. 6d.; 97-99%, 2s. 7d. to 2s. 8d., ex works, London, and f.o.b. other ports. Sulphate of ammonia: home trade, November £20. 15s., basis 24½%. Nitrate of soda, £22. 10s. to £22. 15s.

FERTILISER MATERIALS. LIVERPOOL, THURSDAY.

Nitrate of soda is very firm, but the quotation on spot for 95/96% quality for prompt delivery remains £20. 2s. 6d. per ton, net cash, f.o.r. East Indian bone meal for November December shipment is without alteration, the quotation for 4½% ammonia and 52% phosphates being £17. 10s. per ton, net cash, ex ship Liverpool. Owing to the easier freight market in the forward position, shippers indicate £13. per ton, net cash, ex ship Liverpool, for January-February shipment, 4½% and 52% quality. On spot, holders ask £17. 10s. per ton, net cash, for 4½% and 45% quality. Mineral phosphates are without alteration and values at present are only nominal. Dried blood: Supplies of this article are scarce, and full prices are being paid for any parcels offering, the value being 32s. 6d. to 35s. per unit of ammonia per ton, net cash.

LONDON METAL MARKET.**THURSDAY.**

Copper: Standard brands, £97. 15s. to £98., cash; £99. to £99. 5s. three months; electrolytic, £111. to £114. Tin: Standard, £282. 10s. to £282. 15s., cash; £284. to £284. 5s. three months; Straits, £282. 10s.; English, £281. 10s. to £282. 10s. Lead: Soft foreign, £34. 12s. 6d.; English, £35. 10s. Spelter, £46. 12s. 6d.; hard, £33. to £34. Antimony, English regulus, 90%, £47. 10s. Aluminium, £150. Nickel, £205., delivered; packages extra. Quick-silver, £17. 5s. to £17. 10s. Bismuth, 12s. 6d. Platinum, 442s. per oz. Wolfram, 32s. 6d. per unit.

MANCHESTER CHEMICAL MARKET.**THURSDAY.**

The inquiry for heavy chemicals continues active, both for home and export account, and quotations, generally, are firm with an upward tendency. Resale lots of 70% caustic soda are scarce, and price higher at £26. per ton. 58% alkali is dearer at £10. 10s. per ton, and refined bicarbonate soda, bags, at £9. 15s. ex store. Soda crystals steady at £5 5s. rails. Chlorate of soda is in fair request at 5½d. per lb. Potash dull at 1s. per lb. Roasted saltcake, in bulk, 70s. per ton carriage paid. Recovered rock sulphur, £17 on rails. Sulphate of copper continues flat, and export price unchanged at £40. per ton f.o.b. Bichromate of soda is in strong inquiry at 11d. Potash unaltered at 1s. 6d. per lb. Commercial hyposulphite of soda is steady at £19. per ton. Phosphate of soda £29. per ton. Nitrite in short supply, and price firm at £61. per ton, basis 100%. Concentrated sodium sulphide, £23. per ton in casks. White powdered arsenic is dearer, and £65. is now asked for Cornish brands. Yellow prussiate of potash quiet at 1s. 9d. per lb. Soda well maintained at 1s. 1d. per lb., and makers fully engaged with orders. Lead salts rather dull again, but values without alteration. White acetate at £84. per ton. Brown, £67. Nitrate, £55. Acetate of soda, £49. per ton. Acetic acid, quiet and unchanged. English brown acetate of lime firmly maintained at £12. 10s. Grey, £19. per ton. Miscible naphtha, 10s. 6d. per gallon. Green coppers dull at £4 5s. in sellers' wagons. With the clearance of foreign supplies, oxalic acid has a firmer tendency, and 1s. 2d. to 1s. 2½d. per lb. is now quoted. Permanganate of potash, commercial crystals, 3s. 3d. per lb.

TURPENTINE MARKET REPORT.

Messrs. James Watt and Son, Ltd., of 101, Leadenhall Street, London, E.C. 3, report that the stocks of turpentine on November 15 were: American, 32,384 barrels, compared with 3,208 barrels at the corresponding date of 1918; French, 904 barrels (1,029 barrels); and Spanish, 318 barrels (1,130 barrels). Deliveries during the week ended November 15 were 1,718 barrels, against 521 barrels last year, and since January 1, 65,765 barrels, compared with 22,461 barrels in 1918. The price on Saturday last was 126s. 3d. per cwt., compared with 105s. at the corresponding date of last year. November-December delivery was quoted at 126s. 9d., and January-April (1920) 128s. 9d.

SWANSEA MARKET REPORT.**THURSDAY.**

Great activity prevails in the tinplate market, and prices are very firm on the basis of 45s. 6d. per standard box, f.o.b. Copper is somewhat easier, with a fair demand for over three

months at £101. per ton and £99. 15s. cash. Tin active for prompt delivery at £283. 15s. cash and £284. 15s. three months. Lead in good inquiry at £34. 7s. 6d. over next quarter and £31. 5s. prompt. Spelter quiet and easier at £47. 5s. Antimony £47. 10s. Quicksilver £17. 10s. Nickel £205. delivered. Aluminium £150. Pitch in rather better supply at 62s. 6d. per ton at ship. Bonemeal 17s. 6d. per cwt. net. Sulphate of ammonia very steady at £20. 15s. per ton prompt and £21. forward. Sulphate of copper quiet but steady, with prompt at £41. per ton, f.o.b.; home quotations £1. less. Nitrate of soda very steady at 21s. 9d. per cwt., in bags. Palm oil rather quiet and easier: Lagos, £88. 10s.; softs, £88.; Benin, £86. 10s.; and hards, £85. per ton. Turpentine £5. 7s. 6d. per cwt. Arsenic in better request at £58. per ton for white powdered, in bags. Oxalic acid rather quiet at 1s. 0½d. per lb.

LIVERPOOL CHEMICAL MARKET.

THURSDAY.

Inquiries for chemicals have come in freely, the export branch of the trade again being well in evidence. Stocks of some of the heavier articles are still light, so that prices continue very firm. Bleaching powder has been in good request, though in limited supply. The price for home trade uses is £17. per ton, free on rail or conveyance, in buyers' packages; and for export £15. to £18. per ton. Chloride of calcium has been rather more in demand, and is £8. to £11. per ton, in casks, f.o.r. Caustic soda has been well inquired for; prices are: 76%, £24. per ton; 70 to 72%, £22. per ton; and 60 to 62%, £21. per ton. Nitrate of soda has been in moderate request, and is £21. to £22. per ton. Saltcake has again been in very fair demand, and is £6. 10s. per ton, in casks, f.o.b. Soda crystals have sold with some freedom, and are £5. 10s. per ton, in 2cwt. bags, f.o.r. at works. Bicarbonate of soda has been rather more in demand, and is £8. 5s. to £10. per ton, according to terms of delivery. Borax has been in very fair request, and is £39. per ton for ordinary and £40. per ton for powdered, in bags, less 3% for lots of not less than 50 tons. Ammonia alkali has been in good request, and is £6. 10s. to £6. 15s. per ton, f.o.r. at works. Hyposulphite has been rather more inquired for, and is £18. 10s. per ton for ordinary and £22. per ton for pea crystals, in 1cwt. bags. Sulphite of sodium has been in moderate demand, and is £10. per ton for ordinary and £16. to £18. per ton for pea crystals, in 1cwt. kegs. Sulphide of sodium has been quieter, and is £22. per ton in casks and £23. per ton in drums. Prussiate of soda has been more in request, and is 11d. to 1s. per lb. Bichromate of soda has been in slightly better request, and is 9½d. per lb. Phosphate of soda has been more inquired for, and is £26. per ton. Chlorate of potash has been steadily called for, and is 1s. to 1s. 1d. per lb. Permanganate has sold more readily, and is 3s. 6d. per lb. Sulphate of potash has been but little in request, and is £25. per ton. Carbonate of potash has been in moderate demand, and is £95. to £100. per ton for 80 to 85%. Caustic potash has been in good request, and is £120. per ton. Nitrate of potash has been in quietly steady demand, and is £55. to £60. per ton for refined and £40. for ordinary. Canadian potashes have been but little called for. First quality Montreal is £200. to £220. per ton, and second quality £190. to £210. per ton. Bichromate of potash has been quiet, and is 1s. 6d. to 1s. 7d. per lb. Yellow prussiate of potash has been rather more in request, and is 1s. 9d. to 1s. 10d. per lb. Salammoniac has met with a fair inquiry, and is £90. per ton for first quality, £85. per ton for second quality, and £5. per ton extra for crushed. Sulphate of ammonia has had a limited sale; it is £20. 15s. per ton for November, £21. for December, £21. 7s. 6d. for January (1920), £21. 15s. for February, and £22. per ton for March to May (1920). Carbonate of ammonia has been in moderate demand, and is 6½d. per lb. Muriate has been quiet, and is £48. to £50. per ton, according to grade. Magnesia has been in very fair demand. Carbonate is £2. 5s. per cwt., and sulphates £11. to £16. per ton, according to grade. Alum has been steadily called for, but scarce, and is £18. 10s. per ton for the home trade and £18. 10s. to £19. 10s. per ton for export. Aluminoferic has been in very limited demand, and is £8. 10s. to £12. per ton, according to quality. Sulphate of alumina has been but little in request, and is £12. to £17. per ton, according to grade. Sulphur has been in fairly active demand. English flowers are £32. per ton; roll is £28. per ton, and rock £22. per ton, in bags, f.o.r. Sicilian grades are: Flowers, £28. per ton; roll, £22. 10s. per ton; and rock, £17. 15s. per ton. Cream of tartar has been in somewhat freer request, and is £12. 5s. to £12. 10s. per cwt. Tartaric acid has again met with a fair inquiry,

and is 3s. 2d. to 3s. 3d. per lb. Boracic acid has been quieter; crystals are £72. per ton, and powdered £74. per ton, and £2. to £3. extra if delivered in casks. Oxalic acid has moved but slowly, and is 1s. to 1s. 1d. per lb. Citric acid has sold rather more freely, and is 4s. 3d. per lb. White acetate of lead has been quiet, and is £83. per ton. Arsenic has been in moderate demand, and is £60. per ton for white powdered. Sulphate of copper has been very quiet. Prices are £40. per ton for the home trade, and £40. to £41. per ton, less 5%, in casks, f.o.b. at Liverpool.

TYNE CHEMICAL REPORT.

TUESDAY.

Market continues steady without much alteration in prices, and inquiry both for home and export is good. Locally, soda crystals are in strong request at £5. 10s. per ton, 2cwt. bags. Rock sulphur scarce and firm.

The following prices are per ton net: Bleaching powder, softs and hards, £18.; caustic soda 76/77%, £25.; do., 74/76%, £24. 5s., do., 70%, £23., do. 60%, £21.; recovered sulphur, 2cwt. bags, £24.; hyposulphite of soda, 5/7cwt. casks, £19., 1cwt. kegs, £25.; sulphite of soda, 5/7cwt. casks, £12., do., 1cwt. kegs, £20.; silicate of soda, 75° Tw., £9. 12s. 6d., do. 100° Tw., £10., do. 140° Tw., £10. 10s.; soda crystals, 2cwt. bags, £5. 10s.; sulphate of soda (saltcake) in bulk, £4.; pure white sulphate of alumina, £19. 10s.; blanc fixe, £22.; sulphide of sodium, crystals, £18., do., refined-concentrated solid, 60/62%, £25.; hydrate of barium, do., crystals, £56.

COALS. Market very strong both for prompt and forward, and a considerable amount of business for export to Allied countries has taken place for delivery in the early months of next year. Prompt prices nominally: Best Northumbrian steam coals, 95s. to 100s. per ton, second qualities, 90s. to 95s.; Northumbrian small coals, 75s. to 80s., seconds, 67s. 6d. to 72s. 6d.; best Durham gas coals, 80s. to 85s., seconds, 65s. to 75s.; Durham bunkers, 70s. to 80s., seconds, 65s. to 67s. 6d.; foundry coke, 100s.; gas coke, 95s. to 100s.

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Wednesday.

During the past week a fairly brisk demand has been passing in all classes of chemicals, and while big deals have not been particularly conspicuous, yet in bulk the week's transactions have amounted to a big volume. Prices remain more or less stationary, with a rising rather than a lowering tendency; but the only appreciable change over the week is in the case of cream of tartar, which is now selling at £12., as against £11. 15s. per cwt., net, Glasgow. Current quotations now are: Arsenic, £64. per ton, net, Glasgow; bicarbonate of soda, £10. 10s. and £12. 10s. per ton for 6-8cwt. casks and 1cwt. kegs, net, Liverpool; boracic acid crystals, English refined, £72. for 2cwt. bags; and borax crystals, £39. for 2cwt. bags, carriage paid; caustic soda, white, 70-72%, £25. per ton net, Glasgow; chlorate of potash, 1s. 1d. per lb., net, Glasgow; chlorate of soda, 8d. per lb., net, Glasgow; citric acid, 4s. 4d. per lb., 5%, Glasgow; cream of tartar, 98%, £12. per cwt., net, Glasgow; paraffin wax, U.K. deliveries, 125°, 6½d. to 6¼d.; 121-30°, 5½d. to 5¼d.; 118-20°, 5d.; 110-120°, 4d. to 4¼d.; and 98-102°, 4d. to 4½d.; salammoniac, £95. and £85. per ton, net, any port, for first and second lump respectively; salammoniac crystals, £70. per ton, net, Glasgow; saltpetre, £3. 2s. net, Glasgow; tartaric acid, 3s. 3d. per lb., 5%, Glasgow.

There are no changes in the sea oil section, either as regards supply, demand, or prices. Whale oils keep to their old figures of 94s. for pale, 76s. for brown, and 76s. for black (with yellow still unobtainable); while Newfoundland cod is also retaining its former price of 80s. Pale seal is still on offer at 96s., and menhaden at 80s., and it is interesting to note that the full range of prices given above has been in operation in every case during the last four or five weeks. The only variation over that period has been in the case of whale oil of the pale variety, which, after being as low as 90s. in the middle of October, has since jumped back (as stated above) to 94s.

In the West of Scotland coal trade it is still a question of the demand being greater than the supply, and an exceptionally severe spell of cold weather did not ease the position. Both industrially and domestically, the requirements are considerably heavier now that the winter is in fuller swing, and there is no difficulty in getting rid of all fuel as it reaches the pithead.

IMPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

GLASGOW.

Week ending November 15.

ACETATE OF LIME—
Gothenburg, 273 bgs.; Philadelphia, 1,014 bgs.

CREAM OF TARTAR—
Valencia, 40 cks.

DEXTRINE—
Baltimore, 215 bgs.

DYESTUFFS—
Tanning Extract
Newport News, 200 brls.

FERRO SILICON—
Rouen, 39 cks.

GLUE—
Gothenburg, 453 bgs.; Rouen 41 brls.

IRON PYRITES—
Huelva, 2,033 t.

OCHRE—
Newport News, 258 brls.; Rouen, 11 cks.

PARAFFIN WAX—
Philadelphia, 695 brls.

ROSIN—
Lisbon, 35 cks.

SOAP—
Newport News, 30 brls.; Philadelphia, 2,000 bxs.

TAR—
Gothenburg, 105 brls.

TAR OIL—
Gothenburg, 23 cks.

TARTAR EMETIC—
Rouen, 10 cs.

WHITE LEAD—
Philadelphia, 82 brls.

ZINC SULPHATE—
Gothenburg, 4 cks.

GOOLE.

Week ending November 15.

CAUSTIC SODA—
Rotterdam, 47 drms.

GLUE—
Antwerp, 32 bgs.

PHOSPHATE—
Antwerp, 140 t.

GRANGEMOUTH

Week ending November 15.

FERRO SILICON—
Skien, 151 cs.

GRIMSBY.

Week ending November 15.

NIL.

HULL.

Week ending November 15.

BARYTES—
Rotterdam, 41 cks.

FATTY ACIDS—
Amsterdam, 198 brls.

MANGANESE ORE—
Bombay, 2,200 t.

OCHRE—
Rouen, 10 cks.

PHOSPHATE (ROCK)—
Sfax, 5,900 t.

TALLOW—
Auckland, 19 brls., 915 cks.; Napier, 721 cks.

TAR (WOOD)—
Trondhjem, 100 brls.

TARTARIC ACID—
Helsingfors, 53 brls., 9 cs.; Venice, 98 cks.

LIVERPOOL.

Week ending November 15.

AMMONIA—
Havre, 4 cs.

AMMONIUM SULPHATE—
Montreal, 1,833 bgs.

BEES WAX—
Rotterdam, 10 brls.

BISMUTH ORE—
W. C. S. America, 16 sks.

BORATE OF LIME—
Buenos Ayres, 1,962 bgs.

CANDELLILLA WAX—
Galveston, 19 sks.

CARBON (DECOLOURIZING)—
Amsterdam, 20 bgs.

CARBON BLACK—
Baltimore, 150 cs.

CHEMICALS (otherwise undescribed)—
Havre, 23 cs.; Montreal, 13 pkgs.

COPPER PRECIPITATE—
Seville, 2,832 bgs.

DYE EXTRACTS (otherwise undes.)—
Norfolk, 2,795 bgs.

DYESTUFFS—
Chestnut Extract
Norfolk, V., 784 sks., 5,102 brls.
Cochineal
Teneriffe, 18 bgs.
Cutch
Karachi, 16 bgs.
Myrabolans
Bombay, 1,593 bgs.
Tanning Extract
Baltimore, 970 brls.; Norfolk, 6,496 brls.

FATTY ACIDS—
Rotterdam, 595 brls.

GLUE—
Boston, 7 brls.

GLYCERINE—
Buenos Ayres, 10 drms.

IRON OXIDE—
Malaga, 121 brls.

LITHOPONE—
Rotterdam, 88 cks.

MAGNESITE—
Montreal, 1,000 bgs.

OCHRE—
Bordeaux, 90 cks.

OLEO STEARINE—
La Plata, 100 tcs.; Montreal, 100 brls.

OXALIC ACID—
Rotterdam, 13 cks., 41 brls.

PARAFFIN WAX—
Baltimore, 683 bgs.

ROSIN—
Bordeaux, 600 brls., 402 cks.; Savannah, 700 brls.

SILVER SULPHIDE—
Callao, 4 cs., 56 pkgs.

SOAP—
Norfolk, 1,100 brls.; Seville, 100 cs.

SODIUM NITRATE—
Tocopilla, 10,214 sks.

STEARINE—
Buenos Ayres, 75 cs., 110 cks.; La Plata, 656 tcs.

TALLOW—
Buenos Ayres, 1,163 tcs., 22 brls., 2,796 cks.; La Plata, 573 tcs.

TARTAR—
Marseilles, 48 cks.

LONDON.

Week ending November 15.

ALUMINA SULPHATE—
Germany, £2,870.

AMMONIUM BENZOATE—
Switzerland, 2 cs.

BARYTES—
Belgium, 300 bgs.; Germany, 190 cks.; Spain, 240 cs.

BEESWAX—
Asiatic Turkey, 2 bgs.; Aden, 21 brls.; British India, 8 cs.; Portugal, 41 pkgs.; Holland, 20 bgs.; Portuguese East Africa, 62 pkgs., 198 bxs.; Madagascar, 104 bgs.; Transvaal, 50 brls.; U.S.A., 778 bxs.

CALCIUM LACTOPHOSPHATE—
France, £8.

CAMPHOR—
France, 75 cs.; Natal, 14 cs.

COAL PRODUCTS—
Anthracene
Rouen, 100 bgs.

CREAM OF TARTAR—
France, 100 kgs.; Spain, 40 cks.

DYESTUFFS—
Aniline
Switzerland, 250 pkgs.; U.S.A., 15 kgs.

Argols
France, 913 pkgs.; Italy, 616 pkgs.; Portugal, 556 pkgs.; Spain, 39 cks., 47 pkgs.

Chestnut Extract
France, 100 cks.

Cochineal
Canary Islands, 2 pkgs.

Dyewood Extract
U.S.A., 5 pkgs.

Mangrove Bark
British India, 57 pkgs.; Madagascar, 1,867 bgs.

Myrabolans
British India, 11,013 pkgs.

Saffron
Spain, 2 cs.

Sumac
Italy, 70 pkgs.

Tanner's Bark
Cape, 50 t.; Natal, 25 t.

Tartars
Italy, £1,144.

Turmeric
British India, 838 pkgs.

FISH OIL—
Cape, 1,013 pkgs., 18 drms.; Japan, 2,600 cs.

FULLERS EARTH—
Japan, £24.

GELATINE—
Belgium, £4,881.

GLUE—
Holland, £405.; Sweden, £280.

HYDROGEN PEROXIDE—
U.S.A., £1,100.

Kieselguhr—
Spain, £375.

LITHOL—
Switzerland, £35.

LITHOPONE—
Holland, 80 cks.

MAGNESIUM CHLORIDE—
Holland, 34 t.

MOUTAN WAX—
Denmark, 10 bgs.; Germany, 200 bgs.; Holland, 3 cs.

OXALIC ACID—
Holland, £700.; Sweden, 5 cks., 5 brls.

PARAFFIN SCALE—
U.S.A., 18 t. 10 c.

PARAFFIN WAX—
British India, 200 t.; U.S.A., 94 t. 13 c.

PITCH—
Holland, 28 brls.

PLUMBAGO—
Canada, 1 bx.; France, 61 bgs.; Japan, 240 cks.; Madagascar, 319 brls.; U.S.A., 44 cs.

POTASH SALTS—
France, 89 t.; Holland, £2,687.

POTASSIUM SULPHATE—
Holland, 505 t.

QUININE—
Belgium, 1,120 ozs.

RED LEAD—
Canada, 24 cks.; Italy, 17 cks.

ROSIN—
France, 308 cks.; Portugal, 116 brls.; Sweden, 28 brls.; U.S.A., 8,200 brls., 100 cks.

SIZE—
Spain, £123.

SOAP—
Holland, £84.; U.S.A., £3,600.

SODA—
France, 1 c.

SODIUM PRUSSATE—
France, 4 t. 17 c.; Holland, 34 t. 1 c.; Sweden, 4 t. 10 c.

STEARINE—
E. Turkey, 62 brls.; Victoria, 16 pkgs.

SULPHUR—
Italy, 40 t. 8 c.

TALLOW—
China, 31 t.; New Zealand, 323 t. 19 c.; N.S.W., 35 t. 18 c.; Victoria, 204 t. 15 c.; W. Australia, 12 t. 10 c.

TANNIC ACID—
Switzerland, 9 cks.

TARTAR CRYSTALS—
Italy, £2,511.

ULTRAMARINE—
Holland, 40 cks.; Newfoundland, 145 brls.

VEGETABLE WAX—
China, 8 brls.

WHITE LEAD—
Canada, 224 kgs.; U.S.A., 104 cks.

WOOD OIL—
China, 1,346 brls., 438 cks.; Hong Kong, 2,800 cs.

ZINC OXIDE—
Belgium, 140 cks.

MANCHESTER.

Week ending November 15.

ACID—
Boston, 20 brls.

AMMONIA—
Rotterdam, 6 cs.

ANILINE COLOURS—
Antwerp, 58 brls., 2 cs.

ANTIMONY SALT—
Rouen, 4 cks.

CALCIUM CARBIDE—
Montreal, 500 drms.

EMETIC CRYSTALS—
Antwerp, 1 kg.

GELATINE—
Rotterdam, 50 brls.

GLUE—
Antwerp, 190 pkgs.

MAGNESITE—
Rotterdam, 63 pkgs.

PYRITES—
Fallonica, 3,000 t.

ROSIN—
New Orleans, 500 brls.

SOAP—
Fallonica, 280 cs.

SOAP (STOCK)—
New Orleans, 400 brls.

STEARINE—
Antwerp, 63 bgs.

TANNIC ACID—
Montreal, 30 brls.

TARTARIC ACID—
Rotterdam, 24 crts.

ULTRAMARINE BLUE—
Antwerp, 4 cs.

WAX—
New Orleans, 2,289 brls.

WHITE LEAD—
Antwerp, 4 cks.

ZINC OXIDE—
Antwerp, 100 brls.

MIDDLESBROUGH.

Week ending November 15.

NIL.

NEWCASTLE-ON-TYNE

Week ending November 15.

NIL.

N. & S. SHIELDS.

Week ending November 15.

NIL.

SWANSEA.

Week ending November 15.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

BRISTOL.Publication of Official Returns
Suspended.**GLASGOW.**

Week ending November 15.

AMMONIUM PHOSPHATE—
Rouen, £520.**CARBON BISULPHIDE**—
Trinidad, £118.**CHEMICALS** (otherwise undescribed)
Brisbane, 10 pkgs.; Demerara, 12 pkgs.; Madras, 2 pkgs.; Melbourne, 232 pkgs.; Montreal, 46 pkgs.; Natal, 25 pkgs.; New York, 20 pkgs.; Sydney, 168 pkgs.; Trinidad, 83 pkgs.**COAL PRODUCTS** (otherwise undescribed)
Bombay, £202.; Havre, £1,766.; Montreal, £660.; Natal, £637.; New York, £2,252.; Philadelphia, £1,592.; Rouen, £155.; Spezia, £6,190.; Sydney, £27.**DEXTRINE**—
Montreal, £69.**DYESTUFFS** (otherwise undescribed)
Melbourne, £1,081.**DYESTUFFS**—
Quebracho Extract
Brisbane, £207.**GELATINE**—
Montreal, 2 c.**MAGNESITE (CALCINED)**—
New York, £308.**MANGANESE CHLORIDE**—
New York, £260.; Philadelphia, £260.**SHEEP DIP**—
Buenos Ayres, £15,016.; Trinidad, £81.**SOAP**—
Colombo, 25 bxs.; Demerara, 1 bx.; Montreal, 15 c.; Trinidad, 12 c.**SODIUM BICHRIMATE**—
Melbourne, £424.; Sydney, 24 pkgs.**SODIUM CHROMATE**—
Brisbane, £81.**STOCKHOLM TAR**—
Demerara, £92.**SULPHUR**—
Demerara, 2 t.**TURPENTINE**—
Demerara, £44.; Mauritius, 100 galls.**GOOLE.**

Week ending November 15.

NIL.

GRANGEMOUTH.

Week ending November 15.

AMMONIUM CARBONATE—
Bergen, Stavanger, and Trondhjem, 4 t. 15 c.**BORAX**—
Bergen, 19 c.**BORIC ACID**—
Bergen, 19 c.**CERESINE WAX**—
Christiania, 2 c.**COAL PRODUCTS**—
Pitch
Bergen, Stavanger, and Trondhjem, 7 t. 17 c.**PARAFFIN WAX**—
Christiania, 10 t.; Rotterdam, 39 t.**PITCH**—
Rotterdam, 448 t.**SALT**—
Bergen, Stavanger, and Trondhjem, 8 t.**SOAP**—
Bergen, Stavanger, and Trondhjem, 10 t. 7 c.**SODA ASH**—
Rotterdam, 5 t.**SODIUM BICARBONATE**—
Rotterdam, 19 t. 16 c.**GRIMSBY.**

Week ending November 15.

NIL.

HULL.

Week ending November 15.

AMMONIUM SULPHATE—
Catania, 500 bgs.**BLEACHING POWDER**—
Bilbao, 211 cks.**BORAX**—
Wasa, 10 cks.**CHEMICALS** (otherwise undescribed)
Abo, 5 cks., 300 drms.; Amsterdam, 40 brls.; Antwerp, 3 t. 22 c., 1 kg.; Bergen, 1 c.; Bilbao, 12 drms., 20 c.; Copenhagen, 69 drms., 1 c.; Genoa, 43 drms., 55 brls., 80 kgs., 17 cks.; Helsingfors, 4 cks.; Leghorn, 9 drms., 120 bgs., 50 kgs.; Mantyluoto, 4 cks.; New York, 63 cks.; Rotterdam, 4 bxs.; Rouen, 1 drm., 165 bxs., 250 bgs., 18 cks.; Stockholm, 1 cs., 2 kgs., 86 cks., 5 brls., 37 bgs.**COAL PRODUCTS**—
Tar
Rotterdam, 15 brls.**CREAM OF TARTAR**—
Fremantle, 40 kgs.**DISINFECTANTS** (otherwise undescribed)
Fremantle, 22 drms.**DYESTUFFS** (otherwise undescribed)
Genoa, 13 cks.; New York, 8 kgs., 7 cks.**FATTY ACID**—
Rouen, 59 brls.**GLUE**—
Abo, 100 bgs.; Hango, 10 bgs.; Helsingfors, 1 ck.; Rotterdam, 360 bgs.**PARAFFIN WAX**—
Wiborg, 850 bgs.**PITCH**—
Antwerp, 90 t.; Gothenburg, 5 t.**RED LEAD**—
Wiborg, 2 cks.; Wasa, 10 cks.**SALT**—
Amsterdam, 100 cs.**SALT CAKE**—
Gothenburg, 400 t.; Terneuzen, 140 t.**SOAP**—
Aalesund, 5 cs., 3 crts., 238 drms.; Bergen, 158 kgs., 100 brls., 1,275 drms.; Christiansund, 295 drms.; Copenhagen, 4 cs.; Dunkirk, 200 drms.; Genoa, 2,015 cs.; Ghent, 3 c.; Stockholm, 208 cs.; Stavanger, 80 crts., 125 drms.; Trondhjem, 30 cs., 600 drms.; Wiborg, 120 bxs.**TAR**—
Stockholm, 294 cks., 6 brls.**WOOD PRESERVATIVE**—
Antwerp, 3 drms.; Bilbao, 90 brls.; Copenhagen, 1 brl., 640 drms.; Fremantle, 22 drms.; Stockholm, 125 drms.**LEITH.**

Week ending November 15.

ACETIC ACID—
Iceland, 1 t. 3 c., £4.**AMMONIUM CARBONATE**—
Lisbon, 1 t. 12 c., £410.**AMMONIUM SULPHATE**—
Dunkirk, 413 t. 10 c.**CAUSTIC SODA**—
Amsterdam, 7 t. 8 c., £145.**COAL PRODUCTS** (otherwise undescribed)
Iceland, 1 t. 2 c., £7.**COAL PRODUCTS**—
Naphthalene
Dieppe, 13 t. 3 c., £523.**COPPER SULPHATE**—
Iceland, 4 c., £12.**MAGNESIA**—
Cadiz, 7 c., £29.**POTASSIUM BICHRIMATE**—
Rotterdam, 10 t., £1,580.**SODA**—
Iceland, 1 c., £7.**SODA ASH**—
Amsterdam, 18 t., £130.**SODA CRYSTALS**—
Iceland, 7 t. 10 c., £46.**SODIUM BICHRIMATE**—
Rotterdam, 1 t., £68.**SODIUM HYPOSULPHATE**—
Iceland, 2 c., £4.; Lisbon, 1 t. 2 c., £187.**LIVERPOOL.**

Week ending November 13.

ACETIC ACID—
Bombay, 1 t. 2 c., £160.; Rangoon, 18 c., £78.**ALUM**—
Bordeaux, 14 t., £251.; Half Assinie, 1 c., £2.; Lagos, 1 c., £1.; Monte Video, 2 t. 16 c., £52.; Piraeus, 5 t. 1 c., £90.; Rangoon, 10 t. 1 c., £170.; Rouen, 1 t. 2 c., £105.; Salonica, 3 t., £57.; Volo, 2 t. 15 c., £51.**ALUM (AMMONIA)**—
Buenos Ayres, 2 t. 17 c., £53.; Pernambuco, 2 c., £13.**ALUM (CHROME)**—
Paris, 10 c., £44.**AMMONIA**—
Accra, 1 c., £8.; Arequipa, 1 c., £7.; Iquique, 2 c., £14.; Piraeus, 1 t. 1 c., £30.; Rio de Janeiro, 6 c., £18.**AMMONIUM CARBONATE**—
Arequipa, 2 c., £10.; Arica, 2 c., £11.; Bordeaux, 2 t., £131.; Calcutta, 10 c., £36.; Christiania, 1 t., £64.; Lisbon, 1 t. 10 c., £92.; Madras, 1 t., £95.; Patras, 1 c., £6.; Piraeus, 1 t. 1 c., £64.; Rangoon, 1 t., £95.; Rio de Janeiro, 2 t. 13 c., £247.; Valparaiso, 2 c., £14.; Yokohama, 5 t., £343.**AMMONIUM CHLORIDE**—
Algoa Bay, 3 c., £9.; Dunedin, 5 c., £15.**AMMONIUM MURIATE**—
Kobe, 5 t., £298.; Montreal, 4 t. 16 c., £254.; Natal, 10 c., £2.; Philadelphia, 55 t. 4 c., £2,710.; Patras, 18 c., £57.; Piraeus, 2 t. £102.; Rangoon, 1 c., £3.; Volo, 4 t., £108.; Yokohama, 5 t., £221.**ANTIMONY**—
La Guala, 1 t., £40.**ANTIMONY SULPHIDE**—
Sao Felix, 6 c., £28.**ARSENIC**—
Christiania, 2 t., £120.; Santos, 10 c., £115.**BLEACHING POWDER**—
Bombay, 40 t., £703.; Havre, 30 t. 13 c., £360.; Hong Kong, 25 t., £381.; Piraeus, 4 t., £76.; Rotterdam, 15 t. 7 c., £234.; Rouen, 51 t. 7 c., £624.**BORAX**—
Arequipa, 4 c., £12.; Bombay, 1 t., £50.; Lisbon, 2 t., £107.; Marseilles, 5 t., £240.; Maccio, 2 c.; Paris, 5 t. 4 c., £230.; Rotterdam, 11 t. 10 c., £578.**BORIC ACID**—
Maccio, 1 c., £6.**CALCIUM CARBONATE**—
Forcados, 5 c., £6.; Sierra Leone, 1 t. 3 c., £33.**CALCIUM CHLORIDE**—
Barcelona, 10 drms.; Bombay, 311 drms.; Calcutta, 78 drms.; Karachi, 7 drms.**CALCIUM CHLORIDE**—
Algoa Bay, 1 c., £1.; Marseilles, 20 t., £138.; Melbourne, 18 t. 15 c., £255.; Sydney, 5 t. 2 c., £37.; Townsville, 2 t. 3 c., £15.; Wellington, 5 t. 2 c., £35.**CARBONATE OF LIME**—
St. Louis, 16 t. 5 c., £231.**CARBOSIL**—
Melbourne, 4 t. 13 c., £42.**CAUSTIC SODA**—
Aarhus, 100 drms.; Amsterdam, 152 drms.; Antwerp, 34 cks.; Buenos Ayres, 110 drms.; Catania, 41 drms.; Copenhagen, 3 drms.; Cebu, 41 drms.; Genoa, 489 drms.; Lisbon, 291 drms.; Iloilo, 15 drms.; Manao, 12 drms.; Yokohama, 177 drms.**CHEMICALS** (otherwise undescribed)
Alexandria, £172.; Cairo, 15 c., £63.**CITRIC ACID**—
Maccio, 2 c., £66.**COAL PRODUCTS**—
Carbolic Acid
Kobe, 26 t. 11 c., £2,020.**Creolina**
Caracas, 10 c., £39.; La Guala, 4 t. 19 c., £453.; Maracaiba, 2 t. 3 c., £196.; Pernambuco, 4 t. 18 c., £416.; Rio de Janeiro, 8 t. 10 c., £1,149.**Creosote**
Buenos Ayres, 16 t. 6 c., £236.; Christiania, 148 t., £1,190.**Pitch**
Corfu, 1 t., £15.; Lagos, 2 c., £2.**Tar**
Accra, 4 t. 8 c., £47.; Lagos, 5 t. 12 c., £55.; Lome, 11 t. 17 c., £73.; Secondee, 2 t., £22.; Tamatave, 1 c., £5.**COPPER SULPHATE**—
Algoa Bay, 1 t. 5 c., £11.; Bordeaux, 852 t. 18 c., £31,174.; Bombay, 34 t. 4 c., £308.; Calcutta, 7 t. 2 c., £61.; Dunedin, 6 t. 2 c., £59.; Karachi, 8 t. 11 c., £76.; Kingston, 10 c., £5.

COPPER SULPHATE—

Maceio, 1 c., £3.; Piraeus, 27 t. 4 c., £199.; Soerabaya, 6 c., £11.

DISINFECTANTS (otherwise undes.)

Accra, 12 c., £61.; Addah, 1 c., £3.; Buenos Ayres, 9 t. 16 c., £425.; Callao, 6 c., £30.; Cottonion, 1 c., £1.; Gothenburg, 5 c., £14.; Karachi, 1 t. 15 c., £63.; Lome, 10 c., £28.; Melendo, 1 c., £5.; Nantes, 3 c., £10.; Porto Alegre, 2 c., £15.; Rangoon, 2 c., £6.; Quechesla, 2 c., £10.; Stanley, 5 c., £8.; Secondee, 10 c., £50.; Vancouver, 9 c., £49.

DYESTUFFS (otherwise undescribed)

Algiers, 5 c., £191.; Bordeaux, 1 t. 5 c., £466.; Boston, 25 lbs., £9.; Christiania, 2 c., £59.; Genoa, 7 t. 16 c., £4,042.; Monte Video, 2 c., £95.; Natal, 4 c., £55.; New York, 3 c., £50.; Patras, 3 t., £434.; St. John, N.B., 5 t., £382.; Shanghai, 34 t. 2 c., £11,748.; Stockholm, 3 c., £64.; Valparaiso, 3 c., £104.

DYESTUFFS—

Aniline Dye
Toronto, 11 c., £378.

FERRO MANGANESE

Copenhagen, 1 t.; Philadelphia, 805 t.

GLUE, SIZE, AND GELATINE—

Copenhagen, 480 pkgs.; Kobe, 110 pkgs.; Para, 1 pkg.; Porto Alegre, 1 pkg.

GLYCERINE—

Amoy, 5 cs.; Antwerp, 60 drms.; Hankow, 5 pkgs.

LEAD ACETATE—

Bahia, 2 c., £96.; Piraeus, 1 t., £85.

LEAD CARBONATE—

Pernambuco, 1 c., £8.

MAGNESIA (CALCINED)—

Bahia, 2 c., £11.

MAGNESIUM CARBONATE—

Maceio, £4.; Porto Alegre, 2 c., £11.; Santos, 2 c., £11.

MAGNESIUM CHLORIDE—

Calcutta, 12 t. 16 c., £213.

MAGNESIUM CITRATE—

Vera Cruz, 1 c., £17.

MAGNESIUM SULPHATE—

Arequipa, 1 c., £2.; Desterro, 10 c., £9.; Half Assinie, 3 c., £10.; Rouen, 50 t., £680.; Sao Paulo, 2 t. 10 c., £39.

MANGANESE—

Rotterdam, 100 bgs.

NICKEL SULPHATE—

Buenos Ayres, 1 t., £63.

NITRIC ACID—

Oruro, 1 c., £10.

OXALIC ACID—

Barcelona, 1 t., £130.; Karachi, 1 t. 10 c., £203.; Piraeus, 9 c., £66.

PARAFFIN WAX—

Lisbon, 78 bgs.

PHOSPHORUS—

Kobe, 3 t. 2 c., £613.

POTASSIUM BICHRIMATE—

Pt. Elizabeth, 2 c., £17.

POTASSIUM CHLORIDE—

Constantinople, 10 c., £59.; Iquique, 2 c., £20.; Kobe, 14 t., £855.; Piraeus, 2 c., £4.; Shanghai, 40 t., £2,610.

POTASSIUM IODIDE—

Maceio, £70.

POTASSIUM PRUSSATE—

Rosario, 5 c., £92.

SALAMMONIAC—

Accra, 1 c., £2.; Arica, 2 c., £11.; Bombay, 2 t. 8 c., £175.; Calcutta, 3 t. 18 c., £276.; Christiania, 10 c., £45.; Hong Kong, 2 c., £7.; Karachi, 7 t. 10 c., £530.; Philadelphia, 2 t., £146.; St. Nazaire, 5 c., £17.; Sydney, 15 c., £58.; Salonica, 1 t. 3 c., £75.; Vera Cruz, 1 c., £7.

SALT—

Accra, 425 t.; Addah, 33 t.; Attuaboe, 7 t.; Boston, 100 t.; Buenos Ayres, 397 t.; Cabinda, 12 t.; Calcutta, 6,888 t.; Calabar, 215 t.; Cape Town, 38 t.; Christiania, 200 t.; Christiansund, 210 t.; Conakry, 252 t.; Demerara, 262 t.; Drammen, 250 t.; Duala, 718 t.; Dunkwa, 11 t.; East London, 1 t.; Durban, 50 t.; Fremantle, 5 t.; Gibraltar, 8 t.; Gothenburg, 525 t.; Grand Bassam, 106 t.; Halifax, N.S., 805 t.; Iquitos, 81 t.; Kingston, Jam., 105 t.; Koko, 13 t.; Lagos, 2,198 t.; Landana, 45 t.; Loango, 10 t.; Lome, 17 t.; Malmo, 106 t.; Manaos, 255 t.; Maranham, 144 t.; Montego Bay, 18 t.; Montreal, 321 t.; New York, 225 t.; Para, 171 t.; Rangoon, 814 t.; Rio de Janeiro, 57 t.; St. John, N.B., 200 t.; Shanghai, 7 t.; Sierra Leone, 320 t.; South Georgia, 193 t. 6 c.; Stockholm, 658 t.

SALTPETRE—

Half Assinie, 2 c., £7.; Lagos, 1 c., £3.; Santos, 1 c., £6.

SHEEP DIP—

Algoa Bay, 2 t. 5 c., £129.; Buenos Ayres, 63 t. 2 c., £1,700.; Cape Town, 3 t. 11 c., £241.; East London, 4 t. 9 c., £258.

SOAP—

Aden, 1,050 bxs.; Bahia, 550 bxs.; Bombay, 35 bxs.; Calcutta, 2 bxs.; Cheribon, 50 cs.; Djibo ti, 90 bxs.; Genoa, 19 bxs.; Havre, 76 brls.; Hong Kong, 2 cs.; Iquique, 60 cs.; Iquitos, 650 bxs.; Karachi, 197 bxs., 314 cs.; Lagos, 100 bxs.; 9 cs.; Leghorn, 500 cs.; Macassar, 3,575 cs.; Madras, 5 bxs., 1 cs., 40 drms.; Malta, 306 bxs.; Manaos, 260 bxs.; Manoa, 60 bxs.; Manta, 336 bxs.; Menado, 600 cs.; Medan, 500 cs.; Monte Video, 40 drms.; Mollendo, 396 bxs.; Para, 704 bxs.; Patras, 63 bxs.; Penang, 1,056 bxs.; Pt. Harcourt, 448 bxs.; Pt. Said, 941 bxs.; Pt. Simon, 50 pkgs.; Pt. Sudan, 2,908 bxs.; Rangoon, 3,731 bxs.; Rio de Janeiro, 1 bx.; Sabang, 275 cs.; Santos, 6 bxs.; Samarang, 935 cs., 2 bxs.; Soerabaya, 1,450 bxs.; Sao Paulo, 20 bxs.; Secondee, 60 bxs.; Shanghai, 714 bxs.; Singapore, 483 bxs.; S'rabaya, 540 bxs.

SODA ASH—

Buenos Ayres, 519 pkgs.; Calcutta, 7,120 pkgs.; Cologne, 230 pkgs.; Callao, 323 pkgs.; Concepcion, 76 pkgs.; Eten, 50 pkgs.; Genoa, 40 pkgs.; Gothenburg, 2,250 pkgs.; Havana, 40 pkgs.; Kobe, 2,867 pkgs.; Melbourne, 430 pkgs.; M. Video, 380 pkgs.

SODA CRYSTALS—

Alexandria, 30 pkgs.; Antofagasta, 500 pkgs.; Buenos Ayres, 866 pkgs.; Coquimbo, 30 pkgs.

SODIUM BICARBONATE—

Aalborg, 20 kgs.; Aarhus, 100 kgs.; Abo, 200 kgs.; Amsterdam, 1,635 pkgs.; Antofagasta, 50 pkgs.; Antwerp, 100 pkgs.; Calcutta, 3 pkgs.; Fremantle, 216 pkgs.; Gothenburg, 270 pkgs.; Rotterdam, 255 pkgs.; Santos, 1 pkg.; Singapore, 150 pkgs.

SODIUM BICHRIMATE—

Syra, 4 pkgs.

SODIUM SILICATE—

Alicante, 10 brls.; Christiania, 10 pkgs.; Kobe, 162 pkgs.; Singapore, 6 pkgs.

SULPHUR—

Bahia, 4 c., £10.; Christiania, 6 c., £12.; La Guaiya, 2 t., £30.; Maceio, 1 c., £3.

SULPHURIC ACID—

Malta, 3 c., £5.; Oruro, 3 c., £18.; Tientsin, 2 c., £16.

TARTAR EMETIC—

Sao Felix, 22 lbs., £4.

TARTARIC ACID—

Bahia, 2 c., £43.; Christiania, 1 t., £368.; Ontario, 5 c., £35.

ZINC CHLORIDE—

Bombay, 5 t., £245.; Singapore, 5 t. 8 c., £388.

ZINC SULPHATE—

Paris, 5 t., £115.

LONDON.

Week ending November 12.

ACETANILID—

Amsterdam (F.), 2 cs., £31.; Antwerp, 2 brls., 1 cs., £48.; Rotterdam, 26 pkgs., £507.

ACETIC ACID—

Auckland, 10 cs., £26.; Barbados, 1 ck., £17.; Channel Islands, 1 cs., £17.; Durban, 20 cs., £54.; Genoa, 27 cs., £345.; Rotterdam (F.), 2 cs., £30.; Rosario, 5 cs., £13.

ACETO SALICYLIC ACID—

Bombay, 2 cs. (pt.), £7.; Mossel Bay, 1 cs. (pt.), £6.; Pt. Elizabeth, 1 cs., £24.; Sydney, 1 cs. (pt.), £23.; Tazanray, 5 cs., £127.

ACETONE—

Buenos Ayres, 2 cs., £6.; Brussels, 2 drms., £10.; Paris, 34 drms., £986.

ALUM—

Antwerp, 2 c., £11.; Canaries, 5 c., £6.; Cartagena, 1 t. 8 c., £44.; Corinto, 8 c., £11.; Payta, 3 c., £5.; Penang, 8 c., £14.; Shanghai, 1 ck., £5.

AMMONIA—

Beira, 12 cs., £22.; Bombay, 6 cs., £12.; Bordeaux, 14 drms., £190.; Buenos Ayres, 2 drms., £6.; Cape Town, 47 cs., £91.; Durban, 67 cs., £129.; East London, 8 cs., £15.; Hong Kong, 4 cs., £7.; Iddo, 5 cs., £8.; Paris, 28 drms., £250.; Rio de Janeiro, 16 cs., £30.; Shanghai, 5 cs., £10.; Trinidad, 8 cs., £12.

AMMONIA (ANHYDROUS)—

Constantinople, 6 cys., £128.; Malta, 7 cys., £46.; Penang, 10 cys., £74.; Rangoon, 35 cs., £488.

AMMONIUM ACETATE—

Calcutta, 1 cs., £11.; East London, 1 cs., £5.

AMMONIUM BROMIDE—

Cape Town, 1 cs., £17.; Launceston (F.), cs. £5.; Rosario, 1 cs., £9.

AMMONIUM CARBONATE—

Bangkok, 9 c., £56.; Beira, 1 c., £6.; Bombay, 1 c., £8.; Gibraltar, 3 c., £11.; Hiogo, 10 t., £598.; Hong Kong, 1 t., £89.; Kobe, 10 t., £608.; Pernambuco, 4 c., £22.; Rio de Janeiro, 2 t. 17 c., £293.; Santos, 12 c., £62.; Yokohama, 25 t., £1,494.

AMMONIUM IODIDE—

Melbourne, 1 cs. (pt.), £29.

AMMONIUM MURIATE—

Bombay, 7 t. 10 c., £543.; Kilindini, 10 c., £45.; Lisbon, 2 c., £10.; Madras, 5 c., £19.; Rabat, 2 c., £10.; Rosario, 1 t., £71.; Shanghai, 6 c., £26.

AMMONIUM NITRATE—

Melbourne, 40 t., £120.

AMMONIUM PHOSPHATE—

Durban (F.), 21 cks., £347.

AMMONIUM SULPHATE—

Dunkirk, 410 t., £10,550.; Mauritius, 200 t., £4,900.

AMYL ACETATE—

Brussels, 1 drmm., £15.; Paris, 10 drms., £453.

AMYL NITRATE—

Buenos Ayres, 2 c., £86.

ANTIMONY—

Rotterdam, 8 cks., £128.

ANTIMONY CHLORIDE—

Montreal, 2 cs., £9.; Tientsin, 1 cs., £7.

ANTIMONY REGULUS—

Antwerp, 3 t.; Rotterdam, £648.

ANTIMONY SULPHATE—

Paranagua, 20 cks., £40.; Rio de Janeiro, 32 cks., £62.; Santos, 16 cks., £30.

ANTIMONY SULPHIDE—

Bordeaux, 3 cks., £159.; Kobe, 33 cks., £501.; Ostend, 30 cks., £672.

ARSENIC—

Batavia, 4 c., £14.; Porto Alegre, 1 t., £79.; Rio de Janeiro, 19 c., £138.; Santos, 1 t. 10 c., £107.

BARBITONE—

Melbourne (F.), 1 cs. (pt.), £15.; Shanghai (F.), 1 cs. (pt.), £10.

BARIUM NITRATE—

Bombay, 20 cs., £59.

BARIUM SULPHIDE—

Alexandria, 2 drms., £18.; Sydney, 1 cs. (pt.), £6.

BEESWAX—

Ostend, 1 c.

BENZALDEHYDE—

Demerara, 1 cs., £7.

BENZOIC ACID—

Buenos Ayres, 1 cs., £13.

BENZOIC ACID AND SODIUM BENZOATE—

Yokohama, 10 cs., £246.

BISMUTH AND AMMONIUM CITRATE—

Pt. Elizabeth, 1 cs., £6. a

BISMUTH CARBONATE—

East London, 2 cs. (pt.), £33.; Melbourne, 1 cs. (pt.), £43.; Sydney, 2 cs. (pt.), £49.; Valparaiso, 1 cs. (pt.), £11.

BISMUTH CITRATE—

East London, 1 cs. (pt.), £5.; Sydney, 1 cs., £26.

BISMUTH SALTS—

Melbourne, 1 cs. (pt.), £11.

BISMUTH SUBCHLORIDE—

Sydney, 1 cs. (pt.), £6.

BISMUTH SUBGALLATE—

Rotterdam, 1 cs. (pt.), £25.

BISMUTH SUBNITRATE—

Bombay, 1 cs. (pt.), £6.; Santander, 3 cs., £470.; Sydney, 1 cs. (pt.), £10.

BITUMEN—

Buenos Ayres, 70 cks., £340.

BORAX—

Switzerland (via Antwerp), 10 t., £480.; Switzerland (via Antwerp), £480.; 9 t. 17 c., £394.; Antwerp, 7 t., £355.; Antwerp, 42 t. 10 c., £1,630.; Barranquilla, 10 c., £20.; Basle, 8 t., £480.; Durban (F.), 1 t. 19 c., £79.; Genoa, 19 t. 14 c., £768.; Hamburg, 15 t. 2 c., £655.; Rio de Janeiro, 2 t. 14 c., £120.; Rotterdam (F.), 4 t. 18 c., £197.; Rotterdam, 10 t., £600.; Sao Paulo, 10 t., £390.; Sao Paulo (F.), 4 t. 18 c., £192.; Stockholm, 20 t., £780.

BORIC ACID—

Barcelona (F.), 1 t., £74.; Bushire, 2 c., £10.; Calcutta, 4 c., £17.; Constantinople, 2 c., £11.; Cape Town, 3 c., £15.; Czech-Slov. (via Hamburg), 1 t., £82.; Durban, 2 c., £8.; Durban (F.), 5 c., £16.; East London, 2 c., £8.; Gibraltar, 2 c., £9.; Madras, 1 c., £6.; Mauritius, 2 c., £11.; Piraeus, 2 c., £8.; Rotterdam, 10 t., £740.; Rotterdam, 4 c., £21.; Shanghai, 10 c., £50.; Singapore, 1 c., £6.

CALCIUM CARBIDE—

Bangkok, 10 c., £14.; Pt. Elizabeth, 9 t. 17 c., £250.; Secondee, 20 drms., £50.

CALCIUM CHLORIDE—

Calcutta, 2 cs., £10.; Cape Town, 2 cs., £9.

CALCIUM PHOSPHATE—

Rosario, 1 cs., £6.

CARBON TETRACHLORIDE—

Antwerp, 1 drmm., £35.

CAUSTIC POTASH—

Bangkok, 2 cs. (pt.), £8.; Melbourne, 1 cs., £13.

CAUSTIC SODA—

Antwerp, 24 t. 19 c., £449.; Beira, 2 c., £9.; Delagoa Bay, 6 c., £15.; Lobita Bay, 1 t. 3 c., £54.

CERESINE WAX—

Antwerp, 1 t. 10 c.

CHEMICALS (otherwise under rubric)

Adelaide, 2 cs., £28.; Italy (*via* Antwerp), 1 cs., £18.; Barbados, 2 cks., £20.; Bilbao, 1 cs., £12.; Cape Town, 2 cs., £69.; Czechoslovakia (*via* Hamburg), 1 cs., £6.; Hong Kong, 5 pkgs., £78.; Kilindini, 1 cs., £23.; Madras, 10 cs., £35.; Melbourne, 1 pkgs., £59.; Montreal, 2 cs., £128.; New York, 1 cs., £31.; Wellington, 1 cs., £10.

CHRYSAROLIN—

Portland, Me., 2 cs., £125.

CITRIC ACID—

Bombay (F.), 1 c., £18.; Beira (F.), 1 cs., £7.; Calcutta, 2 cs., £50.; Cape Town, 1 t., £464.; Dundee, 1 c., £23.; Durban, 1 c., £32.; East London, 1 cs., £6.; Halifax, 1 c., £10.; Mauritius, 2 cs., £13.; Paris, 1 t. 10 c., £635.; Rangoon, 1 cs., £6.; Santiago, Chile, 1 c., £13.; Sydney, 2 t., £858.; Valencia, 10 c., £203.; Wellington, 1 cs., £11.

COAL PRODUCTS—

Alizarine
New York, 10 cks., £376.
Aniline Dye
Boulogne, 3 kgs., £165.; Calcutta, 4 pkgs., £120.; Cape Town, 18 pkgs., £317.; Casablanca, 1 cs., £34.; Durban, 3 cs., £70.; Mauritius, 1 cs. (pt.), £8.; Melbourne, 95 pkgs., £3,010.; Mossel Bay, 6 pkgs., £203.; New York, 1 cs., £64.; Paris, 49 pkgs., £3,076.; Pt. Elizabeth (F.), 2 cs., £82.; Rabat, 1 cs., £31.; Sydney, 14 pkgs., £378.

Benzonaphthol
Iquique, 1 cs. (pt.), £12.

Betanaphthol
Antwerp, 1 cs., £18.

Carbolic Acid
Bombay, 4 cs., £19.; Brisbane, 8 pkgs., £39.; Durban, 25 drms., £21.; Piraeus, 1 cs., £5.; Rio de Janeiro, 6 drms., £6.; Rotterdam, 26 pkgs., £212.

Cresosote
Boulogne, 265 cks., £536.; New Orleans, 756,000 galls., £25,205.

Cresosote Oil
San Francisco, 70 cks., £111.

Naphthalene
Calcutta, 35 cks., £100.; Montreal, 559 cks., £2,133.; Pt. Elizabeth, 3 cks., £9.

Nitronaphthalene
Bordeaux, 2 cks., £75.

Pitch
Antwerp, 1,418 t., £5,473.; Boulogne, 250 t., £1,100.; Calais, 660 t., £2,522.; Dunkirk, 560 t., £2,055.; Galatz, 50 brls., £44.

Pyridine
Durban, 40 drms., £90.

Tar
Buenos Ayres, 25 rnts., £46.; Delagoa Bay, 30 drms., £11.; Durban, 400 pkgs., £373.; East London, 740 drms., £78.; Kilindini, 244 drms., £148.; Pt. Elizabeth, 400 drms., £52.

Tar Oil
Dunkirk, 114 cks., £233.

Tri-Cresyl
Boston, 10 cs., £420.

COBALT LIOLEATE—
Antwerp, 1 brl., £40.

COBALT RESINATE
Rouen, 1 ck., £18.

COPPER SULPHATE
Bordeaux, 17 t. 4 c., £500.; Delagoa Bay, 5 c., £14.; Durban, 10 c., £20.; East London, 9 c., £24.; Ostend, 6 c., £14.

COPPERAS
Bombay, 7 cks., £26.; Durban, 25 cs., £13.

CREAM OF TARTAR

Antonina (F.), 2 c., £28.; Antwerp, 5 c., £60.; Canterbury (F.), 5 c., £63.; Beira (F.), 1 cs., £7.; Bombay, 1 c., £12.; Bombay (F.), 2 c., £26.; Bombay 1 cs., £8.; C. Town (F.), 1 c., £122.; C. Town, 1 t., £235.; Durban 5 c., £69.; Fremantle (F.), 10 c., £128.

CREAM OF TARTAR—

Hango, 10 c., £133.; Jamaica (F.), 1 c., £14.; Karachi (F.), 1 cs., £6.; Marseilles (F.), 1 cs., £10.; Paranagua (F.), 1 c., £14.; Wanzanui (F.), 1 c., £13.; Adelaide (transit) (F.), 14 c., £126.; Brisbane (transit) (F.), 3 t. 6 c., £900.; Melbourne (transit) (F.), 39 t. 10 c., £11,160.

DISINFECTANTS (otherwise under)

Alexandria, 3 t. 17 c., £241.; Amoy, 3 t. 13 c., £720.; Auckland, 2 t. 6 c., £115.; Barcelona, 1 t. 6 c., £270.; Beira, 1 c., £8.; Bombay, 1 c., £8.; Calcutta, 4 t., £191.; Cape Town, 14 t. 7 c., £551.; Canterbury, 2 c., £21.; Dundee, 1 t. 9 c., £189.; Durban, 12 t. 6 c., £457.; East London, 1 t. 2 c., £51.; Grey-mouth, 3 c., £25.; Haifa, 3 c., £6.; Havana, 1 t. 11 c., £92.; Hong Kong, 5 t. 11 c., £832.; Invercargill, 7 c., £42.; Iddo, 7 c., £56.; Kilindini, 3 t. 9 c., £197.; Lyttleton, 8 t. 16 c., £413.; Mombasa, 9 c., £18.; Montreal, 6 t. 7 c., £257.; Napier, 1 c., £8.; New York, 19 t. 8 c., £672.; New Plymouth, 12 c., £70.; Penang, 2 t. 4 c., £68.; Paris, 4 t. 12 c., £125.; Pt. Elizabeth, 1 t. 10 c., £88.; Paysandu, 15 c., £52.; Shanghai, 5 t. 9 c., £179.; Singapore, 4 t. 18 c., £170.; Sydney, 3 t. 8 c., £151.; Wellington, 1 t. 9 c., £207.; Westport, 2 c., £12.; Zanzibar, 2 t. 5 c., £15.

ETHER

Alexandria, 5 cs., £21.; Batavia, 7 cs., £5.; Shanghai, 5 cs., £34.; Tientsin, 4 cs., £9.

ETHER (ACETIC)—

Jaffa, 1 cs. (pt.), £8.

ETHER (SULPHURIC)—

Madras, 16 cs. (pt.), £50.

ETHYL CHLORIDE

Rangoon, 1 cs. (pt.), £15.

FLUORIC ACID—

Pt. Elizabeth, 3 cs., £89.; Singapore, 1 cs., £21.

FORMALDEHYDE—

Alexandria (F.), 2 cs., £7.; Amsterdam (F.), 6 brls., £165.; Buenos Ayres, 5 cks., £147.; Buenos Ayres (F.), 4 cs., £14.; Shanghai (F.), 1 cs., £10.

FULLER'S EARTH—

Colombo, 3 t.

GALLIC ACID—

Antwerp, 1 cs., £38.

GELATINE—

Constantinople, £17.

GLUE—

Stockholm, 5 t.

GLUE (MARINE)—

Hong Kong, 5 t.

GLUE, SIZE, AND GELATINE—

Alexandria, 1 c.; Amsterdam, 3 t. 3 c.; Antwerp, 13 t. 10 c.; Bergen, 1 c.; Bilbao, 1 t.; Bombay, 1 c.; Brisbane, 1 c.; Calcutta, 1 t. 1 c.; Canary Islands, 2 c.; Cape Town, 5 c.; Cologne, 16 t. 15 c.; Colombo, 3 c.; Durban, 4 t. 1 c.; Demerara, 7 c.; Gibraltar, 3 c.; Hong Kong, 1 c.; Lourenco Marques, 1 c.; Melbourne, 3 t. 4 c.; Montreal, 3 t.; Ostend, 1 c.; Pt. Elizabeth, 3 c.; Rio de Janeiro, 3 c.; Rotterdam, 5 t.; Shanghai, 1 c.; Wellington, 10 c.

GLYCERINE (DISTILLED)—

Alexandria, 2 c., £17.; Beyrout, 1 cs., £5.; Constantinople, 1 t., £130.; Paris, 7 t., £938.; Rio de Janeiro, 4 c., £31.; Santos, 2 c., £15.; Singapore, 2 c., £18.

GLYCEROPHOSPHORIC ACID—

Cape Town, 1 cs., £16.

HYDROCHLORIC ACID—

Antwerp, 5 c., £26.; Trinidad, 1 t., £44.

HYDROCYANIC ACID—

Pt. Elizabeth, 1 cs., £8.

HYDROGEN PEROXIDE

Alexandria, 4 c., £19.

HYDROGEN PEROXIDE—

Durban, 1 cs., £5.; Haifa, 2 cs., £5.; Malta, 3 cs., £9.; Melbourne, 5 cs., £34.; Paris, 38 cys., £63.; Pt. Elizabeth, 3 cs., £15.; Suez, 3 cs., £18.

HYPOPHOSPHORIC ACID—

Sydney, 1 cs. (pt.), £7.

INFUSORIAL EARTH—

Paranagua, 1 t. 12 c., £42.; Rio de Janeiro, 2 t. 1 c., £54.; Santos, 1 t. 4 c., £32.

IODINE (RESUBLIMED)—

Bangkok, 4 cs. (pt.), £11.; Brussels, 1 cs., £101.; Buenos Ayres, 1 cs. (pt.), £51.; Mauritius, 1 cs. (pt.), £7.; Sydney, 1 cs. (pt.), £13.

IRON AND AMMONIUM CITRATE

Buenos Ayres, 1 cs., £11.; Pt. Elizabeth, 1 cs., £13.; Rosario, 2 cs., £43.; Sydney, 1 cs. (pt.), £5.

IRON & METHYL SALICYLATE—

Valparaiso, 1 cs. (pt.), £6.

IRON CITRATE—

Ghent, 3 cs., £125.

IRON IODIDE—

Buenos Ayres, 1 cs., £19.

IRON PYROPHOSPHATE—

Montreal, 1 cs., £11.

IRON PYROPHOSPHATE AND AMMONIUM CITRATE—

Gothenburg, 1 cs., £45.

LACTIC ACID—

Callao, 1 cs. (pt.), £25.; Melbourne, 5 cks., £93.; Paris, 1 ck., £17.

LEAD ACETATE—

Constantinople, 1 ck., £9.; Mauritius, 1 ck. (pt.), £10.; Pt. Elizabeth, 1 ck., £11.; Rouen, 20 cks., £415.; Taganrog, 5 cks., £181.

LEAD NITRATE—

Fremantle, 44 brls., £588.; Paris, 12 cks., £175.

LITHIUM CARBONATE—

Antwerp, 1 cs. (pt.), £12.

MAGNESIA (CALCINED)—

Bordeaux, 1 cs., £17.; Cartagena, 7 cs., £35.; Lisbon, 1 cs., £15.; Panama, 2 cs., £20.

MAGNESIUM CARBONATE—

Alexandria, 3 cs., £9.; Buenos Ayres, 3 cs., £18.; Genoa, 50 cs., £119.; Panama, 2 cs., £21.; Paranagua, 4 cs., £9.; Pt. Elizabeth, 1 cs., £6.; Rouen, 30 cks., £107.

MAGNESIUM CITRATE—

Buenos Ayres, 3 cs., £24.; Cape Town, 2 cs., £11.; Piraeus, 1 cs., £7.; Rangoon, 7 cs., £54.

MAGNESIUM SULPHATE—

Bombay, 4 c., £14.; Cape Town, 8 c., £17.; Durban, 10 c., £22.; Grenada, 14 c., £12.; Jamaica, 1 t. 3 c., £55.; Paranagua, 5 c., £7.; Porto Alegre, 9 c., £23.; Port Said, 1 t., £51.; Tientsin, 3 c., £6.; Wellington, 10 c., £20.

MERCURIAL SALTS—

Perth, 1 cs. (pt.), £5.; Melbourne, 1 cs. (pt.), £25.

MERCURY IODIDE—

Taganrog, 2 cs., £340.

MERCURY OXYCYANIDE—

Antwerp, 1 cs. (pt.), £88.

MERCURY PERCHLORIDE—

Durban, 4 cs., £11.

MERCURY SUBCHLORIDE—

Durban, 4 cs. (pt.), £11.

METHYL ALCOHOL—

Rangoon, 1 cs., £17.

METHYL SALICYLATE—

Antwerp, 4 cs., £110.; Durban, (F.), 1 cs., £6.; Taganrog (F.), 1 cs. (pt.), £8.

NICKEL AND AMMONIUM SULPHATE

Soerabaya, 2 kgs., £19.

OXALIC ACID—

Melbourne, 1 ck., £53.; Montreal, 24 cks., £1,058.; Shanghai, 2 pkgs., £19.

PARALDEHYDE—

Adelaide (F.), 1 cs. (pt.), £6.

PHOSPHORIC ACID—

M'bourne, 2 cys., £10.; Montreal, 28 cys., £150.; Paris, 45 cys., £430.; Rangoon, 2 cs., £7.

PHOSPHORIC & CITRIC ACID—

Cape Town, 4 cs., £35.

PLUMBAGO

Adelaide, 12 c.; Delagoa Bay, 2 t.

POTASH—

Perth (F.), 2 c., £27.

POTASH (ALUM)—

Brussels, 2 cks., £4.

POTASSIUM BICARBONATE—

Alexandria, 1 cs., £9.; Brussels, 1 ck., £8.; Cape Town, 1 cs., £7.; Durban, 1 cs. (pt.), £5.

POTASSIUM BICHROMATE—

Hamburg (F.), 2 t. 1 c., £327.; Valencia, 3 cks., £200.

POTASSIUM BROMIDE—

Buenos Ayres (F.), 1 cs. (pt.), £22.

POTASSIUM CARBONATE—

Cape Town, 1 kg., £11.; Sydney, 1 kg., £13.

POTASSIUM CARBONATE AND OXIHYDRATE—

Madras, 10 cs. (pt.), £7.

POTASSIUM CHLORATE—

Colombo, 1 c., £15.

POTASSIUM CHLORIDE—

Bangkok, 1 c., £9.; East London, 1 c., £14.; Monte Video, 2 c., £30.; Pt. Elizabeth, 1 c., £6.

POTASSIUM CITRATE—

Barbados, 2 cs. (pt.), £7.; Melbourne, 4 cs., £115.; Pt. Elizabeth, 1 cs., £15.; Rangoon, 1 cs., £12.

POTASSIUM CYANIDE—

Bangkok, 2 c., £55.; Hong Kong, 3 cs., £82.; Monte Video, 3 c., £48.

POTASSIUM HYDROXIDE—

Melbourne, 1 cs. (pt.), £7.

POTASSIUM IODIDE—

Adelaide, 1 cs. (pt.), £11.; Antwerp, 1 cs., £39.; Bombay, 1 cs. (pt.), £8.; Buenos Ayres, 1 cs., £18.; Bangkok, 5 cs., £337.; Barbados, 2 cs. (pt.), £44.; Mauritius, 1 cs. (pt.), £5.; Melbourne, 1 cs., £90.; Pt. Elizabeth, 1 cs., £19.; Singapore, 1 cs., £87.; Sydney, 2 cs., £90.; Taganrog, 3 cs., £255.; Trinidad, 1 cs. (pt.), £8.

POTASSIUM METABISULPHITE—

Bombay, 10 cks., £145.; Cape Town, 3 kgs., 6 c., £121.; Montreal, 30 pkgs., £435.; Paris, 4 cks., £224.; Toronto, 43 pkgs., £370.

POTASSIUM PERMANGANATE—

Antwerp, 2 c., £56.; Beyrout, 5 c. (pt.), £7.; Calcutta, 1 kg., £12.; East London, 1 cs. (pt.), £6.; Iquique, 1 cs. (pt.), £5.; Karachi, 1 cs. (pt.), £6.; Mauritius, 1 cs. (pt.), £7.; Melbourne (F.), 1 cs., £20.; Taganrog, 10 cs., £192.

POTASSIUM PRUSSATE—

Rabat, 1 ck., £6.

POTASSIUM SULPHATE—

Durban, 4 cs. (pt.), £7.; Iquique, 1 cs. (pt.), £17.

POTASSIUM SULPHOGALICOLATE—

Antwerp, 2 cs., £560.; B. Ayres (F.), 1 cs. (pt.), £30.

PYRO ACID—

Antwerp, 1 cs., £38.; Bombay 1 cs. (pt.), £6.; Shanghai, 1 cs. (pt.), £5.

QUININE—

Cape Town, 63 ozs.; New York, 4,000 ozs.; Singapore, 36 ozs.

RESORCIN—

Montreal, 1 cs., £85.

SALAMMONIAC—

Sydney, 3 c., £11.

SALICYLIC ACID—

Durban, 1 kg., £13.

SALT

Boulogne, 10 t.; Brisbane, 10 t.; Lagos, 39 t.; Rangoon, 9 c.

SALT—

Rio de Janeiro, 29 t.; Rotterdam, 2 c.; Townsville, 2 t.

SALTPETRE—

Bahia, 10 c., £29.; Barcelona, 1 t. 11 c., £78.; Buenos Ayres, 1 t. 11 c., £78.; Christiania, 2 t., £109.; Durban, 5 c., £15.; Lisbon, 3 t. 13 c., £199.; Oporto, 2 t. 19 c., £160.; Pernambuco, 156 t. 14 c., £7,902.; Porto Alegre, 10 c., £29.; Rio de Janeiro, 11 t. 15 c., £717.; Santos, 6 t. 3 c., £369.

SHEEP DIP—

Buenos Ayres, 30 t. 8 c., £1,699.; Durban, 9 t., £348.; Wellington, 5 t. 8 c., £266.

SILVER NITRATE—

Alleppey, 1 cs. (pt.), £6.; Auckland, 3 cs. (pt.), £145.; Cape Town, 1 cs. (pt.), £14.; Durban, 1 cs. (pt.), £11.

SOAP—

Aalesund, 7 t. 4 c.; Adelaide, 3 c.; Amsterdam, 4 c.; Aden, 2 c.; Antwerp, 81 t. 18 c.; Amsterdam, 3 t. 13 c.; Auckland, 3 c.; Antwerp, 248 t. 8 c.; Barbados, 6 c.; Bilbao, 3 c.; Beira, 1 t. 16 c.; Bombay, 14 t. 15 c.; Boulogne, 32 t. 6 c.; Brisbane, 1 c.; Buenos Ayres, 3 c.; Bordeaux, 6 c.; Calcutta, 11 c.; Canary Islands, 1 c.; Canton, 1 c.; Cape Town, 1 t.; Channel Islands, 6 c.; Christiania, 11 c.; Christchurch, 6 c.; Cologne, 57 t. 4 c.; Colombo, 2 c.; Copenhagen, 2 t. 16 c.; Cyprus, 5 c.; Durban, 9 c.; Dunedin, 2 c.; Hankow, 2 c.; Hobart, 2 c.; Ipoh, 1 c.; Iquique, 1 c.; Jaffa, 5 c.; Karachi, 16 c.; Kilindini, 5 c.; Limon, 1 c.; Madras, 10 c.; Melbourne, 10 c.; Mombasa, 2 c.; New York, 7 c.; Penang, 7 c.; Pernambuco, 2 c.; Pt. Said, 3 t.; Pt. Swettenham, 7 t.; Rangoon, 6 t.; Rosario, 2 t.; Rotterdam, 9 t. 10 c.; St. Malo, 4 c.; Santiago, 4 c.; Shanghai, 5 c.; Singapore, 1 t. 10 c.; Stavanger, 6 c.; Stockholm, 8 c.; Sydney, 2 t. 1 c.; Toronto, 1 t. 3 c.; Trinidad, 1 t. 7 c.; Trondheim, 3 t. 9 c.; Wellington, 1 t. 4 c.; Zanzibar, 1 c.

SODA ASH—

Antwerp, 19 t., £153.; Genoa, 38 t. 8 c., £378.

SODA CRYSTALS—

Aden, 10 c., £5.; Batavia, 8 c., £12.; Colon, 10 c., £7.; Piraeus, 3 c., £10.

SODIUM ARSENITE—

Delagoa Bay, 1 t. 2 c., £78.

SODIUM BENZOATE—

Buenos Ayres, 5 cs., £76.; Lisbon, 1 cs. (pt.), £5.; Mauritius, 1 cs. (pt.), £10.

SODIUM BICARBONATE—

Brussels, 4 c., £7.; Calamata, 8 c., £12.; Calcutta, 1 c., £6.; Switzerland (via Ostend), 5 t., £80.; Paranagua, 5 c., £6.

SODIUM BISULPHITE—

Lisbon, 10 drms., £78.

SODIUM CITRATE—

Cape Town, 1 cs., £12.; Melbourne, 1 cs., £25.; Rosario, 1 cs., £22.; Sydney, 1 cs. (pt.), £6.

SODIUM CYANIDE—

Delagoa Bay, 32 t., £3,255.; Fremantle, 6 t., £558.; Paris, 3 c., £23.

SODIUM GLYCEROPHOSPHATE—

Constantinople, 1 cs., £40.

SODIUM NITRATE—

Bombay, 35 cs., £147.; Montreal, 1 t., £110.

SODIUM PHOSPHATE—

Brussels, 2 t., £17.; Rio de Janeiro, 18 t. 2 c., £477.

SODIUM PRUSSATE—

Genoa, 2 t. 19 c., £329.

SODIUM SALICYLATE—

Bombay, 1 cs. (pt.), £13.; Cape Town, 6 cs. (pt.), £111.

SODIUM SULPHATE—

Batavia, 7 c., £11.

SODIUM SULPHATE (GLAUBER SALTS)—

Cartagena, 2 t. 10 c., £27.; Panama, a. qty.

SODIUM SULPHITE—

Stockholm, 10 c., £17.

SODIUM TARTRATE—

Calcutta, 3 cs., £19.; New York, 10 cks., £140.; Paris, 2 t. 12 c., £286.

STEARINE—

Wiborg, 42 t. 12 c.

SULPHUR—

Alexandria, 2 c., £9.; Paranagua (F.), 72 bgs., £108.; Rio de Janeiro (F.), 3 t., £90.; Santos (F.), 2 t. 8 c., £72.; Shanghai, 1 c., £6.

SULPHUR (FLOWERS)—

Paris, 10 c., £20.

SULPHUR (ROLL)—

Paris, 11 t., £275.

SULPHURIC ACID—

Antwerp, 4 c., £11.; Alexandria, 4 t. 3 c., £165.; Demerara, 6 t. 5 c., £108.; Madeira, 9 c., £37.; Madras, 2 c., £6.; Trinidad, 6 t., £96.

SUPERPHOSPHATES (otherwise undescribed)—

Cape Town, 310 t., £3,105.; Channel Islands, 50 t., £400.; Colombo, 65 t., £913.; Durban, 20 t., £210.; Mossel Bay, 20 t., £208.

TANNIC ACID—

Cape Town, 1 cs., £10.; Cape Town (F.), 1 cs. (pt.), £6.; Karachi, 4 pkgs. (pt.), £7.; Lisbon, 1 pkg. (pt.), £7.; Shanghai (F.), 1 pkg. (pt.), £8.

TAR (STOCKHOLM)—

Fiji, 1 t. 5 c.; Jamaica, 1 t. 1 c.

TARTARIC ACID—

Bombay (F.), 1 cs., £7.; Bombay, 2 c., £46.; Cape Town, 19 c., £332.; Durban, 5 c., £92.; Durban (F.), 4 c., £56.; East London, 4 c., £74.; Jamaica (F.), 1 c., £20.; Karachi (F.), 1 c., £23.; Madras, 4 c., £89.; Mauritius, 1 cs., £6.; Pt. Sudan, 2 c., £38.; Rangoon, 1 c., £10.; Shanghai, 1 c., £22.; Taganrog, 5 c., £87.; Wellington, 1 c., £14.; Antwerp (transit) (F.), 10 c., £200.

THEOBROMINE—

Alexandria, 1 cs. (pt.), £5.; Buenos Ayres, 1 cs., £10.

WAX—

Berbice, 1 c.; Copenhagen, 1 t. 5 c.; Durban, 8 c.

WHITE LEAD—

Antwerp, £70.; Calcutta, £869.; Christchurch, £33.; Durban, £2,365.; East London, £107.; Genoa, £6.; Lisbon, £10.; Napier, £155.; Rangoon, £97.

ZINC SULPHATE—

Melbourne, 5 cks., £9.

ZINC SULPHIDE—

Sao Paulo, 50 cks., £134.

MANCHESTER.

Week ending November 12.

ALUM—

Lisbon, 54 bgs.

ALUM (GROUND)—

Montreal, 282 cs.

ALUMINA SULPHATE—

Bordeaux, 300 bgs.

ALUMINA SULPHOCYANIDE—

Bombay, 1 ck.

AMMONIA—

Bordeaux, 27 drms.

AMMONIUM CARBONATE—

Gothenburg, 10 cks.

AMMONIUM MURIATE—

Montreal, 20 cks.

ANTIMONY SALTS—

Rotterdam, 2 cks.

BLEACHING POWDER—

Gothenburg, 377 cks.; Lisbon, 162 cks.; Montreal, 25 cks.; Oporto, 226 pkgs.

BORAX—

Rotterdam, 10 bgs.

CALCIUM CHLORIDE—

Lisbon, 133 drms.

CAUSTIC SODA—

Gothenburg, 15 drms.

CHINA CLAY—

Bombay, 120 cks.

CHLORIDE OF LIME—

Lisbon, 20 brls.

CHROMIUM OXIDE—

Rotterdam, 5 cks.

CITRIC ACID—

Montreal, 3 cks.

COAL PRODUCTS (otherwise undes.)

Antwerp, £1,100.; Bordeaux, £1,530.; New York, £2,319.; Rotterdam, £763.; Sydney, £822.; Wellington, £140.

COAL PRODUCTS—

Carbolic Acid

Bordeaux, 8 drms.

CREAM OF TARTAR—

Montreal, 12 cks.

DISINFECTANTS (otherwise undes.)

Alexandria, 13 pkgs.; Rotterdam, 20 pkgs.

DYESTUFFS (otherwise undescribed)

Bordeaux, 40 cks.

FERRO MANGANESE—

Bordeaux, 1 brls.

FISH OIL—

Rotterdam, 16 cks.

HYDROSLPHITE—

Rotterdam, 8 kgs.

IRON OXIDE—

New York, 28 cks.

MAGNESIUM BISULPHATE—

Montreal, 10 cks.

POTASSIUM BICHROMATE

Rotterdam, a qty.

POTASSIUM CHLORATE—

Lisbon, 202 kgs.

POTASSIUM METASULPHATE—

Oporto, 1 ck.

POTASSIUM PRUSSATE—

Lisbon, 1 kg.; Montreal, 5 cks.

SALICYLIC ACID—

Rotterdam, 4 kgs.

SALT—

Gothenburg, 4,657 bgs.; Montreal, 8,154 bgs.; Quebec, 3,200 bgs.; Sydney, 2,206 bgs.; Wellington, 7,400 bgs.

SALTPETRE—

Bordeaux, 2,500 bgs.

SHEEP DIP—

Wellington, 120 drms.

SOAP—

Alexandria, 20 cs.; Bordeaux, 10 cs.; Jaffa, 1 cs.; Malta, 8 cs.; Rotterdam, 1,485 cs.

SODA ASH—

Gothenburg, 190 bgs.; Montreal, 600 cks.; Rotterdam, 1,555 bgs.

SODIUM BICARBONATE—

Rotterdam, 450 bgs.

SODIUM NITRATE—

Oporto, 100 bgs.

SODIUM PRUSSATE—

New York, 87 cks.

SODIUM STANNATE—

Rotterdam, 1 kg.

SODIUM SULPHATE—

Oporto, 40 drms.

SODIUM SULPHIDE—

Bordeaux, 61 drms.; Philadelphia, 50 drms.; Rotterdam, 6 brls.

SULPHUR—

Gothenburg, 100 t.; Rotterdam, 5 bgs.

SUPERPHOSPHATE—

Oporto, 500 bgs.

TALLOW (UNREFINED)—

Oporto, 30 cks.

TANNIC ACID—

Lisbon, 1 ck.; Rotterdam, 1 brl.

TARTARIC ACID—

Bombay, 10 kgs.; Montreal, 50 brls.

TETRACHLORETHANE—

New York, 25 drms.

ULTRAMARINE BLUE—

Alexandria, 202 kgs.; Beyrout, 2 cks.

ZINC OXIDE—

Gothenburg, 7 bgs.

MIDDLESBROUGH.

Week ending November 15.

AMMONIA—

Antwerp, 45 t., £790.

COAL PRODUCTS—

Benzole

Antwerp, 52 t., £1,625.

Carbolic Acid

Antwerp, 6 t., £418.

Tar

Gevle, 35,296 galls., £806.

DISINFECTANTS (otherwise undes.)

Calcutta, 9 t. 11 c., £312.

Madras, 6 t. 17 c., £246.

PITCH—

Antwerp, 2,785 t., £7,942.; Rotterdam, 1,634 t., £5,309.

SALT—

Durban, 16 c., £32.; Lausanne, 5 t. 8 c., £37.; Malmö, 249 t., £622.; Ystad, 173 t. 10 c., £435.

SOAP—

Calcutta, 3 c., £10.

SODIUM SILICATE—

Calcutta, 25 t. 5 c., £300.

WOOD PRESERVATIVE—

Colombo, 1 t., £50.; Calcutta, 3 t. 15 c., £119.; Durban, 1 t., £31.

NEWCASTLE-ON-TYNE

Week ending November 15.

ANTIMONY—

Antwerp, 11 t.

BARIUM BINOXIDE—

Rouen, 20 t.

BEES WAX—

Bergen, 19 c.

BITUMASTIC SOLUTION—

Antwerp, 10 c.

BLEACHING POWDER—

Antwerp, 50 t.

CAUSTIC SODA—

Antwerp, 100 t.

COBALT SULPHATE—

Gothenburg, 1 c.

MAGNESIUM CARBONATE—

Antwerp, 2 t.; Rouen, 20 t.

RED LEAD—

Gothenburg, 9 t. 19 c.

SOAP—

PRICES CURRENT.

THURSDAY Nov 20, 1919.

PREPARED BY MESSRS. HIGGINBOTTOM AND CO., 21, SPRING GARDENS, MANCHESTER.

The values stated are F.O.R. at makers' works, or at usual ports of shipment in U.K., unless otherwise specified.
The prices in different localities may vary

Acids:—		£ s. d.		£ s. d.	
*Acetic 40% and 60%	... per cwt.	29/-	& 43/6	Lead, Carbonate (White lead), pure	... per ton 52 0 0
" " Glacial	... per ton	85	0 0	" Nitrate	... " 55 0 0
Arsenic, S.G. 2,000°	... per ton	75	0 0	Lime, Acetate (brown)	... " 12 10 0
Boric, Crystals	... "	72	0 0	" (grey), 80%	... " 19 0 0
*Fluoric	... per lb.	0	0 7	Magnesium Chloride	... " 15 10 0
*Muriatic (Tower Salts), 28° Tw.	... per carboy	0	7 0	" Carbonate (light)	... per cwt. 2 7 3
*Nitric, 80° Tw.	... per ton	32	0 0	" Calcined Magnesite	... per ton 21 10 0
Oxalic	... per lb.	0	1 2	" Sulphate (Epsom Salts) (comf)	... " 12 0 0
Phosphoric, 1,750°	... "	0	1 9	" (druggists)	... " 16 0 0
*Sulphuric (fuming, 70%)	... per ton	—	—	Manganese, Sulphate	... " 75 0 0
" (Pyrites, 168°)	... "	7	18 9	" Borate	... " 110 0 0
" (140°)	... "	4	10 0	*Methylated Spirit, 64° (Industrial)	... per gal. 0 5 7
" (free from arsenic, 144°)	... "	5	7 4	*Naphtha (Wood), Solvent	... " 0 10 0
Tannic (commercial)	... per lb.	0	2 6	" " Miscible, 60° p.	... " 0 10 6
Tartaric (crystals)	... "	0	3 0		
*Acetone	... per ton	85	0 0	Oils:—	
*Alum, loose lump (delivered)	... "	16	10 0	*Cottonseed	... per ton 95 0 0
Alumina Sulphate (pure)	... "	16	10 0	*Linseed, Raw	... " 95 0 0
Aluminoferrous (in slabs)	... "	8	10 0	Stearine, 115-120° M.P.	... " 105 0 0
Aluminium (Ingot Metal, 98/99%)	... per ton	150	0 0	Potassium, Bichromate	... per lb. 0 1 6
*Ammonia, Anhydrous	... per lb.	0	2 0	" Carbonate, 85%	... per ton 100 0 0
" 880	... per ton	33	0 0	" Chlorate	... per lb. 0 1 0
" 920	... "	20	0 0	" Hydrate (Caus. Pot.) 88/90%	... per ton 105 0 0
" Carbonate	... per lb.	0	0 6½	" 75/80%	... " 95 0 0
" Muriate (grey)	... per ton	47	0 9	" Potash Hydrate Liquid, 50° B.	... " 65 0 0
" (sal ammoniac) 1st & 2nd,	per cwt.	80/-	& 75/-	" Nitrate (refined)	... " 55 0 0
" Nitrate	... per ton	60	0 0	" Permanganate (commercial)	... per lb. 0 3 3
" Phosphate	... "	110	0 0	" Prussiate (yellow)	... " 0 1 9
" Sulphate (grey), London, net	... "	—	—	" (red)	... " 0 5 6
" " Hull	... "	—	—	" Sulphate, 90% (ex ship)	... per ton 25 0 0
" " Manchester.	... "	—	—	" Muriate, 80%	... " 25 0 0
*Aniline Oil (pure)	... per lb.	0	1 6	Silver (metal)	... per oz. 0 5 10½
Aniline Salt	... "	0	1 6	Sodium (metal)	... per lb. 0 1 3
Antimony	... per ton	45	0 0	" Acetate	... per ton 49 0 0
" (tartar emetic), 43/44%	... per lb.	0	3 1	" Arseniate, 45%	... " 0 2 0
" (golden sulphide)	... "	0	1 3	" Borate (Borax), Crystals	... " 39 0 0
Arsenic, white powdered	... per ton	65	0 0	" Bicarbonate (2 cwt. bags)	... " 8 5 0
Barium Chloride (in casks)	... "	23	0 0	" Bichromate	... per lb. 0 0 11
" Carbonate (native), 92/94%	... "	11	10 0	" Carb. (Caustic Soda-ash), 48%	Per ton 12 10 0
" Sulphate (native levigated)	... "	£7 to £14		" " (Alkali), 58% (bags)	... t.o.r. 6 10 0
Baryta Chlorate	... per lb.	0	1 1	" (Soda Crystals), (bags) car. pd.	... wks. 5 10 6
*Bisulphide of Carbon	... per ton	55	0 0	" Chlorate	... per lb. 0 0 6
*Bleaching Powder, 35%	... "	17	0 0	" Cyanide (100% basis) for export	... " 0 0 11
" " Liquor, 7%	... "	6	0 0	" Hydrate (76% C. Soda) (f.o.r.)	... per ton 24 0 0
Casein (commercial)	... "	85	0 0	" (74% C. Soda)	... " 23 5 0
Chromium Acetate (crystals)	... per lb.	0	1 0	" (70% C. Soda)	... " 22 0 0
Calcium Chloride	... per ton	8	0 0	" (60% C. Soda)	... " 21 0 0
China Clay (at Runcorn), in bulk	... "	70/- to 90/-		" (pure liquid, 90° Tw.)	... " 10 2 6
				" 77/78% Powdered (99%) Hydrate	... " 24 10 0
				" Hyposulphite (commercial)	... " 19 0 0
				" Manganate, 25%	... " 65 0 0
				" Nitrate, 96%, reifd., f.o.r., L'pool	... " 21 0 0
				" Nitrite, 100%	... " 61 0 0
				" Phosphate	... " 29 0 0
				" Prussiate	... per lb. 0 1 1
				" Silicate (glass) Alkaline	... per ton 12 5 0
				" (liquid, 100° Tw.)	... " 9 10 0
				" Sulphate (Saltcake), delivered	... " 3 10 0
				" (Glauber's Salt)	... " 4 0 0
				" Sulphide (conc.), 60/65% casks	... " 23 0 0
				" Sulphite	... " 12 10 0
				Sulphocyanide, Ammonium, 95%	... per lb. 0 2 0
				" Barium, 95%	... " 0 1 4
				" Potassium	... " 0 2 4
				" Alumina	... " 0 0 9
				Sulphur, (Flowers)	... Sicilian per ton 23 0 0
				" (Roll Brimstone)	... " 22 10 0
				" Brimstone (best thirds)	... " 13 10 0
				" (ex ship)	... " 110 0 0
				Galvanic	... " 110 0 0
				tin Crystals	... per lb. 0 2 0
				" English Ingots	... per ton 282 0 0
				" Titanium, Potass. Oxalate	... per lb. 0 1 6
				" Titanous Chloride	... per cwt. 4 10 0
				Zinc (Spelter)	... per ton 47 0 0
				" Powder, 88/92%	... " 75 0 0
				* " Chloride (solution, 102° Tw.)	... " 24 0 0
				" Sulphate, Crystal	... " 21 10 0

* Packages extra or returnable; otherwise, prices usually include packages.

THE CHEMICAL TRADE JOURNAL

AND CHEMICAL ENGINEER.

No. 1,697.

LONDON, SATURDAY, NOVEMBER 29, 1919.

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Readers are invited to forward items of intelligence, company reports and balance-sheets, or cuttings from local newspapers of interest to the trades concerned.

Articles, reports, and correspondence on all matters of interest to the chemical and allied industries, home and foreign, are solicited. Correspondents should condense their matter as much as possible, write on one side only of the paper, and in all cases give their names and addresses, not necessarily for publication. Sketches should be sent on separate sheets.

Communications for the Editor, if intended for insertion in the current week's issue, should reach the office not later than Wednesday morning.

CURRENT TOPICS.

TO PREVENT DUMPING.

THE Imports and Exports Regulation Bill, which had its first reading in the House of Commons last week, constitutes, we hope, a step towards finality in the framing of our national commercial policy. The absence of anything of that nature has had a most disturbing influence upon industry generally, and to an appreciable extent has retarded the recovery of industry from the position into which it was forced by the war. Although not directed exclusively to that end, the Bill is, primarily, a measure for the prevention of the dumping of foreign goods into this country, and the very keen discussion which will certainly take place in Parliament will centre upon that aspect of it. As will be seen from the Schedule appended to the Bill, the industries that it is desired to protect are almost wholly concerned with the manufacture of chemicals and allied products, and in its present form one would be justified in designating it a Chemical Industries Protection Bill. The probability is, however, that further articles affecting other industries will be added to the schedule as the measure emerges from its successive stages. Briefly stated, the object is to prevent the dumping of foreign goods similar to those produced in this country, at selling prices lower than those prevailing in the country of origin. This definition of dumping has been substituted for the one previously approved of officially by the leaders of the Government—viz., the sale of foreign goods in British markets at prices below the actual cost of production,—and in our view it carries with it the merit of providing a more effective safeguard for goods of British manufacture. That the Bill will meet with powerful opposition in the course of its passage through the House of Commons is certain. One of the great lessons of the war is already being forgotten by many people, even

among those who would disclaim sympathy with those politicians whose objection to the Bill, apparently, is founded on nothing more substantial than a rooted aversion to any alteration of "our traditional Free Trade policy." Legislation on the broad lines laid down in the Bill is, however, essential, and it is, indeed, time that the question of providing adequate protection for British "key" industries was approached with minds refreshed with the knowledge of the dangers that confronted the Empire during the years of the war, and with a complete disregard for political traditions.

THE PATENTS BILL.

THE fact that the Patents Bill is now before the House of Lords should quicken interest in this measure. The circumstances attending it we have already discussed in connection with the conference which was held on the subject at the British Scientific Products Exhibition in July. On that occasion leading engineers and patent lawyers agreed that before any Bill amending the admittedly imperfect patent law, as it exists at present, was passed through Parliament, there should be a conference between all parties concerned with the object of arriving at a draft Bill which could be sent to the Government representing the views of industry. Presumably, in drafting the present Bill the Government consulted somebody, but having regard to the fact that the House of Lords, or rather members of it, have received protests and suggestions from trade and technical associations, it seems a little difficult to imagine who, outside the Law Officers of the Crown, have advised the Government. Some members of Parliament, and among them no less a patent authority than Sir George Croydon Marks, are inclined to take the view that the Government Bill is a step forward and ought to be accepted as being better than nothing. Our view, and the view of many others, is that if we are to have an amending Bill—and it is undoubtedly wanted,—let us have a comprehensive one, and not deal with this important question piecemeal and in a manner which will carry us over only for a few years. The Government endeavoured to get this Bill rushed through the House of Commons at the end of the Session in August, but happily, although they succeeded in doing that, they were unsuccessful in securing the adherence of the House of Lords to the same policy. Hence the measure is now before that body. If, in general, the Bill as drafted is to become law, one of the greatest injustices in it—viz., its treatment of the inventor whose invention could not be worked during the war—must be redressed. We and others have all along contended that these specifications ought to be extended for the period during which they could not be worked, and patents which expired during the war period ought to be extended for a period equivalent to that during which they could not be worked on account of war conditions. To say that a general extension of all patents for two years meets the case with regard to these unfortunate inventors to whom we have referred, is to beg the question entirely. There are many

points of technical detail in the Bill which will need discussion and to which we will not refer now, but an ample case has been made out for a much more complete investigation of the position than has apparently yet been done. There still seems in official circles too much of that antiquated feeling that the inventor is a man who, by reason of his patent specification, is an enemy of the community at large, in that he is given a limited monopoly in order to be able to exploit the results of what his own brains and inventive genius have produced. Far better would it be if he were more often looked upon as the benefactor of mankind, for the inventor has in countless directions benefited humanity; indeed, the whole industrial progress of the world is due to the inventor, and yet, in this country at any rate, he finds himself regarded with suspicion at almost every turn.

POWER SUPPLY.

CHEMICAL engineers are indirectly, if not directly, interested in the present state of affairs with regard to the supply of electricity and gas throughout the United Kingdom. The Government have just got their Electricity Supply Bill through the Standing Committee, and we also know that fresh legislation is on the *tapis* dealing with the gas industry. The position with regard to electricity is that Electricity Commissioners are to be appointed who will have general supervisory powers over all developments of electricity supply, and under them will work District Boards which, in certain defined areas, will work the whole business of electricity supply with a view to arriving eventually at some state of uniformity. At present the greatest chaos exists in the sense that there are hundreds of power stations, many of them serving quite small areas; there are dozens of voltages both generating and distributing, and generally uniformity is conspicuous by its absence. With regard to the gas industry, the authorities at Westminster seem at last to have been brought to a realisation of the fact that illuminating power is no longer a factor in gas supply, and that even in lighting calorific power is the criterion. Consequently, we are promised legislation in the near future to place the gas industry on a fresh basis, and, incidentally, enable it to bring its charges into line with the position created by the war. The basis of this new legislation is to be that gas shall be charged according to its heating value instead of by the thousand cubic feet. Incidentally, with all this legislative activity, the criticism has been levelled that the Government ought to take in hand as one thing the reorganisation of the power and lighting problems of the country irrespective of what the motive power or lighting agent may be. In other words, this line of thought foreshadows a close alliance between the gas and electrical industries under something approaching Government control. Whatever may develop in that direction, it is clear that the services of chemists will be in greater and greater demand in both industries, and a specially fine field will be offered to the chemical engineer in the next few years.

HEAT ECONOMY IN CHEMICAL PLANTS.

BY HARALD NIELSEN.

THE recent abstract in the *Chemical Trade Journal* and *Chemical Engineer* of the paper by Mr. C. J. Goodwin on "Waste-Heat Boilers and Pulverised Fuel," really leaves one wondering why the paper was written. We all know that a deplorable waste of coal has taken place in chemical and other works in the past, but even if waste-heat boilers and pulverised fuel were widely adopted to-morrow, the thermal efficiency obtained would be regarded ten years hence as ridiculously low, at any rate as regards power purposes.

With reference to waste heat recovery from chimney gases by means of modern economisers, etc., I consider that at the present stage of development in boiler practice there is not much lost. The leading engineers of Great Britain specialising on boiler plant can, I think, be relied upon to see that nothing which can be profitably recovered is lost, and I should say that few people in this country or in the United States can teach them much. What is really wanted is an entirely new method—a great departure from existing things,—and I do not find any such hint or suggestion in the abstract of the above paper.

Then there is the question of exhaust boilers deriving heat from the exhaust gas from gas engines. This has also been carried as far as can be done at present. Generally, from the exhaust from large gas engines 2.5 to a maximum of 3lb. of steam can be generated per B.H.P. hour, and unless the gas engine is of at least 500 B.H.P. it does not pay to install a boiler. How many of these big power units are to be found in the chemical industry? Mr. Goodwin must be aware that if the exhaust gases are cooled down below a certain temperature, say 120° to 150° C., excessive corrosion due to the nitrogen compounds formed in the gas engine, takes place, and it would be almost as bad as if Mr. Goodwin placed a waste-heat boiler behind a saltcake furnace. The paper indicates no fresh thought in this particular case either.

Any modern firm erecting retort settings takes good care to utilise the waste heat in heat-interchangers, or for pre-heating both primary and secondary air to as high a degree as possible. When the gases leave the setting for the chimney there is not much left in them, and here again it is a matter of £. s. d., in the form of extra power, if induced or transformed draught can be applied instead of natural draught. There are, of course, old plants here and there, but their life will not be long now—they simply must disappear; the cost of coal prevents them from being used.

Mr. H. M. Ridge's remarks in the discussion were very much to the point, and I think that most engineers will agree with him that the proposition should be tackled from the beginning—that is, from the furnace door,—and then if the economy has been carried as far as it is possible here, it is time to look round and see if something more is to be got from the tail end—i.e., the waste flue gases.

As far as pulverised fuel is concerned, this country is not lagging so far behind the States, as is suggested by Dr. Ormandy and Mr. Harvey, and I wonder if the Americans did not get the powdered fuel idea from Europe? There are many powdered fuel installations in Great Britain; I know of a very large cement works on the Thames where large rotary kilns are fired solely by this fuel, and have been for many years past. Not so

long ago, within a few miles from London, I carried out some calcining tests in a small rotary kiln, fired with coal dust, with success. I should like to point out, however that to install powdered-coal firing plant is not quite so easy as it sounds. It will take the operators a considerable time before all goes "safely." It is in large works where great quantities are used daily that the powdered-fuel firing may be advantageous over gas firing. I very much doubt whether many owners of small works can afford to train up people and install plant for this fuel.

The handling of powdered coal is a highly technical matter. The raw coal must first be dried in effective dryers and rendered almost free from moisture before grinding can take place. In order to insure a good furnace efficiency the powdered fuel must not leave much more than from 3 to 5% residue on a 200-mesh sieve. Then comes the storing of the fine dust. This must be carried out in almost air-tight containers, and moisture must at all costs be kept away—therefore large quantities cannot be stored at a time with safety. The fuel ought to be used as soon as possible after grinding—that is to say, every works must possess their own drying and grinding plant.

The idea that one large central dépôt or grinding plant should be able to supply a number of works in the vicinity with powdered fuel does not at all appeal to me, and I think the same feeling will animate most people who have used powdered coal. The special covered trucks and quick delivery necessary, owing to the storage-in-bulk danger, must be an insurmountable difficulty, for some years to come at any rate.

There is a certain element of danger in using powdered coals, and there will always be. Mr. Goodwin may be able to suggest something fresh to overcome the various small but very real obstacles, but I do not see any indication of such in his paper. I remember that a few years ago the Americans were starting up a very large cement works, and when coal-dust firing was commenced in one of the huge rotary kilns a big explosion took place, partly demolishing the whole works. Even at works where experts in preparing and firing with coal dust are in charge, unforeseen accidents are difficult to eliminate entirely. I have seen heavy drying drums crumpled up like paper, and I have also seen spontaneous combustion take place, even in the small feeding hoppers for the feeding nozzles, so that the red-hot, already burning dust had to be fed into the furnace at as quick a rate as possible to prevent further damage.

I have tried to point out that the use of powdered fuel cannot be indiscriminately carried out with the same facility and safety as, for instance, with producer-gas firing proper, at any rate not at present, before radical alterations have been carried out so as to render the drying, grinding, and storage of coal dust safer and cheaper than at present. I believe it will be some time yet before coal-dust firing can be placed in the hands of an ordinary semi-skilled workman.

On the other hand, producer-gas firing is safe, and the advantages claimed for powdered coal are fully met by this with none of the drawbacks. Very inferior fuel, containing as much as 30 per cent. ash and a large percentage of smalls and dust, can be most successfully dealt with in a suitable modern producer, of which there are

many well-trying types. Naturally, there are the usual producer losses, amounting to 15 to 20 per cent., but in competition with coal-dust firing such losses are balanced by the cost of drying and grinding, etc. For large works the by-product recovery producer plant will easily beat the coal-dust plant as a financial proposition, and after all, this, in conjunction with safety, is what we are looking for.

Taking a broad view of the fuel economy question, it appears to the writer that the true way is first to carbonise the coal by a low-temperature operation—recovering the oils and a proportion of the ammonia,—and then to treat the solid coke residue in “producers,” by these means producing a very large quantity of cheap fuel gas, and at the same time recovering the bulk of the ammonia and other by-products.

EXAMINATION OF HYDROGENATED OILS.

EIGHT samples of hydrogenated vegetable oils (cotton-seed, earth-nut, linseed, and sesame oils) and six samples of hydrogenated fish-oil were examined by G. Reiss (*Arbeit. Reichsgesundheitsamte*); their chemical and physical characters were similar to those of ordinary edible fats, and their suitability for human consumption was confirmed by the results of feeding experiments. The quantities of nickel and arsenic present in the samples were usually negligible; the largest quantity of nickel found was 0.36mgm. per kilo of hydrogenated earth-nut oil, whilst the largest quantity of arsenic was 0.1mgm. (As_2O_3) per kilo.

The following extraction method was found to be more sensitive than the usual incineration method for the detection and estimation of nickel: 200grms. of the fat are melted in a flask, 100 c.c. of 12.5 per cent. hydrochloric acid and a small quantity of potassium chloride are added, and the mixture is heated in a boiling water-bath for one hour with frequent agitation. After cooling, the liquid is separated from the solidified fat, filtered, and an aliquot portion of the filtrate evaporated to dryness in a porcelain basin. The residue is dissolved in 20 c.c. of water, the solution rendered ammoniacal, boiled, filtered, and the filtrate treated in the usual way with dimethylglyoxime solution. The precipitate obtained—if nickel is present—is collected and weighed; it contains 20.31 per cent. of nickel.

To detect and estimate arsenic, 20grms. of the sample are melted in a porcelain basin, and 20 c.c. of a mixture of 10 parts of fuming nitric acid and 1 part of concentrated sulphuric acid are added drop by drop while the fat is stirred. After the contents of the basin have been heated for some time on a water-bath, they are mixed with 30grms. of a mixture of equal parts of sodium nitrate and potassium nitrate, and the mass is transferred, in small portions at a time, to a platinum basin containing 5grms. of the sodium-potassium nitrate in a molten condition. When the incineration is complete, the mass is cooled, dissolved in about 200 c.c. of water, the solution acidified with dilute sulphuric acid, boiled to remove carbon dioxide and nitrous acid, and filtered. The filtrate is treated with 10 c.c. of 11.12 per cent. crystallised aluminium sulphate solution, then rendered ammoniacal, heated for thirty minutes on a water-bath, and filtered. The precipitate is washed with dilute ammonia; the filtrate is acidified with sulphuric acid, and again treated with aluminium sulphate and ammonia. The two precipitates are united, dissolved in

35 c.c. of 10 per cent. sulphuric acid, and the solution heated on a water-bath until all nitric acid has been expelled (diphenylamine test). Ten grammes of concentrated sulphuric acid are then added, together with sufficient water to make the total weight about 50grms., and the solution is transferred to a Marsh apparatus, and the estimation carried out in the usual way.—*The Analyst*.

MARKET FOR CHEMICALS IN SOUTH AFRICA.

THE chemicals in demand in South Africa are those used in the mining industry. The ones that are being used mostly, and the amount imported, are as follow:—

In 1917 there was a small amount of nitric acid brought in, of which about 20 per cent. came from the United States. Sulphuric acid was formerly a large item of import, coming mainly from England, but now it is manufactured locally, and importations have decreased considerably. A little tannic acid is imported, but to no great amount, only 1,454lb. being brought in during 1917. All this came from the United States, whereas in 1914 Germany, Italy, and Switzerland were the sources of supply.

Ammonia for ice making is of growing importance here, in view of the fact that the meat-export trade is rapidly increasing in importance. However, this chemical is being made locally in connection with one of the explosive works. There are several large explosive factories here making all the blasting explosives required for the mining industry, and it is these plants that are turning to various by-products. In 1917 there was roughly £8,800. worth of ammonia brought into South Africa, of which England and Australia furnished 75 per cent., almost equally divided, and the United States furnished the remainder.

Borax is a fair item of import, and is all listed as coming from the United Kingdom, even prior to the war. Calcium carbide is one of the heaviest items of import. In 1917 a very large proportion came from Canada, with only 119,610lb. out of 4,283,643lb. coming from the United States. In 1914 9,824,146lb. were brought in, of which 3,846,495lb. came from Canada, 4,360,365lb. from Norway, 1,062,857lb. from Sweden, and 523,611lb. from the United States, with small amounts from other countries.

Carbonate of soda is another important item of import, but it is now being produced in British East Africa. In 1917 3,011,055lb. came from the United Kingdom, 112,000lb. from British East Africa, and 56,605lb. from the United States. Caustic soda is used to a considerable extent in soap-making, and in 1914 243,000lb. came from the United States, out of a total of 3,897,996lb., the remainder being practically all from England. In 1917 5,647,851lb. were imported, of which 2,693,945lb. came from the United States, the remainder from England.

Chloride of lime was imported in 1917 to the extent of 745,451lb. from England, 8,960lb. from Japan, and 3,280lb. from the United States. Sodium cyanide used on the mines centred at Johannesburg was imported to the extent of 7,868,811lb. in 1917. In 1914 the United Kingdom furnished 5,416,295lb., and Germany 4,637,885lb., out of a total importation of 10,084,868lb. —*U.S. Com. Rep.*

THE USE OF ZINC IN PAINT.*

BY W. HOMER HENDRICKS.

THE rapidly increasing demand for zinc oxide as a paint pigment and its value as an ingredient in protective coatings are subjects to which students of paint problems are at present devoting a great deal of attention. A brief consideration of the qualities and properties of zinc oxide, however, soon reveals why it has attained the popularity which it so justly deserves and why its star is still in the ascendancy in popular favour.

A well-made paint is no haphazard blending of pigments and vehicles selected and proportioned at the whim of the maker. Each constituent has its own part to play. To devise and put together a product which will retain its appearance and provide the maximum of protection over the longest possible period of time under such conditions of surface, application, exposure, and climate as may be imposed on it is a problem which taxes alike the maker of a paint and the one who applies it. In practically all cases those who make judicious use of zinc oxide come out winners in the race over those who do not.

We have in paint what are termed "base pigments"—that is, pigments which supply the "body" of all white and tinted coatings. The quality of a paint depends very largely upon the proper selection of these base pigments, whether considered from the point of view of its working qualities by the painter or its wearing qualities and protective effect on the surface over which it is applied. The "hiding power," or capacity to conceal the surface over which the paint is applied; the spreading rate, or the area over which it will extend in a continuous layer and present fair "covering" or hiding properties when applied with a brush; the protective power, or ability to preserve the surface over which it is applied from natural agencies of destruction; the class of surface produced, whether "flat," "oil finish," or "enamel"; these and many other valuable properties are to a considerable extent determined by the proper selection and use of the base pigment. With these principles in mind, let us consider zinc oxide in its relation to them.

Zinc oxide possesses important qualities peculiar to it alone. In whiteness, permanence, fineness, oil-absorbing properties, inertness towards other pigments, non-poisonous qualities, and durability it takes front rank. When exposed to air containing sulphur gases it does not change colour, since the sulphide of zinc, if any were formed, is as white as the oxide. It does not chalk or crumble and does not become transparent. In view of these statements, the question arises—Why not use zinc oxide in all paint? Why any other constituents?

For interior use, where a glossy surface, easily cleanable, and highly sanitary as well as decorative, is desired, such a paint is eminently satisfactory. For exterior use zinc oxide, when used alone, in common with all other pigments, has certain economic drawbacks, which vanish entirely when it is used in a properly compounded mixed paint. Continued experimentation has proved conclusively that a paint made up with a single pigment is never as satisfactory as one made up with a combination of pigments.

In the first place, owing to its extreme fineness, zinc oxide forms a perfect blend with the oils of the vehicle, and in consequence spreads out under the brush in an exceedingly thin layer. Hence, in order to secure the

thickness of paint coating necessary to hide and protect properly, more coats of paint are required than would be the case with a coarser pigment. Coarse-grained pigments absorb less oil, consequently they do not spread as far, and, as a result, cover better over a limited area. When such pigments are mixed with zinc oxide they check the tendency of that pigment to excessive spreading.

There seems to prevail among the painting profession an erroneous impression that zinc oxide is quite deficient in covering power. This is due to the fact that, because of its extreme fineness, it brushes out so thinly. In reality, however, if taken, weight for weight, in comparison with other white paint pigments, and confined to the same area over which those pigments will spread, zinc oxide will be found to have a far superior covering and hiding power.

Secondly, a paint consisting of zinc oxide and linseed oil only dries with a hard, smooth surface. The advantages of this quality will be considered later. The disadvantage is that when in the course of years the oil becomes dry and decomposed (as happens, sooner or later, with all paints), the paint coat may crack and peel off in patches. White lead, the pigment most generally combined with zinc oxide, does not do this. When a white lead paint coat fails it does so by gradually and progressively crumbling to powder, a process called "chalking." The powder of "chalk" weathers off and a fresh surface is presented, which in turn powders. A chalking paint presents an even surface for repainting.

If white lead is used alone, however, chalking progresses with unnecessary rapidity, so that the protective coating is soon disintegrated and the elements gain access to the wood in a relatively short time. Moreover, a white lead coating is subject to the formation of tiny cracks, which make a fine network pattern all over the paint film called "checking." As the paint weathers these cracks enlarge and deepen until they are open down to the wood, exposing it to the action of sun and rain. It, therefore, is apparent that the presence of zinc oxide, which does not check nor chalk, is necessary in a paint to stabilise it and prevent the rapid perishing of the protective film.

It becomes evident, then, that when we make a paint composed of zinc oxide and white lead we secure the advantages proper to each of these pigments. The zinc oxide imparts whiteness, durability, permanence of colour, high oil absorption, and smoothness of surface. The white lead assures a heavier film, and thus increases the covering or hiding capacity of the paint, and insures a satisfactory surface for repainting when, in the course of time, the paint shall have perished.

Zinc oxide does one thing more—it furnishes a smooth, easily cleaned surface. If we paint two boards, one with zinc oxide and one with white lead, and expose them to a dusty atmosphere, the white lead board will accumulate dust much faster than the zinc oxide board. The smooth, even surface of the latter makes it very difficult for particles of dirt to adhere, while the comparatively rough surface of the former holds them. This is particularly well shown when a wet sponge is passed over the boards. The zinc board will show up clean and white after this treatment, while the lead board will remain dirty. A board painted with a combination of these two pigments behaves in this respect like a board painted with straight zinc oxide. The zinc oxide, owing to its excessively fine state of division, blends so thoroughly with the oil that it enters the glossy surface which the oil forms over the paint so that the surface of

* New Jersey Zinc Co., New York.

the paint coat has the same relative dirt-resisting and wet-repelling power that a straight zinc oxide paint possesses. At the same time the mixture does not tend to crack and peel and gives a good surface for repainting. The effect of this property on the protective value of the paint is obvious.

POTASH MINES OF ALSACE.*

THEIR FUTURE PROSPECTS.

AFTER the technical installation which has taken place in the past few months, the moment has come when the economic aspects of the potash industry have to be considered. This industry, which Germany used and abused as if it were a monopoly, must be emancipated. Freed from all shackles, it must take its place in the economic life of France; the markets of our Allies and the neutrals must be opened wide to it.

CAPITAL TO BE EMPLOYED.

Prudence and sagacity are required. The German "Kali fever" must be avoided, for she looked upon potash merely as a speculation. That disease in Germany had the fatal effect of the absorption of too much capital. This caused a permanent crisis, from which the potash industry has suffered for more than 50 years and which rages to-day in a worse form than ever. The Alsatian deposits must not be exposed to the same dangers.

A lesson can be learned from the German balance-sheets, with their fictitious assets and arbitrary valuations, with their enormous capitals which an unhealthy speculation sunk in the mines, and their mortgage loans, the proceeds of which were distributed by the mine-owners unblushingly. On the other hand, only as much capital as is absolutely indispensable must be employed by the Alsatian mines.

If only the strictly necessary capital has to bear interest the margin for the fixing of the selling prices will be all the greater, and any further capital which may be offered can be made use of in the opening up of the deposits. It will thus be all the easier to compete with German potash.

THE COMPETITION OF GERMAN POTASH.

The production of potash is no longer a monopoly capable of imposing its own conditions. The future of the Alsatian mines depends on the ability and the far-sightedness of their management and the resources by means of which German potash is to be countered. Germany has a great advantage over Alsace owing to the fact that, the potash industry having been long established, she has gained an experience and organisation which are denied to Alsace. But, nevertheless, the importance of this must not be exaggerated.

The potash industry of Germany fears the Alsatian industry. Alsace rises before Germany at a moment when the economic outlook in Germany is darkening: over-capitalisation, difficulties of transport, and difficulties of coal and labour. Many shafts had to be shut down, others are flooded, and the remainder are unable to supply even the needs of her own country. So far German agriculture has received but 800,000 tons, as against the 900,000 tons which she had consumed in the same period last year. No wonder that Germany has been compelled to decline orders from abroad, nor is it a wonder that self-interest induces Germany to try to come to an understanding with Alsace.

ORGANISATION OF THE ALSATIAN MINES.

Some time ago one of the leading men in the German potash industry—Herr Wilhelm Sauer—stated that Alsace was not to be feared as a competitor because France would not be able to create an organisation with sufficiently wide views to establish a powerful industry and at the same time to the public interest. Herr Sauer was a bad judge and ill-informed, for that same organisation, the creation of which he believed France incapable, is being methodically built up. Whatever the future constitution of the mines, whoever their future owners may be, one aim must always be kept in view, and that aim is the adoption of liberal ideas both in the administration and in the working of the mines, coupled with co-operation and mutual self-help.

The mines of Alsace lend themselves admirably to compact grouping on a limited area. The small number of working centres, the uniformity of the deposits both in their richness and purity of the salts, the favourable labour and transport conditions, facilitate the establishment and continuity of an understanding between the producers.

For the solution of labour questions a collective contract has been recently concluded with the Miners' Union. It is applicable to the entire potash industry of Alsace and will necessarily have as a consequence the creation of an Employers' Union. With a view to attracting more workers, who will be wanted as the industry increases, it will be necessary to create labour colonies, with which the mines will again have to come to an understanding.

The supply in common of motive power and raw materials, the standardisation of working methods, and the introduction of uniform accountancy principles will create between the various centres of production a solidarity which must strengthen as well as promote the well-being of every mining field.

In conclusion, an industry of such importance requires a centre for research and experiments—a central organisation where directors, engineers, and analysts of the entire district can supply at any moment all the required technical, chemical, and commercial information, and contribute by their labours to that progress which must be achieved if a source of national wealth which victory has given to France is not to be sacrificed.

GERMAN CHEMICAL FACTORIES ON SHORT TIME.

A Frankfort advice states that through the closing down of large chemical works in the neighbourhood of that town, about ten thousand workmen are unemployed. The idleness of these works is important, because of the large deliveries that they have to make to the Entente countries, which would have considerably improved the value of the German mark. The demand for coal in the chemical industry, particularly in the colour factories, compared with other branches of industry is relatively small. Amongst the works so affected are the Höchst Colour Works, the Griesheim-Elektron Chemical Works, and Leopold Cassella and Co., of Frankfort, all of which have been working on a limited scale only, due to coal scarcity, and, as stated above, are now practically idle. The advice deplores the crisis, particularly on the ground that the demand for these companies' goods is very strong at the moment.

* Extracts from an address by Mr. Helmer, Official Receiver of the Alsatian Potash Mines.

THE GERMAN CHEMICAL TRUST.

DETAILS OF WAR-TIME DEVELOPMENTS.

THE special meetings of the German chemical companies forming the great community of interests have approved the proposed extensive increases in the share and preference capital, to which reference was recently made in this journal. The most complete information on the subject was given at the meeting of the Farben Fabriken vorm. Fried. Bayer and Co., by Herr Fried. Bayer, chairman of the company, whose statement is summarised as follows:—

UTILISATION OF ATMOSPHERIC NITROGEN.

The Chairman stated that the Badische Anilin und Soda Fabrik, of Ludwigshafen, with which the Farben Fabriken vorm. F. Bayer and Co. and the A. G. fur Anilin Fabrikation, of Berlin, had in operation a community of interests since the end of 1904, had been occupied for years past with the problem of rendering useful the nitrogen of the atmosphere for the supply of fertilisers to agriculture and of nitric acid for industrial purposes. In the first place, the Ludwigshafen company succeeded in "consuming" the atmospheric nitrogen by the employment of high-pressure electricity in an appropriate manner. This invention was carried out in Norway, but it was not suitable for Germany, as the process was bound up with the availability of large, constant, and cheap water-power.

As a consequence the Baden company in 1908 acquired the process of Professor Haber, which consists in combining atmospheric nitrogen with hydrogen in the form of ammonia by the use of high pressure at a suitable temperature. The problem of improving this process so that ammonia could be produced on a large scale was solved by Professor Bosch, of Ludwigshafen, in such a short time that the first installation was brought into operation in 1913 at Oppau for an annual output of 35,000 tons of sulphate of ammonia. The results of this installation were so encouraging that the Baden company at once decided to extend the plant to a yearly capacity of 150,000 tons of sulphate of ammonia, or 30,000 tons of nitrogen.

THE "FINANCIAL" ASSISTANCE OF THE STATE.

The Chairman then recalled the fact that the imports of Chilean nitrate were stopped through the outbreak of the war. As a consequence the Government repeatedly asked for the execution of extensions of the works during the war. The productive capacity of the Oppau works was doubled and further increased to 100,000 tons of nitrogen. As the safety of the Oppau works became jeopardised by great aerial attacks, the Baden company, at the instance of the Government, undertook the construction in 1916 of a second ammonia works at Merseburg, in Central Germany, for an annual production of 36,000 tons of nitrogen in the first place. During the same year the Government demanded a further extension of the plant up to a capacity of 130,000 tons, and in 1918 a still further expansion of 70,000 tons of nitrogen was called for as being urgently necessary, with which demand the company complied for national reasons. The Government placed at the company's disposal an interest-bearing loan of a definite amount for the carrying out of the extension, and in addition a contribution was made by the Government owing to the increased cost of construction and equipment, particularly in regard to the extensions put in hand in 1918—such contribution to be repaid gradually in the form of deliveries out of the

production of the Merseburg works that were in excess of a definite tonnage of the output.

At present the production of nitrogen by the Baden company, the Chairman proceeded to remark, was prejudicially influenced by the inferiority of the war replacement material (substitutes) at the company's disposal on the one hand, and on the other by the disinclination to work which existed among the workmen and the consequent reduced output of the works. Nevertheless, the company hoped to reach a production of 10,000 tons of nitrogen in the month of November, and steady increase was expected in the coming months, provided that the necessary quantities of coal and coke were available for the purpose. A further expansion of the nitrogen works did not come into consideration within a conceivable period. It was necessary, however, for the Baden company to make provision for the requisite capital needed for the completion of the extensions already in progress and for the lignite mines which served for the supply of the Merseburg works with fuel. The negotiations which had proceeded on the subject between the parties forming the community of interests led to the result that no other way of raising capital was possible than that of again increasing the share capital.

In this connection the firms who had newly joined the community (Hochst, Cassella, Griesheim, and Weilerter-Meer) adopted the attitude that they could only co-operate in the capital expansion if they were permitted to participate in the working results of the nitrogen works to a greater extent than hitherto. The negotiations on the matter led to the removal of the reservations in this respect as from January 1, 1919. It was then resolved that the three largest firms—Ludwigshafen, Hochst, and the Bayer Company—should proceed to double their respective share capitals, whilst the remaining firms should increase their capital in accordance with their profit share in the community. Concerning the price of issue at 107 per cent., it was mentioned that this rate was fixed because a higher premium would have rendered difficult the absorption of the new shares in the home market and caused a large efflux of the shares abroad—which must be hindered as far as possible for national economic reasons. The proposed capital augmentation would cause the influx into the community of a total of 365,000,000 marks, and thus the financial requirements would be covered for a period as far as could be foreseen.

PREFERENCE SHARES AND FOREIGN COMPETITION.

The question of the issue of preference shares was next raised by the chairman. On this point he observed that large coal-tar dyeworks had risen during the war in the important hostile countries in order to render the latter independent of Germany for their requirements in dyes. The German works and sales houses in those countries had been seized and were partly already liquidated or their liquidation was impending. Under these circumstances the Germans would have to build up their foreign business quite from the beginning, and in doing so would have to meet increased foreign competition—which would endeavour to defend itself against German dyes by all possible measures, as, for instance, protective duties, anti-trust, and other laws, propaganda, etc. A firm combination and united action on the part of the community of interests were more necessary than ever in order successfully to meet this trade contest, and the issue of the preference shares, amounting to 40 per cent. of the increased share capital, would draw the interests of the community closer

together and strengthen their competitive capabilities in the world's markets. The preference shares would be inter-changed among the firms forming the community, and would have double voting powers, but would be limited to a dividend of up to $3\frac{1}{2}$ per cent.

THE PRESENT SITUATION.

The Chairman, in conclusion, referred to the course of business as it affected the community of interests in the current year, and stated that it had not been satisfactory. The financial results would be greatly influenced by the difficulties which confronted them in production and sales, by the increased wages and salaries, the indisposition to work, and by the stoppage of the works of some of the firms for months owing to strikes and the scarcity of coal. Nevertheless, the prospect was held out of the distribution of a moderate dividend for 1919, the amount for which, in case of necessity, would have to be transferred from the reserves accumulated in former years for this purpose.

AMOUNT OF CAPITAL INVESTED.

A little further information on the subject was given at the meeting of the A.G. fur Anilin Fabrikation, of Berlin. The chairman mentioned, for instance, that the capital already invested in the Oppau and Merseburg works amounted to several hundred millions of marks. In addition, the State had made contributions of several hundred millions of marks towards the Merseburg works. Besides these sums, the present proposals represented a further capital requirement, so that on the completion of the works the aggregate capital invested in them would exceed 1,000,000,000 marks (pre-war £50,000,000.).

It was stated further that when the works were finished the production would permit of the delivery of nitrogenous products for technical and fertilising purposes to such an extent as to be able substantially to cover the needs of the national chemical and agricultural industries.

REFRACTORY PROPERTIES OF ALUMINOUS PRODUCTS.

H. LE CHATELIER and B. Bogitch have recently completed some tests on bauxite, corindite, and carborundum, having the following analyses—viz:—

	PURE BAUXITE.	Corindite.	Carborundum.
Alumina	58.6	61.4	—
Iron oxide	5.2	5.7	6.1
Silica	29.5	24.0	12.9
Carbon silicide	—	—	79.2
Free carbon	—	3.7	1.8
Titanium	3.8	4.8	—
Not estimated	2.9	0.4	—
	100 %	100 %	100 %

The corindite and the carborundum, when coarsely crushed, left the following residues on the screen:—

	Corin- dite.	Car- borundum.
Residue from 80 meshes to the sq. cm.	24	20
Between 80 and 200 meshes per cm. ²	27	40
Between 200 and 5,000 meshes per sq. cm. .	22	27
Following pass through the screen of 5,000 mesh	27	13
	100	100

The samples investigated were:—

(1) Pure bauxite brick, manufactured industrially, moulded under pressure and baked at 1,300° C. in a large oven.

(2) Corindite agglomerate containing 10 per cent. of crude bauxite.

(3) Corindite agglomerate containing 10 per cent. kaolin.

(4) Corindite agglomerate with 2 per cent. of a syrupy solution of silicate (of soda).

(5) Corindite agglomerate with 6.5 per cent. of syrupy silicate (of soda).

(6) Carborundum agglomerate with 10 per cent. kaolin.

The mixtures for obtaining the blocks contained the quantity of pure water necessary to give a plastic paste; they were then moulded by hand and baked for three hours at 1,200° C. (in the case of corindite) and 1,400° C. (in the case of carborundum).

The crushing strengths in the hot state were measured with a special apparatus which had previously been used for similar tests. The rate at which the load was applied was 0.5kg. per second.

The following tables give the crushing strength in kg. per sq. cm. The values in parentheses refer to material which had become plastic and consequently had no further crushing strength. The figures given thus show the pressure reached at the moment when the sample had been crushed to one-third of its height for the speed of stressing of 0.5kg. per second:—

Sample	20° C.	1000° C.	1200° C.	1300° C.	1400° C.	1500° C.	1600° C.
1 ..	200	180	73	34	18	(12)	(10)
2 ..	43	—	5	—	(2)	—	—
3 ..	55	—	15	9	—	(2)	—
4 ..	35	—	(4)	—	—	—	—
5 ..	41	—	(6)	—	—	—	—
6 ..	143	110	19	(8)	(7)	(6)	(5)

All these products, therefore, became plastic at temperatures ranging between 1,200° and 1,500° C. For this reason they cannot be used in the construction of steel furnace arches, the temperature of which exceeds 1,600° C. Carborundum and alumina, which are perfectly intact at these temperatures, swim in a molten mass, which allows their grains to slide on one another; there is no longer any cohesion in the mass. At the same temperatures silica, although much more fusible, resists perfectly because the crystallisation of the tridymite gives rise to a network, in the centre of which the molten mass lodges without, however, modifying the continuity of the network. Alumina therefore behaves like magnesia; in spite of its infusibility it gives bricks which easily give under pressure when they are hot. It will also be seen that agglomeration with silicate of soda is less advantageous than agglomeration or briquetting with kaolin. Silicate of soda may, however, be used for laboratory furnaces, where the temperature does not exceed 1,400° C., because the walls have no stress to withstand.

The authors were able, by experimenting, to obtain aluminous products which showed a much greater degree of strength when hot than the preceding ones, by taking pure alumina and adding the strict quantity of agglomerant necessary to harden them by baking.

Alumina calcined industrially was used, the following being the final mixtures:—

	Per Cent.	Per Cent.
Alumina	80	90
White bauxite	20	—
Kaolin	—	10
	100	100

These mixtures each contained 95 per cent. of alumina. When first baked they contracted considerably and split in every direction. The material is first calcined at 1,700° C.; it is then crushed into coarse sand, and afterwards rebriquetted with one-quarter of its own weight of the same crude mixture. It is then stamped under pressure and baked at 1,700° C. In this way blocks are obtained which do not commence to soften at even 1,600° C. At this temperature their crushing strength is 20 to 40kg./cm².—*Comptes-rendus*, through *Technical Review*.

BY-PRODUCT COKING.

MR. J. W. PORTEOUS, the President of the Northern Section of the Coke Oven Managers' Association, delivered his presidential address to the members at a general meeting of the Section held at Durham on Saturday.

Mr. Porteous spoke for some time on his early connections with the industry. His first experience of making sulphate was in the early months of 1884, when the open pan salt method was employed. In those days they were rarely troubled, as now, with blue salt, that being conspicuous by its absence. Since then rapid changes and improvements had taken place, and he had looked up some old notes which proved how interesting the developments had been. He would like to take the opportunity of mentioning one who had done a great deal for the by-product industry but whose name he never remembered even seeing in print—he referred to the late Mr. Robert Dixon, of Pease and Partners, one of the pioneers in the movement, who had often proceeded under great difficulties and in spite of a great deal of prejudice.

They had heard a great deal of recent days about the necessity of fuel economy, but it seemed to him very strange that scarcely a word was said about the saving that might be effected in the coke oven industry. Great progress had been made respecting the condensation of gases and the recovery of by-products, but they still appeared to him to go on in a crude and unscientific way regarding the fuel put into the ovens. Little attention was paid to the grading of the fuel or the crushing and washing of it or the draining of it, and it was due to that fact that a great deal of unnecessary waste was taking place. Much valuable fuel was being wasted week by week, and as a result of personal experience he had no hesitation in saying that one of the factors in the wasting of fuel was moisture—moisture was responsible for wasting hundreds of tons of good coking material in Durham county every week. A large amount of gas was required to deal with moisture, which, more often than not, ought not to be there. He was convinced that a large amount of condensing trouble was due to the excessive amount of water present.

Another point in connection with water trouble in plants where condensing facilities were limited was that as the water began to run to the seal pot it naturally took up a certain amount of ammonia. On plants where coal with a large percentage of moisture was used there were more naphthalene troubles than where dry coal was used. Moisture up to 9 per cent undoubtedly improved the yield of ammonia—it helped to protect it in the oven,—but when above 9 per cent. he thought he was on sound ground in saying that the yield of ammonia had a tendency to fall. Too large a percentage of water also affected the coke yield. He considered there were cases where 2 per cent of coke had been lost through the stamping of the fuel. Owing to the repressed character of the cells and the steam being converted the oxygen came into contact with the carbon, formed water-gas, and the yield was decreased. There were those who held that the gas issuing from the coking charge passed up the centre of the charge, but he thought it passed through the already incandescent mass. Not only had they condenser trouble owing to the over-percentage of water, but it destroyed much fuel that would otherwise get to the blast-furnaces.

Another great enemy of the coke oven manager was the question of ash, and he professed a great deal of sympathy with blast-furnace managers, who complained of the ash trouble in the coke sent to them. He did not agree that the usual laboratory figures giving ash percentages could be taken as really correct. Ash was injurious to the yield of ammonia not only because of the certain position it occupied in the oven instead of clean coal, but also from the fact that when the ash contained a certain amount of iron in an oxidised state or even as pyrites the iron acted upon the already formed ammonia, and by catalytic action at certain temperatures—say 600° and upwards—destroyed a large amount of ammonia already formed when it came into contact with it. He suggested that when the yield of ammonia fell in a manner unaccounted for after the usual examinations of the plant had been made, a further investigation in respect to the iron content of the ash would result in solving the problem to a large extent.

DISCUSSION.

Dr. Lishman said it was the first time he had heard it said that the results from a compressed charge were less than from a non-compressed charge.

Mr. G. A. Phillipson agreed that tar acids kept naphthalene in suspension—a point which was not generally understood. He was inclined to think that Mr. Porteous' references to temperatures of ovens were on the high side. The question of ash was one which certainly needed ventilating, and although he knew nothing of the catalytic action of the iron, he thought the president had stretched the point of its interference with the ammonia yield. If his ammonia yield went down he would be inclined to look to the flues for leakages and to investigate those subtle effects of draughts.

Mr. A. H. Middleton thought the "pernicious system" of using coke ovens as boilers was a system upon which much could be said and one which should receive a great deal of attention in future discussions. He agreed that the ash question was a very grave one. The effect at the blast-furnaces was much more serious than was generally realised.

Mr. Porteous, referring to Dr. Lishman's remark, said that he had a serious experience in the matter, and was convinced of the truth of his attitude. In reply to Mr. Phillipson's criticism of the figures given regarding temperatures of ovens he stood by them and quoted the late Mr. Cooper on the subject and several American writers. He repeated that he firmly believed that iron existing in coal above a certain percentage had a direct influence on the ammonia yield.

ELIMINATION OF WASTEFUL EFFORT IN INDUSTRY.

PROFESSOR T. H. PEAR, M.A., B.Sc., read a paper on this subject at a meeting of the Manchester Literary and Philosophical Society last week.

The lecturer pointed out that, it being impossible to distinguish sharply between physical and mental effort, in the investigation of the problems of economising human energy physiology and psychology must work side by side. While in many industries improvement of the external conditions of work, such as temperature, ventilation, humidity, illumination, was rapidly proceeding, less had been attempted in the direction of improving the methods of work themselves. Examples of such efforts illustrated the importance of certain fundamental principles. The first was the adjustment, both in total length and in distribution, of rest pauses. By introducing suitably chosen rest pauses and by modifying the working attitude of girls who were engaged in folding handkerchiefs, the output increased 300 per cent., while the folders worked only 45 minutes in each hour and were less fatigued than before. The second principle

was the substitution of habitual movements for constant acts of decision. By rearranging the method of "assembling" a braid machine, so that the parts were not only put together in a more efficient order but were more easily found by the workman, 66 units were assembled by a man in one day instead of 18. The third was the elimination of useless movement. By this means the separate actions required to lay a brick had been reduced from 18 to 5; the output increased from 120 per man per hour to 350.

Insistence was laid upon the importance of teaching the best methods of work first, before the worker had acquired less efficient methods which were difficult to unlearn, and upon the necessity of such training being carried out by persons who knew how to teach. By analysing the results of motion study in a British munition factory during the war and similar improvements elsewhere, it was shown that "speeding up," fatigue, and the exploitation of the worker are by no means necessary results of such modifications. The question of the monotony alleged to be caused by such "shorthand" methods of work was also discussed. The fundamental confusion between the terms "monotonous" and "habitual" was emphasised, and means were described by which the more efficient methods may increase interest in life both directly through their own nature and indirectly through the increased leisure, husbanding of energy, and higher wages which they make possible.

In the discussion which followed, Dr. William Cramp, M.I.E.E., pointed out the dehumanising tendencies of experiments designed to achieve maximum output, and questioned the desirability of extreme specialisation from the point of view of the development of the individual. He suggested also that it was better to encourage individuals by lectures such as those of Professor Pear to take a pride in finding their own most efficient methods than to attempt to force upon them methods similarly deduced by the management.

Mr. Ernest F. Lange, Mr. H. J. Woodall, and Professor F. E. Weiss also contributed to the discussion.

EVAPORATION AND FUEL ECONOMY.

THE first of two lectures on "Evaporation" was delivered by Mr. H. J. Pooley at the Manchester College of Technology on Tuesday last. Mr. Pooley emphasised the importance of evaporation in chemical works practice and the increasingly important part which it would be called upon to play in the near future by reason of the high prices which manufacturers were compelled to pay for fuel. It was natural, therefore, to expect that the question of economy in the use of fuel would become a very practical one, and in evaporating operations steps would be taken to ensure that the greatest possible efficiency was being derived from the plant and the fuel employed. Dealing with the features that were very desirable in an evaporating plant, the lecturer enumerated these as the rapid passage of steam from the evaporator, the efficient circulation of the heated liquor over the heating surfaces, the free escape of steam, freedom from entrainment as far as practicable, accessibility of the plant for cleaning and repairing purposes, and sufficient vapour pipe allowances. The leading types of English and American evaporating plant were referred to. The lecturer expressed the opinion that the vertical type of evaporator, having the liquor under treatment inside the tubes, was the only type of evaporating plant that would survive.

SOIL BACTERIA.

AT the Chemical Industry Club, Newcastle, last week, the second of a series of meetings under the Technical Section was held under the presidency of Mr. O. Smalley. A paper on "Soil Bacteria" was read by Mr. F. H. Walker, B.Sc., A.I.C.

Mr. Walker commenced with a short resumé of the progress of agricultural chemistry up to about 1860, when it almost came to a standstill, when the theories of Leibig on the mineral constituents absorbed by plants from manures had been found to be only partially true. Leibig, as they knew, maintained that ammonia and not gaseous nitrogen was taken up by plants. After a great controversy, the experiments of Lawes, Gilbert, and Pugh proved that all non-leguminous crops thrived when treated under proper conditions with nitrogenous fertilisers and died when deprived entirely of combined nitrogen, despite the other mineral constituents being present. It was found that peas and clover could thrive without nitrogenous manure and the soil in which they grew actually became richer in nitrogen, and the amount brought down by rain failed to account for it at all. Thanks to Pasteur, the science of bacteriology made rapid progress. Pasteur appeared to have recognised that the change of ammonia to nitrate in soil was a bacterial process.

In 1887 Schloesing and Muntz remarked that when a stream of sewage was allowed to trickle down a column after a lapse of 20 days the ammonia in the sewage began to convert to nitrate and finally was completely converted. The process of conversion was stopped by adding an antiseptic and could be re-started by an addition of turbid water extract of dry soil. The "nitrification" was due to bacteria. Later experiments showed that nitrification took place in two stages and that there were two organisms. Beijerinck eventually isolated *B. radicola*, and the conclusion was generally accepted that bacteria are the real makers of plant food in the soil.

After discussing the value of farmyard manure from a bacterial standpoint, Mr. Walker stated that he considered that acidity in soils might be caused by the prolonged use of sulphate of ammonia when not properly corrected by lime. In rich soils the bacteria might be greatly reduced in number by protozoa. *B. radicola* could not live in acid soils or in land rich in nitrates, and Bottomley had finally selected peat as a suitable material for distribution. Raw peat was treated with steam and afterwards inoculated with a mixed culture of *B. radicola* and *azobacter chroococcium*, and remarkable successes were obtained. He described many of the experiments of Bottomley and Rosenheim at this stage of the paper. The attempt to put bacterised peat on the market as humogen had not been altogether successful. He described in detail many experiments which had been carried out with success in producing increased yields of crops.

A long and informal discussion took place, to which the Chairman and Messrs. H. Dunford Smith, G. Weyman, W. D. Jones, J. T. Carr, and C. S. Haddon contributed some remarks.

Mr. Walker, replying to the discussion, said that soil inoculation would not make up for bad cultivation or the shortage of certain mineral constituents. The weather had an enormous influence, and many of his own experiments had been inconclusive owing to the excessive drought. The bacterised peat could be used either with or without stable manure.

SOCIETY OF CHEMICAL INDUSTRY.

NEWCASTLE SECTION.

A GENERAL meeting of the Newcastle Section of the Society of Chemical Industry was held in the Armstrong College, Newcastle, on Wednesday (November 19), under the presidency of Professor P. P. Bedson, when a paper by Mr. N. N. Sen Gupta, B.Sc., was communicated by Mr. S. H. Collins, M.Sc., F.I.C. The paper was on

"THE GENERATION OF HYDROCYANIC ACID AND THE PROPERTIES OF THE FAT FROM THE SEEDS OF THE 'SCHLEICHERA TRIJUGA,' AN INDIAN FOREST TREE."

Mr. Collins explained that the thesis was elaborated by the author whilst a student at the College, and for which he had gained his degree. He (Mr. Collins) had met Indian forest experts who confirmed the statement that the tree grew in large numbers in all parts of India. He did not see why a new industry should not be built up upon the information given by Mr. Sen Gupta in the paper. The information was invaluable to any manufacturer who proposed utilising a material of properties at present virtually unknown.

Schleichera Trijuga, according to the paper, was a large deciduous tree distributed over an area of considerable variations in temperature. It was met in all dry forests throughout India, Burmah, and the Indian Archipelago. It had been known for some time that the seed of the tree was cyanogenetic. The work embodied in the paper fell under three heads: (1) A general survey of the constituents of the various parts of the fruit from the feeding point of view; (2) a study of cyanogenesis in the seed; (3) examination of the fat. Mr. Sen Gupta dealt chiefly with the second head, owing to its special scientific interest and the bearing on the extent to which the fatty and non-fatty elements of the seed might be used as articles of commerce in view of the extreme toxicity of the HCN which, in the absence of suitable precautions, might be present as such in the fat or locked up in the parent substance in the residue and capable of being liberated under favourable conditions. The most obvious feature of the normal, healthy seed was its excessively high fat content, as a result of which a mill refused to pulverise it, and the cracking of nuts revealed a liability to attack of fungi, giving rise to spores and mycelia. Roughly speaking, 70 per cent. of the fruits at his disposal were in some way affected by fungi, although the damage to the seed was not a constant consequence.

Regarding the analysis of healthy seeds, it was noted that the percentage of HCN yielded by the seed under favourable conditions of hydrolysis had been 0.574 per cent., which corresponded to 0.298 per cent of nitrogen. The probable composition of cake from expressed seeds he gave as: Moisture, 8.28; oil, 14.99; albuminoids, 47.07; carbohydrates, 15.88; fibre, 8.79; ash, 4.99. Dealing with the question of hydrolysis, he considered it was hardly conceivable that HCN could be present in the seed in a pre-formed state. The hydrolysis under quite different conditions was quite typical of enzyme activity. At least two products of hydrolysis had been detected—namely, HCN and dextrose, which had been qualitatively examined. No clue had been obtained as to other products of hydrolysis, if any.

Mr. Sen Gupta described the experiments and apparatus used for determining the evolution of HCN under different conditions of hydrolysis by colorimetric

and volumetric estimation. In the section dealing with the effects of thermal conditions he had discovered that a temperature of 25° C. was more favourable for the activity of the enzyme present than that of 45° C. Even at 90° C. the action was by no means nil, but it spread over a short period of time, the enzyme activity stopping altogether within 45 minutes of the commencement of the experiment.

Coming to the more practical aspect of the question of inhibition due to wet heat, observations were made on the effect of steam blown through ground material. The result of a rather elaborate experiment was that the subsequent examination of the steam-treated material failed to detect the minutest trace of HCN. It was evident that the evolution of HCN in that case was a matter of a few minutes before the steam had its full effect, and that the steam carried away what little HCN was generated, leaving the material perfectly innocuous. Experiments on whole seeds were equally satisfactory. So far as the effect of dry heat was concerned, the power of the enzyme to resist the effect of dry heat was very considerable. Similar treatments for longer periods, however, showed that dry heat, though slower in action, eventually overpowered the enzyme, and the ultimate defeat of the enzyme was full of meaning; and it would be well to remember the claims of dry heat for its simplicity and practicability.

The extent to which ether checked the activity of the enzyme was remarkable. Quantities of the ground material, varying from 2 to 3 gm., were percolated with redistilled ether for different lengths of time, and the extracted material, freed from ether by exposure, was then examined in the usual way at 35° C. and 25° C. The results in all cases were highly satisfactory, the evolution of HCN being either nil or so low as to be hardly measurable in view of the comparatively large quantities of the material used. The extracted material on keeping became still more innocuous; 3gm. of material extracted for 2½ hours and then exposed to the atmosphere for a period of 12 days failed to evolve any HCN. As the body temperature of livestock could be, roughly, taken as 39° C., it was obvious that such ether-extracted material would be quite safe for feeding purposes.

As to the effect of petroleum ether on enzyme, the results of two experiments, although not scrupulously concordant, demonstrated clearly that petroleum ether possessed an inhibitory power which demanded serious consideration on account of the cheapness of the solvent and its extensive use for the extraction of fats and oils. Carbon di-sulphide was very effective in checking the activity of the enzyme, as was also carbon tetrachloride. An experiment with ethyl alcohol on enzyme showed that for four hours' examination not the slightest evolution of HCN was detected. An experiment with H₂O₂ showed that the compound was by no means without effect on the enzyme, but the effect of chloride of lime had fallen far short of anticipation. One gramme of material, which must have lost a certain amount of HCN by being kept ground for two days before the experiment, yielded as much as 1.56 mgm. of HCN when 50 mgm. of chloride of lime was used in the hydrolysis medium.

A few experiments had been carried out to determine the influence of a number of commonly employed cattle foods, such as grass, hay, silage, and roots. In accordance with the custom of feeding, one or more of such foods would be admitted into the animal system simultaneously with the cake or meal derived from the

seed under discussion, and thus the enzyme, if not already destroyed in manufacture, would have to act in such foreign elements. The proportions of ground seed were determined with regard to rations in vogue. The object of the experiments was to show how much prussic acid could be generated under ordinary conditions of feeding if the enzyme and glucoside came into full play in the feeding stuff admitted to the rumen. The evolution of HCN was greatest in the presence of silage, and least with grass, hay and roots occupying the intermediate positions in the order of the amount of HCN evolved. Silage increased the activity of the enzyme by more than 100 per cent., and hay by 33 per cent.; in the presence of roots the evolution was slightly higher than normal.

The remainder of the paper gave detailed illustrations of a series of experiments which showed that a reducing sugar (probably dextrose) was found to be one of the products of hydrolysis, and had been estimated in several cases to indicate 1 HCN : $3\frac{1}{2}$ dextrose. The enzyme was extremely difficult of isolation in a potent state, decomposing very quickly outside the seed. It had been found to hydrolyse amygdalin, besides the glucosides contained in the seed. It was reasonable to conclude that there was an emulsion-like body in the seed. The cyanogenetic material in the seed appeared to be a mixture of at least two glucosides, of which the principal one might prove to be a glucoside hitherto unisolated. A small proportion of amygdalin was associated with the seed.

Dealing with the fat of the seed, it was pointed out that Lewkowitsch and others had already dealt with that aspect, though not with the cyanogenesis. The seed contained as much as 67 per cent. of fat, a percentage which almost constituted a record in the vegetable kingdom. The fat was known as kon oil, kusum oil, macassar oil, etc., the last of which had a large currency in commerce. The freshly-extracted material was a solid which liquefied at a comparatively low temperature, possessed a pleasant smell, and was a yellowish-white colour which changed to brown with heating. The specific gravity was 0.86. The fat melted at 21°C . Three saponification values had been obtained—229.1, 214.44, and 207.57. The result of examination for iodine values on the same three samples resulted in 52.4, 55, and 54.6 respectively. The acid value varied with the source of the fat. It was lowest in the fat obtained from healthy seeds, and intermediate in the fat extracted from healthy and diseased seeds mixed. The freshly-extracted fat from healthy seeds gave an acid value of 13.06, although a similar sample allowed to stand for three months had an acid value of 16.28. The fat extracted from diseased seeds alone indicated the enormous acid value of 109.6, whilst mixed seeds gave 75.4.

DISCUSSION.

Professor P. P. Bedson congratulated the author of the paper, and thanked Mr. Collins for so ably presenting it. He asked whether Mr. Sen Gupta had tried the effect of other solvents, such as di-chlor-ethylene, or solvents of that kind, which he understood were used in industry for the extraction of fat from seeds.

Mr. Collins replied that the solvent mentioned by Professor Bedson was not employed. Having tried petroleum ether, he did not think the results would be dissimilar.

Mr. A. Short said that the paper was rather far removed from the ordinary work of the industrial chemist. At first sight it seemed rather startling to learn that foodstuffs could generate prussic acid. He would like to ask whether any cases had happened where death had been caused by lack of treatment or through wrong treatment of foodstuffs.

Mr. Collins replied that the question of the development of prussic acid in foodstuffs was one of those questions which

cropped up periodically just when everyone had comfortably forgotten all about it. There had been a number of cases of calves being poisoned by prussic acid developing in foodstuffs, and a certain, though much lower, number of cases of cows also. There were one or two cases of calves every year, and of cows every five years or so. So far as other animals were concerned the deaths had not been noted, probably due to the less expense involved in the loss of a sheep, for instance. It was practically safe, he concluded, when the meals were prepared by the farmers rather than by manufacturers. Inexperienced persons about a farm occasionally were responsible for disastrous results in feeding. When cattle food was boiled, or even soaked in boiling water, the enzyme was completely destroyed. If the foods were carefully mixed little harm would accrue. The enzymes were so sensitive that they were upset by almost anything. He was of opinion that a new cake put upon the market without a guarantee of freedom from the possibility of developing prussic acid would have little success—farmers would not be inclined to buy. The value of the experiments outlined was, therefore, incalculable. In answer to a further question by Mr. Short, Mr. Collins said the ordinary solvent used for the extraction of oil was petroleum spirit with a low boiling-point.

ANNUAL MEETING OF THE SOCIETY.

Professor P. P. Bedson, chairman of the Newcastle Section, said that the Committee had recommended the members to invite the Society of Chemical Industry to hold its next annual meeting in Newcastle. A similar invitation had been extended to the Society last year, but other arrangements had already been concluded. The annual meeting has already been held in Newcastle—in 1884, 1899, and 1908. He formally moved the resolution, which was seconded by Mr. S. H. Collins, M.Sc., and carried unanimously.

A party of 45 members of the Newcastle Section of the Society of Chemical Industry on Saturday paid a visit to the Elswick works of the Newcastle and Gateshead Gas Company, where a most enjoyable afternoon was spent. The party had as guides Mr. T. Hardie, the company's engineer; Mr. Atkinson, manager of the Elswick department; Mr. G. Weyman, chief chemist; Miss Wallace, and Messrs. Hoovey, Kimpson, Cumming, and Walker.

AMMONIC-POTASSIC NITRATE.

SINCE 1917, according to the Bulletin of the International Institute of Agriculture, experiments have been made in Germany on small plots, in the use, as a fertiliser for beets, of ammonic-potassic nitrate, manufactured by the Badische Anilin- und Sodafabrik by treatment and double decomposition of ammonium nitrate with potassium chloride. The fertiliser, also known as "mixed salt" ("Mischsalz"), is granular, brownish-grey, spreads easily, and contains 13 per cent. of nitrogen, 25 per cent. of potassium, 3 to 4 per cent. of water, and 27 to 30 per cent. of chlorine. This compound may be safely used as a fertiliser. It is preferable to ammonium sulphate, as it spreads more evenly, absorbs less moisture, and is less explosive. Experiments made by Professor Schneidewind on beets in the sandy loam of the Lauchstädt Experiment Station, showed the value of the new fertiliser to be exactly equal to an equivalent quantity of sodium nitrate. The makers also intend putting on the market ammonic-sodium nitrate. The ammonium chloride put on the German market in 1918 contains from 23 to 25 per cent. of nitrogen, and is as satisfactory as ammonium sulphate. It should, however, be used with care when added to plants sensitive to chlorine.

SODIUM AND SODIUM COMPOUNDS IN THE UNITED STATES.

THE manufacture of sodium and sodium compounds in the United States, and the position of the industry in 1918, are reviewed in a report issued by the Geological Survey of that country. The rule of the Department that the production of any single mineral or compound shall not be disclosed unless there are at least three producers of it or special permission is obtained, has necessitated reporting the production of some compounds in the following table in groups. The table summarises the reported production of sodium and sodium compounds in 1918, and gives for comparison such figures as are available for 1917.

PRODUCTION.

SODIUM AND SODIUM COMPOUNDS PRODUCED IN THE UNITED STATES IN 1917 AND 1918.

	1917.		1918.	
	Quantity (short tons).	Value.	Quantity (short tons).	Value.
Sodium (metal)	(a)	(a)	264	\$153,437
Sodium acetate	1,049	\$225,828	2,622	460,783
Sodium benzoate	—	—	203	886,058
Sodium bicarbonate	119,177	4,029,499	118,535	3,293,153
Sodium bichromate and sodium chromate	22,446	9,045,133	28,334	9,868,118
Sodium bisulphite and sodium sulphite	13,707	300,698	16,362	478,482
Sodium bromide	—	—	574	438,730
Sodium carbonate:				
Soda ash	1,390,625	38,028,000	1,390,628	35,635,520
Monohydrate and sesquicarbonate	55,035	1,262,875	22,678	482,958
Sal soda	77,939	1,698,520	82,465	2,020,271
Sodium chlorate and sodium perchlorate	2,915	1,333,426	2,413	1,004,250
Sodium chloride:				
Salt in brine	2,890,588	1,083,586	2,830,600	1,245,265
Rock salt	1,605,025	3,897,595	1,683,941	5,684,661
Evaporated salt	2,482,564	14,959,261	2,724,203	20,010,435
Sodium cyanide, sodium iodide, and sodium peroxide	9,694	6,133,000	9,086	5,427,240
Sodium ferrocyanide	4,173	2,577,667	4,525	2,690,110
Sodium fluoride, acid sodium fluoride, and sodium fluosilicate (silicofluoride)	1,424	397,305	1,228	281,264
Sodium hydroxide (caustic soda)	188,056	29,402,689	513,363	31,854,470
Sodium nitrite	861	480,145	1,701	609,779
Sodium phosphate (including all sodium phosphates)	13,305	711,283	15,620	1,427,947
Sodium silicate	254,011	3,317,547	317,161	5,870,973
Sodium sulphate:				
Salt cake	183,909	2,987,641	141,054	2,844,897
Glauber's salt	47,757	732,403	50,715	1,041,070
Nitro cake	387,821	780,278	143,155	595,660
Sodium sulphide	49,494	1,905,473	43,490	2,293,304
Sodium tetraborate (borax)	32,089	4,717,532	26,673	3,909,565
Sodium thiosulphate (hypo-sulphite)	26,598	717,924	26,868	1,051,623
Miscellaneous sodium compounds	4,563	2,062,300	381	1,122,552
	10,164,825	132,787,578	10,198,842	142,682,575

(a) Included in miscellaneous compounds.

The production given in the above table is practically identical with sales for most of the salts. This is especially true of soda ash, as the soda ash used by manufacturers in making caustic soda in their own plants is not included in the figures above. On the other hand, however, the caustic soda made and consumed in their own plants by paper manufacturers and others is in-

SODIUM COMPOUNDS USED BY THE MAKERS IN THEIR OWN PLANTS IN 1918.

	Quantity (short tons).	Value.
Soda ash	664,119	\$13,627,000
Sodium acetate	2,236	549,085
Sodium bichromate	3,227	812,310
Sodium fluosilicate	87	12,975
Sodium hydroxide	79,207	5,077,891
Sodium silicate	56,696	1,076,621
Sodium sulphate:		
Glauber's salt	7,001	138,820
Nitro cake	39,906	253,672
Salt cake	9,903	207,080
Sodium sulphide	3,269	153,967

SODIUM SALTS DERIVED FROM NATURAL SOURCES IN 1917 AND 1918.

	1917.		1918.	
	Quantity (short tons).	Value.	Quantity (short tons).	Value.
Sodium chloride:				
Salt in brine	2,890,588	\$1,083,586	2,830,600	\$1,245,265
Rock salt	1,605,025	3,897,595	1,683,941	5,684,661
Evaporated salt	2,482,564	14,959,261	2,724,203	20,010,435
Sodium carbonate, sodium bicarbonate and sodium sulphate	21,743	895,602	24,053	992,788
	6,993,920	20,836,044	7,262,797	27,933,149

cluded, as well as small quantities of certain other salts listed below, such as sodium bichromate, saltcake, and nitre cake, consumed by the makers. A large quantity of nitre cake is neither sold nor consumed, but represents a waste product.

IMPORTS.

Sodium nitrate is the principal sodium salt imported. The imports of most of the other salts are very small compared to the domestic production, according to the records of the Bureau of Foreign and Domestic Commerce, which furnishes the data on imports and exports.

SODIUM SALTS IMPORTED FOR DOMESTIC CONSUMPTION IN 1917 AND 1918.

	1917.		1918.	
	Quantity (pounds).	Value.	Quantity (pounds).	Value.
Sodium arsenate	23,296	\$2,404	35	\$88
Sodium benzoate	42,561	197,284	54,150	11,469
Sodium bicarbonate (a) ..	35,737	1,660	12,383	629
Sodium carbonate:				
Soda ash	2,063,571	70,080	1,445	29
Monohydrate and sesquicarbonate ..	45,650	1,179	44,800	1,281
Sal soda	100	5	25	2
Sodium chlorate	33,600	1,080	44,810	8,066
Sodium chloride (common salt)	129,844,300	280,135	80,580,700	281,468
Sodium chromate and sodium bichromate ..	22,025	4,075	5,102	1,184
Sodium cyanide	1,622,118	826,052	69,279	12,615
Sodium ferrocyanide (yellow prussiate of sodium)	22,048	13,454	271,063	98,505
Sodium hydroxide or caustic soda	146,236	17,773	2,002	193
Sodium nitrate	3,456,780,000	60,727,100	4,138,758,400	90,216,935
Sodium nitrite	8,767,415	349,111	2,857,631	289,182
Sodium phosphate	437	180	—	—
Sodium silicate	936,576	15,963	464,461	3,902
Sodium sulphate, crude, or salt cake and nitre cake	984,000	8,583	138,880	947
Sodium sulphide	288,292	5,104	112,821	4,673
Sodium sulphite	1,268	30	30,450	1,287
Sodium tetraborate or refined borax	110	7	2	1
Sodium thiosulphate, or sodium hyposulphite ..	5,840	5,748	1,120	973
	3,601,665,180	62,527,007	4,223,449,559	90,939,431

(a) Or supercarbonate, or saleratus, and other salts containing 50 per cent. or more of sodium bicarbonate.

EXPORTS.

DOMESTIC SODIUM SALTS EXPORTED IN 1917 AND 1918, BY CLASSES.

	1917.		1918.	
	Quantity (short tons).	Value.	Quantity (short tons).	Value.
All soda	—	a 9,322,233	—	—
Sodium carbonate:				
Soda ash	649,210	62,884,569	119,217	\$7,805,550
Sal soda	63,718	697,772	6,358	213,865
Sodium chloride (common salt) ..	113,993	1,000,773	136,783	1,677,577
Sodium hydroxide (caustic soda) ..	644,997	65,832,598	48,689	5,602,813
Sodium silicate	67,275	6216,828	14,125	404,796
All other salts of sodium	—	64,030,196	—	6,587,134
	—	23,384,969	—	22,291,735

a Six months, January-June.

b Six months, July-December.

The domestic exports of sodium salts in 1918, \$22,291,735, were thus only slightly less than those in 1917, \$23,384,969, which were the largest ever recorded.

SODIUM COMPOUNDS IN RELATION TO THE WAR.

The war not only stimulated the chemical industry in the United States to produce sodium compounds that were formerly imported and to supply them to foreign countries, but, on account of the high cost of potash, brought about the replacement, either wholly or in part, of potassium compounds by sodium compounds in the manufacture of glass, soap, and matches, in photography, in medicine, in tanning, and in the manufacture of cyanide for extracting the precious metals from their ores. The need of chlorine for war purposes led to an increased production of caustic soda, which was itself in demand for making phenol used in making the picrates.

From August 1 to November, 1918, the exportation of caustic soda was under Government control through licence. About the time the armistice was signed the prices of nearly all sodium compounds, which were then greatly advanced over pre-war prices, began to fall, and the decline continued well into 1919, leaving the producers in a very uncertain position with regard to possible tariff changes, foreign competition, and domestic demand.

Operation of the Government plant at Edgewood, Md., for making caustic soda and chlorine was discontinued in November, 1918. Most of the caustic soda made in this plant was used in the form of a dilute solution for absorbing residual obnoxious gases incidental to the production of the "war gases."

Although the present prices of many sodium compounds do not compare favourably with those of corresponding potassium compounds before the war, it is practically certain that pre-war prices for potassium compounds will not be again reached for a long time, so that the greater part of the substitutions that have occurred will be permanent. It may be noted that if the costs of production of sodium salts are equal to those of the corresponding salts of potassium per molecule the sodium salts have a slight advantage in lightness and hence in freight rates, as the atomic weights are 23 and 39 respectively.

The demonstrated inventiveness of the chemists and producers of the United States, says the report, indicates that foreign competitors will not easily regain their former position in that country. Moreover, with one or two exceptions, raw materials are abundant in the United States, so that foreign competition will always have the handicap of the long ocean haul, although this may be cheaper than a long land haul. Obviously, however, a certain amount of international exchange is desirable, and it may be noted that although both imports and exports have increased in recent years, the increase in imports has been due largely to sodium nitrate, whereas that in exports has been due to a considerable variety of manufactured compounds.

The principal producers of alkali in the United States have organised an export association under the laws of the State of Delaware, with offices at 171, Madison Avenue, New York City. The object of the association is to work for uniform and favourable conditions in the export business, with special regard to foreign banking facilities and to ocean freight rates.

AMERICAN SMELTING AND REFINING COMPANY.—Dividend of 1 per cent. (\$1. per share) on the common stock for the past quarter.

CORNISH TIN AND WOLFRAM.

THE Committee appointed by the Board of Trade to inquire into the non-ferrous mining in the United Kingdom has held several meetings under the chairmanship of Mr. H. B. Betterton, M.P., and has examined a number of witnesses.

Mr. A. F. Maclaren, the chairman of St. Ives Mines, Limited, said that the Giew Mine is the only mine now working in St. Ives district, and this is working at a loss. The mine lost a large proportion of its men at the beginning of the war by the calling up of naval reservists, and insufficient development work was done in consequence; this is retarding operations now. He thought that the Giew Mine and its immediate neighbours could be equipped for work on a sufficient scale for an expenditure of £40,000., and that a profit could then be made if the price of metallic tin were not less than £220. a ton. He estimated that it would require £180,000. to restart the St. Ives Consols group, and thought it would not be possible at this time to raise the money required for such purposes by the usual means.

Mr. E. Terrell gave evidence respecting Wheal Jewell, Wheal Friendship, and Hemerdon Mine. Underground working at Wheal Jewell was suspended in 1916 owing to the scarcity of labour. He was convinced from the yields of tin and arsenic obtained during development that the mine was a sound commercial proposition under ordinary economic conditions, but the present outlook was speculative and not encouraging. The Hemerdon Mines, Limited, opened a large area to supply the war demand for wolfram. Small quantities of wolfram have been produced, and working results have been very promising. By January, 1919, a plant capable of dealing with large quantities of material had been completed at a cost of £75,000., but the heavy drop in the price of wolfram caused the closing of the mine in April. The directors would not be justified in resuming operations under present conditions with a price for wolfram below 55s. per unit.

Mr. Oliver Wethered, vice-chairman of the Cornish Chamber of Mines, vice-chairman of Dolcoath Mine, Limited, and chairman of the Geevor Tin Mines, Limited, explained the present position and prospects of the Dolcoath, Killifreth, Porkellis, and Geevor Mines in Cornwall, and gave his views as to the future of the Nigerian tin industry. He thought that all the available evidence supported the view that the production of the known tin fields of the world could not expand to meet the inevitable increase in demand for the metal, and was of opinion that high prices for tin would probably rule for some time to come. With regard to Cornwall, he thought there were possibilities of large and profitable production at the prices to which he anticipated tin would go, and suggested a loan at a low rate of interest, with repayment deferred for at least 25 years.

Mr. J. H. Bennetts (Workers' Union) and Mr. W. Hosking, Mr. H. Hosking, Mr. W. Richards, and Mr. J. Nankervis (Dock, Wharf, Riverside, and General Workers' Union) thought that State aid was necessary to enable the Cornish tin mines to carry out developments, and, in some instances, to install modern machinery to increase production. The workers should have the first claim on any prosperity resulting from Government assistance.

ITEMS OF INTEREST.

DYE EXPORTS FROM LEEDS.—Dyestuffs amounting to £2,308. were exported from Leeds to America during the quarter ended September 30 last. None was exported in the corresponding period last year.

REPORTED BRITISH PURCHASE OF GERMAN CHEMICAL WORKS.—A German wireless message says that British financial organisations are negotiating for the purchase of large Siebenburg industrial enterprises. A large soda factory and two leather factories there have already passed into British hands.

PRESENTATION.—Mr. Joseph Watson, the former well-known Leeds soap manufacturer, and Mr. L. C. Paget, a director of the Olympia Oil Works at Selby (Yorks.), both of whom have severed their connection with the last-named works, have been the recipients from the Selby employees of pieces of silver-plate.

BUSINESS NOTICE.—The capital of the Lawrence Chemical Company Ltd., St. Dunstan's Buildings, London, E.C. 3., has been increased to £20,000., consisting of 40,000 ordinary shares of 1s. each, and 18,000 cumulative 6 per cent preference shares of £1. each. The whole of the capital is fully subscribed for cash.

POLAND AND PATENTS CONVENTION.—The new State of Poland has acceded to the International Convention governing the mutual protection of inventions, designs, and trade marks in the signatory States, and an Order in Council, taking effect from November 20, therefore makes section 91 of the Patents and Designs Act, 1907, applicable to Poland.

ZINC AND ZINC DUST PRICES.—The price of Australian high-grade zinc dust (88–92% metallic zinc) is maintained at £75. per ton, with but little stock offering for prompt supply. The price of Australian electrolytic zinc (99.95% purity) has been increased to £44. per ton, f.o.b. Australia, for direct shipment to New Zealand, India, South Africa, and the Far East.

TANNING EXTRACT MANUFACTURE AT RUNCORN.—New works are being established at Runcorn, Messrs. Malcolm, of Glasgow, having purchased an old ropery belonging to the Manchester Ship Canal to convert into a tanning extract works. The firm anticipate a market with the big local tanneries. It is expected that a considerable number of men will be employed.

WAGES ADVANCES FOR SOAP WORKERS.—At a mass meeting of Messrs. Lever Bros.' soap workers, on Monday, Mr. Robinson, the general secretary of the National Warehousemen's Union, announced important advances for workers in the soap and candle trades throughout the whole country. He said a conference of workers and members of the Industrial Council had agreed, subject to ratification, that all males should receive a 5s. advance and females under 18, 2s. 6d. When all payments were consolidated, the wages for adults would be £3 10s. per week. This also included clerical staffs. Shift workers they hoped to increase twopence per hour. They were not opposed to co-partnership, but wanted the co-partnership to give the fullest benefits to their members. He asked them to back up their officials, and cease working with non-unionists at the end of the year. A resolution to this effect was unanimously passed, and the terms of the wages settlement agreed to, subject to acceptance by the Trade Industrial Council.

GERMAN CEMENT INDUSTRY.—The vital interests of the German cement industry are bound up in the coal and transport problems of to-day, and the capacity of production is dependent upon these two important factors. About half of the factories are closed down on account of coal shortage. In peace time, when one could rely on the quality of coal, the cement industry calculated on a 50 per cent. consumption of coal in production in a well-run concern. To-day one must calculate on a 60-65 per cent. consumption of coal. With the 75,000 tons of coal which were available from September 1, one can reckon, taking a basis of 50 per cent., that under the most optimistic circumstances 150,000 tons of cement per month at the most can be produced to meet a monthly demand of, roughly, 1,000,000 tons. The production is divided among the three Unions of the German Cement Union—namely, the North German, the Rhine-Westphalian, and the South German,—so that about half falls to the North German Union and a quarter to each of the remaining two Unions. There are no particular difficulties in the labour question in the cement industry, although the available labour cannot be fully employed owing to the limited output of cement.

EXPLOSIVES PERMITTED LIST.—A Home Office announcement explains the effect of "the Explosives in Coal Mines Order of November 14, 1919," which comes into force on January 1, 1920. The Order revises the permitted list of explosives by omitting from the list those which are not being manufactured at the present time, and consolidates the remainder in one complete list by substituting the schedules attached to the new Order for those attached to the old Order of September 1, 1913, and its amending Orders.

SYNTHETIC DAYLIGHT.—Synthetic daylight is the invention of Mr. G. Sheringham, and as developed by Mr. L. G. Martin (Imperial College of Science) and Major A. Klein, was explained on Tuesday, by Mr. Martin at a Royal Society of Arts meeting in London. Great commercial possibilities are said to lie in its development, for among its other advantages it renders possible an exact matching of colours when daylight has faded from the sky. The apparatus exhibited is simple; and it is possible to obtain results with an electric lamp of 300 candle power. Below the bulb an opaque reflector is fitted in such a way that the rays are projected upwards against a screen of various colours arranged in small patches according to a formula. The light which falls back from the screen presents any coloured material in its daylight hue.

ALCOHOL AS MOTOR FUEL.—Some figures relating to the use of alcohol and other fuels in motor vehicles were given by Dr. T. Blackwood Murray in the course of his address as President of the Institution of Engineers and Shipbuilders in Scotland. In France, some years ago, a mixture of 50 per cent. alcohol, 35 per cent. benzole, and 15 per cent. petrol was tried in comparison with pure benzole and pure petrol. The results showed that 46.3 gross ton-miles were obtained per gallon of alcohol mixture; while for petrol and benzole the corresponding figures were 53.2 and 57.1 respectively. He is confident that denatured alcohol could be delivered to the consumer at a figure at which, taking the current prices of petrol and benzole as 3s. 0½d. and 2s. 9d. per gallon respectively, the cost per ton-mile would be 0.53d. for alcohol mixture, 0.578d. for benzole, and 0.686d. for petrol.

NEW ISSUES.—The directors of Bell's United Asbestos Co. Ltd., announce an issue of 110,000 ordinary shares of £1. each, thereby increasing the issued ordinary share capital from £140,000. to £250,000.—An increase from £5,000,000. to £20,000,000 is to be made in the capital of the Anglo-Persian Oil Company. In this connection there is to be an issue of new capital amounting to £8,600,000. in the near future. The issue will comprise £3,000,000 ordinary shares, to be taken up by the existing ordinary shareholders, £3,000,000. 6 per cent preference shares and £2,600,000. 5 per cent. debenture stock.—Jurgens, Ltd., whose authorised capital is £10,000,000., invite applications for 1,500,000 7 per cent. cumulative participating preference shares of £1. each at 21s. per share, the dividend being guaranteed by the Anton Jurgens' Vereenigde Fabrieken (Anton Jurgens' United (Margarine) Works, of Oss, Holland. The object of the present issue is to provide further working capital and for the payment of 1,000,000 12½ per cent. cumulative participating preference shares of the Olympia Oil and Cake Company, Selby.

PERSONAL.—Professor Percy Frankland, F.R.S., formerly of the chair of chemistry at the University of Birmingham, has been awarded by the Council of the Royal Society the Davy Medal in recognition of his extensive research work in chemistry. Professor Frankland succeeded Professor W. A. (now Sir William) Tilden as Professor of Chemistry at the Mason College, Birmingham, in 1894, and subsequently became Dean of the Faculty of Science at the Birmingham University. During the war he undertook a good deal of research work, his services being enlisted by the Italian as well as the British Government. He was a member of a special mission to Italy, in connection with which King Victor conferred upon him the Order of St. Maurice and St. Nazarus.—The Lords Commissioners of the Admiralty have received with regret the resignation of Professor J. C. M'Lennan, O.B.E., F.R.S., whose services have been lent to the Admiralty by the University of Toronto since 1917, and who since January last has been acting as scientific adviser to the Board of Admiralty. Professor M'Lennan, who has recently found it necessary to return finally to his duties as Professor of Physics and Director of the Physical Laboratory in the University of Toronto, has rendered most important services to the Admiralty, particularly in connection with the development of helium gas.

PARLIAMENTARY NEWS.

British Dyestuffs Corporation.

In the House of Commons, Major Barnes asked the President of the Board of Trade what were the terms of the agreement of May 16, 1919, made between the President of the Board of Trade and the trustee of the British Dyestuffs Corporation; what were the amounts of the advances made and to be made under that agreement; and what was the form of the security taken by the Government?

Sir A. Geddes: An agreement to which my hon. friend refers provided for the formation of the British Dyestuffs Corporation, Ltd., and for the advance to that company (subject to certain conditions) of the sum of £530,420., being the outstanding part of a total sum of £1,700,000. which His Majesty's Government had undertaken to advance to British Dyes, Ltd., in which the new company was acquiring a controlling interest. The agreement also imposed conditions as to the articles of association of the British Dyestuffs Corporation, Ltd., British Dyes, Ltd., and Levinstein, Ltd., so as to secure permanent British control of the three companies, and to give the Board of Trade supervision over the prices charged for, and the distribution of, the companies' products. The restriction previously imposed upon the rate of dividend payable on the share capital of British Dyes, Ltd., was removed. The Government advances were secured by debentures issued by the three companies. The arrangement was subsequently modified, the Government advance, made with the intention of fostering the British dye industry, taking the form of a subscription for 850,000 £1. preference shares and 850,000 £1. preferred ordinary shares in British Dyestuffs Corporation, Ltd.

Major Barnes, on Wednesday, asked the President of the Board of Trade if the agreement of May 16, 1919, made between the President of the Board of Trade and the trustee of the British Dyestuffs Corporation on June 16, 1919, was ratified by the British Dyestuffs Corporation; by whom the proposal to modify the agreement was made; what were the grounds advanced in support of the modification; and on what date was the share capital subscribed for by the Government?

Sir Auckland Geddes: The answer to the first part of the question is in the affirmative. Suggestions as to the modification of the form of Government financial assistance were made to the Board of Trade mainly by representatives of the dye-using interests, on the ground that, though His Majesty's Government were urging those interests to give financial support to the development of the dye-making industry in this country, because of its national importance, the Government were not participating in the risks, but were taking ample security for their advances, thus throwing the whole risk upon the consumers. The Government subscription for shares, as I have already explained, was an alteration in the form of the Government's financial assistance to the dye industry in this country. This alteration was made on July 17 of this year.

Importation of German Dyes.

Major McKenzie Wood, on Monday, asked the President of the Board of Trade whether he can state the value of the dyes which have been received by this country from Germany; and on what basis their price is fixed for sale to consumers?

Sir A. Geddes: No dyestuffs have so far been received from Germany under the Reparation Clauses of the Peace Treaty, though consignments are now on the way. The values to be credited to Germany are to be fixed by the Reparation Commission, subject to certain conditions, but I understand that the Commission have not yet come to a definite decision on the matter.

Major Wood: Can the right hon. gentleman answer the latter part of the question as to price?

Sir A. Geddes: It is governed by part of the answer I have given.

Major Wood: To consumers?

Sir A. Geddes: Surely the hon. member understands that these dyes are really the property of the Reparation Commission and are to be sold in this country on their behalf. We cannot fix prices here until we know what the prices are.

Sulphate of Quinine.

Mr. Hurd asked the President of the Board of Trade why the Report of the Committee on Prices and Supplies of Quinine Sulphate has not been published as promised; and what is the cause of the delay?

Sir A. Geddes: I regret that it has not yet been possible to publish the findings of the Committee appointed to investigate the prices and supplies of quinine sulphate; the delay has been occasioned by the necessity of considering certain legal questions connected with the publication of the Report.

Explosives Storage at Penrhynedraeth.

Mr. H. Jones, on Tuesday, asked the Parliamentary Secretary to the Ministry of Munitions whether he is aware that there is ample accommodation for the storage of high explosives at His Majesty's factory, Penrhynedraeth, where there is also the necessary staff; and whether, having regard to national economy, he will cause the explosives now stored at Dinas Mawddwy to be removed to Penrhynedraeth with a view to the closing of the former store and the saving of about £700. per annum?

Mr. J. Hope: On November 3, in answer to a question put by my hon. friend, I stated that £12,000. had already been realised by sales of explosives stored in this magazine. Negotiations are now in progress for the sale of the balance of the stock, and pending a definite decision it is not considered economical to incur any additional expense, in handling and transport, by the transfer of the stock from Dinas Mawddwy to Penrhynedraeth.

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 4, Queen Anne's Gate Buildings, London, S.W. 1, whence further information may be obtained:—

Spain.

H.M. Consul-General, Barcelona, reports that a Spanish firm of commission agents in that city desire to get into touch with British houses manufacturing chemical and pharmaceutical products, dyes, paints, and varnishes. (Reference No. 1073.)

Peru.

A firm of good standing in Lima are desirous of representing British manufacturers of soaps and aniline colours. (Reference No. 1081.)

Canada.

The following inquiries have been received at the Canadian Government Trade Commissioner's office, Portland House, 73, Basinghall Street, London, E.C. 2, when further information may be obtained:—

A manufacturers' agent and importer in Vancouver is desirous of effecting connections with United Kingdom shippers of English cliffstone lump whiting, iron oxides, and lithopone.

A Canadian Government Department has for disposal a quantity of molybdenite concentrate, and also of tungsten concentrate, and asks for the names of buyers who would be prepared to make offers.

THIRTY YEARS AGO.

From the "Chemical Trade Journal" of November 30, 1889.

Leblanc and Losh.—Our countryside has an especial interest in the memory of Leblanc. Our great alkali industry had its mainspring in his genius. But more than that, it was Mr. Losh, whose memory is still green on the Tyne, who was the first to put in practice in England Leblanc's process for making alkali. It throws a remarkable light on these troublous times that the process was not taken up in England till twenty years after its invention, so effectually and so long was communication between the two countries cut off by the war that raged.

The Russian Government and the English Petroleum Trade.—We learn from London that the Russian Government has despatched to England, to report on the actual conditions of the petroleum trade, M. Gulishambaroff, chief petroleum adviser to the Ministries of Finance and Crown Domains, controlling the Russian petroleum industry. M. Gulishambaroff has edited most of the Russian official literature dealing with petroleum, and is regarded as the leading technical authority in Russia. He ridicules as a canard the statement that the Baku oil supply is decreasing.

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66, Deansgate,
Manchester.

Tel.: Central 3060.
Telegrams: "Expert, Manchester."

DAVIS BROS.,
Chemical Engineers,

265, Strand,
London, W.C.2.

Tel.: Central 13,692.
Telegrams: "Trepex, Estrand, London."

ANTI-DUMPING BILL.

THE text of the Imports and Exports Regulation Bill, 1919, which was introduced into the House of Commons last week, has since been issued. The following extracts are from that section of the Bill relating to the anti-dumping proposals:—

The Board [of Trade] on being satisfied—

- (a) that goods of any class or description produced or manufactured in any country outside the United Kingdom are systematically and in substantial quantities being imported into or being sold or offered for sale in the United Kingdom at prices below the foreign value as defined by this Act or that there are good grounds for apprehending that such importation or sale is about to take place; and
- (b) that the production or manufacture of similar goods in the United Kingdom is or is likely to be thereby adversely affected,

may by order apply this Part of this Act to goods of that class or description, if imported from or if made or produced in any country outside the United Kingdom, or such country or countries as may be specified in the order, and either without any limitation of time or for such period as may be so specified, and either without any exceptions or subject to such exceptions as may be so specified.

While an order applying this Part of this Act to any goods is in force, no person shall subject as hereinafter provided import into the United Kingdom any goods to which the order applies, other than goods imported without previous sale, if the import price of the goods as ascertained by the Commissioners is less than the foreign value of the goods as stated in such sworn declaration and certificate as aforesaid:

Provided that the importation of any such goods as aforesaid shall not be deemed illegal in any such case as aforesaid if the importer before the clearance of the goods pays to the Commissioners such sum as in the opinion of the Commissioners is equal to the amount by which the foreign value of the goods exceeds the import price thereof

While an order applying this Part of this Act to any goods is in force no person shall, except as hereinafter provided, on the first sale of any such goods which have after the date on which the order came into force been imported into the United Kingdom without previous sale, sell the goods at a price which is less than the foreign value of the goods:

Provided that any such sale as aforesaid shall not be deemed to be unlawful if the vendor either—

- (a) previously to or within such time after the sale as may be allowed by the Board pays to the Board a sum equal to the difference between the price at which the goods are sold and the foreign value of the goods; or
- (b) previously to the sale has satisfied the Board that the sale at the price at which the goods are to be sold is due to depreciation in the quality of the goods or to any other cause which it appears to the Board should be taken into account.

If any person sells any goods in contravention of the provisions of this section he shall be liable to forfeit such sum as the Board may demand not being greater than the value of the goods, and any such sum shall, without prejudice to the recovery thereof as a debt to the Crown, be recoverable by the Board summarily as a civil debt.

LIST OF GOODS THE IMPORTATION OF WHICH MAY BE PROHIBITED.

Part I.

(1) Derivatives of coal tar, generally known as intermediate products, capable of being used or adapted for use as dyestuffs or of being modified or further manufactured into dyestuffs.

Direct cotton colours, union colours, acid colours, chrome and mordant colours, alizarine colours, basic colours, sulphide colours, vat colours (including synthetic indigo), oil, spirit, and wax colours, lake colours, and any other synthetic colours, dyes, stains, colour acids, colour lakes, leuco acids, leuco bases, whether in paste, powder, solution, or any other form.

(2)—(i.) Synthetic drugs (including antiseptics).

(ii.) Synthetic perfumes and flavourings, synthetic photographic chemicals, synthetic tannins, esters and acid derivatives of aromatic hydrocarbons, alkaloids and their salts

(except quinine), and the following organic chemicals: Acetamide, acetic acid, acetic anhydride, acetyl chloride, camphor bromide, cinnamic acid and its salts, ethylene bichloride, formamide, formic acid and its salts, gallic acid, lactic acid and its salts, nuclein, paraldehyde, pyrogallol, saccharine or other substances of like nature or use, salicin, thymol.

(iii.) Analytical reagents and the following fine chemicals: Barium compounds, cerium fluoride and fluorides of other rare earth metals, hydrosulphites and allied bleaching compounds, hypophosphorus acids, iron and ammonium citrate, iron tartrate, molybdic acid and its salts, phosphorus oxides and halogen compounds, salts of per-acids and artificial peroxides, silver nucleinate and proteinate, tungstic acid and its salts.

(3) Optical glass, including lenses, prisms, and like optical devices.

- (4) Scientific glassware.
- (5) Illuminating glassware.
- (6) Laboratory porcelain.
- (7) Scientific and optical instruments.
- (8) Potassium compounds.
- (9) Tungsten powder and ferro-tungsten.
- (10) Zinc oxide.
- (11) Lithopone.
- (12) Arc lamp carbons and carbon electrodes.
- (13) Magnetos and permanent steel magnets.
- (14) Hosiery latch needles.
- (15) Gauges.

Part II.

- (1) Thorium nitrate.
- (2) Gas mantles and gas mantle rings.

Writing to *The Times* of Monday with reference to the above schedule, Dr. A. P. Laurie says:—

"It is sufficiently notorious that many dyes urgently required cannot be, or at any rate are not, made by the British Dyes Combine, and must be imported from America or Switzerland. The unhappy user has to apply to the Board of Trade for a licence each time he imports, and never knows when permission may be refused by some official in Room 236, against whose decision there is no appeal. The Board of Trade in one aspect is a dye manufacturer to about one and a half millions, in the other aspect can forbid competition from rivals. The wretched user of the imported dye never knows at what moment his supply may be cut off, and therefore dreads to extend his business. To take another section, the prohibition of fine chemicals, optical and scientific instruments, and chemical glassware, is striking a serious blow at all scientific teaching and research. Not only are the prices disgracefully high, and in many cases the quality, is scandalously bad, but the two or three firms to whom this valuable monopoly has been granted cannot, or do not, choose to supply the demand. While schools and colleges are clamouring for material, they talk of delivering in six months, and the Board of Trade prohibits importation from France.

"If the rest of the list is examined, it will be found to consist of the most extraordinary collection of articles, hardly one of which has anything to do with war. I take two, zinc oxide and lithopone, as an example. There are three pigments suitable for white paint—white lead, zinc oxide, and lithopone. Before the war zinc oxide was largely imported from America, and the Government encouraged its use in place of the poisonous white lead. There is, I believe, one small factory in this country, and one small and one large factory of lithopone, which was largely manufactured and imported from Holland. What is the result of presenting this monopoly to one firm? Before the war lithopone was sold at a little over £9. a ton. To-day it is £40. a ton. I could take many other examples from this list."

The following statement appeared in *The Times* of Wednesday: In his letter on the Anti-Dumping Bill, published on Monday, Dr. A. P. Laurie, referring to the manufacture of zinc oxide, said there was only one zinc oxide factory in this country. As a matter of fact, there are six such factories, of some considerable standing, with a productive capacity of zinc oxide of not less than 20,000 tons per annum, which figure was the average consumption in this country in the years preceding the war. There are factories in London (Enthoven's), at Swansea (Down's), at Newcastle (Foster, Blackett and Wilson's), at Birmingham (Chance and Hunt's), at Luton (Fricker's), and at Stoke-on-Trent (Keeling and Walker's).

FRENCH CUSTOMS DUTIES ON CHEMICALS.

(Concluded from page 543.)

THE following statement, reprinted from the *Board of Trade Journal*, gives particulars regarding the proposed new classification of, and rates of duty on, the principal chemical products contained in Article I. of the Bill referred to in a recent issue, recently passed by the French Chamber of Deputies and the Senate, but not yet promulgated as law. The rates of duty at present leviable on the articles covered by the new proposals are shown for purposes of comparison. Goods of United Kingdom origin and manufacture are entitled to the rates of the "Minimum" Tariff. Italicised and other letters attached to the rates of import duty refer to the explanatory notes which are given at the end.

NOTE.—*Ad valorem* duties are indicated by the use of the "per cent." sign (%). In all other cases the rates are quoted in francs (and centimes) per 100 kilogrammes. Unless otherwise indicated, duty is levied on *gross* weight when the rate of duty is 10 fr. or less per 100 kilogs., and on *net* weight when the rate exceeds that figure.

Rates of Import Duty under:—

Tariff No.	Articles.	Rates of Import Duty under:—			
		"General" Tariff.		"Minimum" Tariff.	
		Present.	Proposed.	Present.	Proposed.
		Per 100 kilogs.	Per 100 kilogs.	Per 100 kilogs.	Per 100 kilogs.
236	Iodide of ethyl and methyl	500 00	1200 00	400 00	600 00
257	Amylic alcohol	8 00	25 00	6 25	12 50
257 bis	Methylic alcohol, crude (methylenic)	11 50	25 00	11 50	11 50
257 bis	Methylic alcohol, rectified	11 50	50 00	11 50	25 00
267	Glycerine: crude	10 00	12 00	3 75	4 00
	Glycerine: distilled	20 00	30 00	7 50	10 00
257 ter	Formic aldehyde in solution at 40%	115 00	50 00	4 9 50	25 00
257 ter	Trioxymethylene	336 00	120 00	624 00	60 00
282	Hexamethylene tetramine and derivatives	71%	20%	5%	10%
271 ter	Acetone	622 50	50 00	615 00	20 00
282	Methyl acetate	71%	50 00	5%	20 00
282	Solvents with base of acetone and methyl acetate	71%	61 00	5%	20 00
258	Acetic acid:				
	Containing less than 40% of crystallisable acid	610 00	15 00	6 5 00	5 00
	Containing 40%—80% of crystallisable acid	620 00	30 00	610 00	10 00
	Containing more than 80% of crystallisable acid	630 00	50 00	615 00	20 00
282	Acetic anhydride	71%	50 00	5%	20 00
271 bis	Acetate or pyrolignite of lime	6 4 50	9 00	6 3 00	3 00
256	Acetate of Copper:				
	Crude	615 00	20 00	610 00	10 00
	Refined in powder	622 00	30 00	614 50	11 50
	Refined crystallised	631 50	40 00	621 00	21 00
256	Acetate of iron	Free	20 00	Free	10 00
256	Acetate of lead	611 40	20 00	6 7 60	9 50
256	Acetate of potash	633 00	45 00	622 00	22 00
256	Acetate or pyrolignite of soda, hydrated or crystallised	606 00	10 00	60 1 75	5 00
256	Other acetates of soda	606 00	12 00	60 5 00	6 00
282	Acetate of cellulose in powder, or small lumps, not plastic	71%	300 00	5%	120 00
281 quarter	Acetate of cellulose (plastic) in plates, sheets, canes, tubes, etc.	150 00	100 00	75 00	150 00
269 ter	Formic acid and formiates	22 00	30 00	15 00	15 00
238	Tartaric acid	618 00	24 00	612 00	12 00
278	Tartrates of potassium (wine lees, pure tartar, tartar crystals, neutral tartrate of potassium, double tartrate of potassium and of soda)	Free	Free	Free	Free
238	Oleic acid:				
	Of animal origin, other than fish fats	1 50	9 00	Free	3 00
	Other (deglycerinated oil)	5 50	18 00	3 50	6 00
238	Stearic acid	13 50	27 00	9 00	9 00
282	Valerianic acid (iso) and valerianates of ammonia, iron, magnesia, soda and zinc	71%	400 00	5%	200 00
282	Other valerianates	71%	30%	5%	15%
238	Lactic acid:				
	Industrial	222 00	50 00	215 00	16 00
	Pure	225 00	200 00	218 00	100 00
269 bis	Lactate of lime	322 00	30 00	315 00	15 00
269	Lactate of iron	350 00	86 00	343 00	43 00

Tariff No.	Articles.	Rates of Import Duty under:—			
		"General" Tariff.		"Minimum" Tariff.	
		Present.	Proposed.	Present.	Proposed.
		per 100 kilogs.	per 100 kilogs.	per 100 kilogs.	per 100 kilogs.
268	Lactate of antimony— <i>see above.</i>				
269 bis	Lactates of manganese, strontium, soda and zinc	322 00	200 00	315 00	100 00
269 bis	Other lactates	322 00	30%	315 00	15%
238	Oxalic acid	19 00	25 00	12 50	12 50
271	Oxalates of potassium	15 00	25 00	12 50	12 50
282	Oxalate of iron	71%	50 00	5%	25 00
238	Citric acid:				
	Liquid (lemon juice, natural)	Free	20 00	Free	Free
	Crystallised	75 00	100 00	50 00	50 00
263	Citrate of lime	Free	20 00	Free	Free
282	Ammoniacal citrate of iron, citrates of magnesia, of potassium, and of soda	71%	100 00	5%	50 00
282	Other citrates	71%	30%	5%	15%
238	Tannic acid (tannin)	71%	200 00	5%	100 00
238	Gallic acid, crystallised	140 00	210 00	93 00	120 00
282	Sulphovinate of soda	71%	20%	5%	10%
282	Sulphate of methyl	71%	50 00	5%	25 00
266 bis	Acetic ether and sulphuric ether of any strength (ethyl oxide)	60 00	80 00	40 00	40 00
282	Ethyl malonate	71%	300 00	5%	150 00
282	Ethyl diethylmalonate	71%	400 00	5%	200 00
282	Cyanacetic ether	71%	400 00	5%	200 00
282	Chloroacetic ether	71%	300 00	5%	150 00
282	Hydrochloric ether	71%	20%	5%	10%
282	Acetylacetic ether	71%	350 00	5%	175 00
282	Chloroacarbonic ether	71%	200 00	5%	100 00
282	Diethylsulphonedi-methylmethane (sulphonol)	71%	600 00	5%	300 00
282	Diethylsulphonedi-methylmethane (trional)	71%	1000 00	5%	500 00
282	Ethylurethane (urethane)	71%	700 00	5%	350 00
282	Diethylmanolyurea (veronal) (diethyl-barbituric acid)	71%	800 00	5%	400 00
282	Acetyl-cellulose— <i>see "Acetate of cellulose" above.</i>				
282 quarter	Collodion containing: Up to 10% of soluble cellulose	6120 00	6120 00	610 00	610 00
	More than 10% of soluble cellulose	60 00	plus 12 fr. per kilog. for each kilog. of cellulose in excess of 10%	40 00	plus 4 fr. per kilog. for each kilog. of cellulose in excess of 10%
281 bis	Chemical manures:				
	Phosphatic manures:				
	Mineral superphosphates	Free	0 75	Free	0 25
	Compound or manufactured manures (mixtures of superphosphate with potassic or nitrogenous matters, such as sulphate of ammonia, nitrate of soda, organic matter, or with two of them)	Free	0 75	Free	0 25
	Bone superphosphate and phosphate precipitated from bones	Free	0 75	Free	0 25
	Dephosphorisation slag	Free	Free	Free	Free
	Various phosphatic manures, such as precipitated mineral phosphate, phosphate of alumina	Free	0 75	Free	0 25
	Double superphosphate, superphosphate of ammonia, superphosphate of potash	Free	1 50	Free	0 50
281 bis	Nitrogenous manures:				
	Natural organic manure	Free	Free	Free	Free
	Made up organic manures	Free	0 75	Free	0 25
(251)	Sulphate of ammonia	4 50	8 00	Free	Free
(270)	Nitrate of soda	Free	Free	Free	Free
(270)	Nitrate of lime and calcium cyanamide	Free	Free	Free	Free
282	Chemical products not elsewhere specified	71%	30%	5%	15%

b.—"Coefficient of Increase" (Decree of 8th July) = 3.

c.—"Coefficient of Increase" (Decree of 8th July) = 1.4.

d.—Including tax to cover the expenses of supervision of soda factories.

e.—Not including the internal revenue tax.

f.—Not including the internal revenue tax on alcohol.

g.—Liquid.

h.—Concentrated.

y.—The present rates on formic acid containing over 60% (by weight) of free acid are:—"General," 25 fr., "Minimum," 18 fr., per 100 kilogs. The "Coefficient of Increase" of the rates of duty on formic acid is 1.1.

z.—Containing 60% (by weight) or less of free acid—"Coefficient of Increase" = 3.

A.—Containing over 60% (by weight) of free acid—"Coefficient of Increase" = 3.

B.—"Coefficient of Increase" (Decree of 8th July) = 2.9.

FERTILISER NEWS.

(SPECIALLY CONTRIBUTED.)

Nitrate of Soda.—The coal strike in the United States is delaying steamers fixed for loading nitrate in Chili, and the shipments thence in the first half of this month point to a much smaller quantity than was expected, leaving early despatch. The Producers' Association, which is now said to have sold about 1,100,000 tons for delivery up to the end of March, may, as we anticipated, find some difficulty in regard to sufficient tonnage, this being the more regrettable since the nitrate has already been waiting so long, and losing weight. November is the best month for shipment of the fertiliser by sailing vessel to arrive in Europe for the spring season, but for some time to come the larger part will probably be shipped by steamer, so many of the former having been lost during the war. The *Cap Horn*, one of the largest French nitrate carriers, left Antofagasta at the beginning of July, and has not since been heard of, the reinsurance premium being 20 guineas per cent. The modest requirements of the British farmer will at all events be easily satisfied, as parcels of a thousand tons or more keep arriving from Chili by the regular liners, the quotation being about £19. per ton, cost, freight, and insurance; the present extremely high charges for landing and delivery account for the wide margin between the above price and that "free on rail" quoted in another column. Continental consumers of nitrate of soda are said to be buying for spring delivery in spite of the fabulous prices due to currency depreciation referred to in our last issue; but interest in the article is at a very low ebb in this country, and business seems to have come to a standstill in Chili since the Producers' Association again put up its "fixed prices."

Sulphate of Ammonia.—Home demand is still reported good for this material, the gradually ascending scale of prices apparently bringing in orders earlier than would otherwise be the case. There is not a strong export position. The price for export is a good one, but either there is not the material available or else the general conditions of the export trade are not attractive, even in view of the better prices obtainable. At the lowest, however, £25. per ton; f.o.b., is being quoted for export.

Basic Slag.—Orders for this fertiliser still come in freely. Many of these are accompanied by plaintive requests for early delivery. That is not a condition that can be complied with, however. Many of the works are now something like two months behind in deliveries. This position seems to recur year after year with unvarying regularity. The material is certainly very popular, and there is no doubt that a very much larger market will be available when supplies are increased and deliveries expedited. Basic slag is a fertiliser with a very big future before it.

Bone Meals.—Business remains on the quiet side in bone meals. The Indian supply of bone meal is declared to be very heavy, but extreme difficulty is still found in procuring tonnage, and in one quarter it is said that £17. per ton has to be paid for the article on arrival. On the other hand, concessions which certain shippers recently made have brought buyers out for small business for shipment running up to about £14. 10s., c.i.f. terms. Imports, however, are very unimportant.

Blood, Tankage, Etc.—There appears to be a little increased firmness in dried blood, and as much as 33s. to 34s. per unit of ammonia, c.i.f. terms, has been quoted. There is a very good inquiry for foreign tankage, but little available stock in hand. Values in this section appear to be 32s. per unit of ammonia and 2s. 6d. per unit of phosphates. In meat meal there is no change to be reported, but demand is steady, with values roughly approximating to the above-mentioned prices.

Potash.—Potash fertilisers are again declared to be rather more plentiful, but Alsatian supplies do not figure so largely as was expected to be the case by this time. The position with regard to American potash is still very uncertain. The industry has been marking time since the Armistice owing to the fact that American consumers have been expecting that heavy shipments of foreign potash would be resumed at somewhere near the pre-war prices. Therefore they have held off buying domestic potash at ruling values. The result of this also has already been recorded in these columns, and it has meant the closing down of many plants in Nebraska, California, and elsewhere. Everyone waits upon a definite policy with regard to the exportation of potash salts from Germany

and France to the United States. If unrestricted importation is allowed at prices even 50 per cent. greater than in 1913, we think very few, if any, of the domestic producers would be able to compete. What would save them would be a policy assuring a market for the domestic potash at a sufficient minimum figure per unit for several years. The imports of Alsatian potash salts into the United Kingdom during the week ending November 22 were 885 tons of sylvinite, 14 per cent. Current quotations are as follows: Sylvinite, 14 per cent. (French kamit), £7. per ton; sylvinite, 20 per cent. (French potash salts), £8. 7s. 6d. per ton; muriate of potash, 80 per cent., £19. 7s. 6d. per ton.

SOUTH WALES NOTES.

(SPECIALLY CONTRIBUTED.)

Important inquiries are still coming to hand from foreign markets for all kinds of tinplates, and manufacturers are busy in executing orders. The supplies now are not equal to the demand, but the greatest difficulty the makers have to contend with is the shortage of suitable men for the mills which they intend to restart. The Dynevor tinplate works, which changed hands some few months ago, and have been idle for some time, during which a modern plant has been installed, have recommenced operations.

There continue to be satisfactory markets for patent fuel, and prices are steady. The announcement of the reduction in the price of coal has not had much, if any, effect on the briquette trade, inasmuch as manufacturers are booked up to the end of this year, but no doubt there will be an easing off in quotations for new contracts. Colliery owners are steadily competing with each other for prompt orders, and were on Tuesday making concessions of from 3s. to 6s. per ton to immediate buyers.

Coke markets are strong and steady, and orders on hand will keep the ovens going for several weeks to come. This means that the production of by-products will in all probability be much larger than was anticipated a short time ago. Sulphate of ammonia is moving off extremely satisfactorily, and there is no trouble in selling the other products.

A good market has been opened up for silica bricks, and the South Wales owners of silica quarries have for a few years back turned their attention to the making of refractory materials. They are now firmly established not only upon the home markets, but have also good customers in the French steel makers and others.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

(SPECIALLY CONTRIBUTED.)

The condition of the hematite pig-iron trade in the district between Workington and Carnforth, where there are now only twenty-one furnaces in blast, is not such as to encourage the hope that the quantity of coke required for furnaces on ordinary iron will not further diminish, and the prospects of the coking industry, if it were to remain wholly dependent on the iron trade, as hitherto it always has done, would be gloomy indeed. It is plain that the worst of the depression that is settling upon the iron trade in Cumberland and North Lancashire has not yet been seen. Furnaces on low phosphorus brands, as well as on ordinary qualities of iron, will be damped down in the course of a week or two, and then East Coast supplies as well as supplies of local coke will be decreased. Despite the tightness of affairs, however, in the iron trade, the outlook of the coking industry is improving; and, as a matter of fact, there has been such an improvement during the last week or two that two of the plants are now in full operation, and another is working at two-thirds of its capacity. When the remaining plants are to become similarly busy depends more upon the release of trucks than upon the growth of the demand for coke for export. Continental requirements have become so large that if the wagons could be found to take the coke to the East Coast for shipment the ovens would speedily be needed to be put into full blast. Already, some thousands of tons of coke have gone across to the East Coast, and a small supply, too, is being shipped locally. The by-product market is fairly brisk. It is not paying at present to rectify, the demand for crude benzole being far in excess of supply. Sulphate of ammonia is quieter, and is sticking somewhat. Tar is a good market, and pitch and creosote are moving away fairly well.

LEGAL INTELLIGENCE.

Customs Seizure of Pyrogallie Acid.

An important test case relating to restrictions on imports by the prohibition of the import of pyrogallie acid was heard by Mr. Justice Sankey in the King's Bench Division on Wednesday, when a non-jury action was brought by the Crown, through the Attorney-General, against John Brown, trading as Brown and Forth, chemical manufacturers, of 10, Dolefield, Bridge Street, Manchester, and Farringdon Street, London.

The Attorney-General said the suit was one, by information, for the condemnation of six packages of pyrogallie acid, claimed to be forfeited as having been imported contrary to the Prohibition of Imports, No. 32, Proclamation of 1919. The real point on a certain view of the facts was as to whether that proclamation was properly made. It was dated June 25, 1919, and was made under Section 43 of the Customs Consolidation Act of 1876, which related to the importation of certain articles into the United Kingdom. The section provided that the importation of arms, ammunition, gunpowder, or any other goods, might be prohibited by proclamation, and the proclamation laid down that, whereas it was expedient to prohibit the importation of certain goods, chemicals of all descriptions were prohibited from importation unless imported on licence given by the Board of Trade. In view of statements which had been made, continued Counsel, perhaps it was right for him to observe that the conduct of the Executive in that matter had been consistent from the outset. This was the

2nd proclamation of its kind, and, since the war began, no matter what the composition or complexion of the Government had been, or what the Law Officers were, the same interpretation had been put on the section throughout. The Act was dealing manifestly with all goods of any kind, and began by saying that all goods may be imported unless they were prohibited, but that the importation of Army ammunition powder or any other goods may be prohibited by proclamation or by order of Council. The words of the section meant exactly what they said, and not other goods of the same genus as arms, ammunition, or powder.

The facts in the case, continued Counsel, were not in dispute. On August 17 this year the pyrogallie acid was imported on the steamer *Boric* into the port of Manchester by the defendant, and on August 28 the goods were seized by Wilfred Buckley, the Customs Officer at Manchester. The following day notice of seizure was given to the defendant, and on September 1 the latter wrote pointing out that the goods were ordered on June 17, 1919, from a Canadian chemical works, and were therefore ordered before the regulations, by virtue of which they were seized, were enacted. They also pointed out that it was obviously for their own benefit that the suppliers had shipped the goods from New York and not from Montreal.

His Lordship, dealing with the contention that all free imports could be stopped by order in Council, said that might be right, but if it was it was a little astonishing.

The Attorney-General submitted that a general power was given to the Executive, to be exercised in times of emergency, to prohibit, by proclamation or order in Council the importation of any goods. Any action under this power which was bitterly resented by public opinion would, of course, be followed by the usual Parliamentary consequence.

His Lordship: There is nothing about times of emergency in Section 43.

Counsel: The words are not there.

Proceeding, the Attorney-General dealt with the uses of pyrogallie acid, and said its most familiar use was for developing in photography. No one required to be told that photography was indispensable in warfare; but, more than that, this acid might be used for the production of poisonous gas, and it belonged to the same family as picric acid, which was an explosive.

Mr. Wright, K.C., argued that the acid was an ordinary commercial substance, and was used for other purposes than photography. That case, he proceeded, turned on the construction put on the Section of the Consolidation Act. The real issue was whether by the Act of 1876, which repealed an earlier Act of 1856, the Legislature had vested in the Executive the absolute power, at their discretion entirely, to reverse or abrogate the policy of free imports and substitute a limited or unlimited power of restriction on imports and exports.

The hearing was adjourned.

Chemical Contract: Arbitration Dispute.

In the King's Bench Divisional Court on Thursday (November 20) before Mr. Justice Coleridge and Mr. Justice McCardie, Messrs. T. W. Watson and Co., chemical and general manufacturers, of Eldon Street, London, sought to set aside an award made by a commercial arbitration in favour of Messrs Mann and Cook, St. Michael's Alley, Cornhill, E.C., with respect to two contracts for the supply of sulphate of alumina.

For the appellants Mr. A. Powell, K.C., said the appeal was based on the alleged erroneous conduct of the arbitrators, who, they said, rushed through matters with the result that the applicants suffered badly, the award being made against them. There were two contracts for the sale of sulphate of alumina, one for 50 tons and one for 40 tons, at £10. 5s. per ton. The contracts were made in February, 1918, and delivery was to be made between February and May, 1918. These contracts were subject to certain conditions, which seemed to have been absolutely ignored by the arbitrators. That was the reason appellants were there that day. The goods were ordered by Messrs. Watson and Co. from a man named Taylor, who was to get them from Pochin and Co., of Manchester. Messrs. Mann and Cook were the purchasers. The goods were not forthcoming, and Messrs. Mann and Cook bought against Messrs. Watson and Co. at a much higher price, and claimed that they were entitled to the difference as damages. The arbitrators awarded them £517. 10s. damages. This sum, observed counsel, would have been somewhere near the mark if there had been no conditions, but these were not gone into by the arbitrators. These gentlemen were originally a Mr. Roff and Mr. McCarthy, but the place of the latter was eventually taken by Mr. Pintus. Messrs. Watson and Co. put the matter into the hands of their solicitors and expected to get due notice of the arbitration, but they only received an intimation that the arbitration was to be held an hour before it took place. Mr. Watson was in the Naval Air Service, and he was represented at the arbitration by his stepmother, his solicitors being unable to be present. The contracts, continued counsel, contained the condition: "Subject *force majeure*, and especially clause one and special war clauses." There would have been no arbitration if the war clauses had been set out in full. The important war clause, which was well known in the trade, was: "Reasonable provision having been made by sellers for the supply of the goods, the contract is subject to their orders with works or suppliers being fulfilled." This clause, it was contended, applied to the contracts, although it was not set out in full.

Legal argument ensued, and eventually the parties agreed to refer the matter to Mr. George Wallace, K.C., as sole arbitrator.

A Contract for Soap: Arbitration Award Sent Back.

An alleged breach of contract for the supply of soap was argued before Mr. Justice Coleridge and Mr. Justice McCardie, sitting as a Divisional Court in the King's Bench Division last week, when they heard the case Martins and Co., Ltd. v. Reginald Godfrey and Co.

According to Mr. Neilson, K.C., for the respondents, an arbitration was brought by Messrs. Godfrey against Messrs. Martins on an alleged breach of contract between the parties for the supply of certain quantities of soap. Claimants said that no deliveries had been made, and for this breach of contract they asked for damages. The claim was for non-delivery of 500 tons of soap on the basis of the difference between the invoice price of £40. a ton and the market price of £61. a ton. The defence raised the point that there was no contract and therefore no breach and no damages. Respondents requested the arbitrators to state their award in the form of a special case. They agreed to do so, but they published the award without any reference to respondents' request as to a special case. The arbitrators were Messrs. Taylor and Pintus, and they appointed an umpire named Barnett. The point in the arbitration was that the original contract was made between the Williams Chemical Manufacturing Company and the claimants, Messrs. Godfrey. The latter firm said that Messrs. Martins took over the contract, or that the Williams Co. were their agents for that purpose. Appellants wanted to know whether there was a contract between Messrs. Godfrey and Messrs. Martins; if so, what were the terms, and there having been no deliveries, were Messrs. Martins excused from non-performance of the contract, if any? If not, what was the measure

of damages? The award was for upwards of £8,000 against the appellants. The question was whether there was a contract between respondents and the claimants with respect to the transaction with Williams and Co., who seemed to be intermediaries.

Mr. Patrick Hastings, K.C., argued that the arbitrators were right in taking the view that the question was merely one of fact, and that therefore they had not been guilty of error of conduct by refusing to state a case.

Mr. Justice Coleridge, giving judgment, said that applicants' contention that there was no contract because the contract was not made with them but with the Williams Chemical Manufacturing Company was *prima facie* a question of fact. As to the second point with respect to the construction of the contract this depended on the interpretation of a number of documents and was a question of law. Either party could have insisted on a case being stated, or a postponement of the award to give them an opportunity of applying to the Courts. By an error of judgment appellants had been deprived of that opportunity before the delivery of the award. He felt that the proper course was to set aside the award and remit to the arbitration the points raised—viz., Was there any contracts between the applicants and respondents, if so, what were the terms of it; were respondents excused performance of the contract, and if not what was the proper measure of damages?

Mr. Justice McCardie agreed.

Palm-oil Soap.

A claim for damages for alleged breach of contract for the non-delivery of palm-oil soap came before Mr. Justice Roche in the Commercial Court of the King's Bench Division on Thursday (November 20). The plaintiff was Mr. Alfredo Beer, a merchant carrying on business in Cairo, Egypt, and the action was brought against Messrs. A. Wilson and Co., export merchants, of Great Tower Street, London.

Plaintiff's case was that on November 23, 1914, he invited defendants to quote for a supply of palm-oil soap, which it was stated was required for sale to the Egyptian Government for delivery in April or May, 1915, and the plaintiff requested a quotation not later than January 10, with the offer firm till March 15. Defendants offered to supply the soap, and quoted 30s. 3d. per box, c.i.f., war insurance risks included. In February, 1915, plaintiff placed an order on the terms of the quotation for 68,800 boxes of soap. It was alleged that in breach of the contract defendants wrote to the plaintiff on March 5, 1915, refusing to accept the offer.

Mr. H. Drysdale Woodcock, on behalf of the plaintiff, said the whole case rested on the correspondence, except one point, and that was the amount of damages. Plaintiff, living in Cairo, was aware that the Egyptian Government were looking out for supplies of various things, amongst them soap, and he received on October 1, 1914, from the defendants a circular letter holding themselves out as able to supply all sorts of things, happily amongst them soap. On November 23 plaintiff wrote to the defendants asking for a firm offer until March 15, 1915. Defendants made a quotation for the soap, and in due course plaintiff obtained a contract with the Egyptian Government. On February 16 plaintiff sent the defendants a formal order, but the soap was never supplied. The Egyptian Government bought against the plaintiff and debited him with the difference, and plaintiff had lost the profit which he would have made on the transaction. The position was taken up by the defendants, said counsel, that the offer was not a firm offer.

Mr. W. Ellis Hill conducted the case for the defendants, and their answer to the claim was that the parties never came to a concluded bargain on the matter.

Mr. Justice Roche said in his judgment the defendants never were bound by any concluded agreement. Accordingly, the action failed, and there would be judgment for the defendants with costs.

Manufacturing Chemists and an Employee's Notice.

In the Bow County Court, before Judge Graham, K.C., Henry Wood, a carman, sued Messrs. Thos. Hill Jones, Ltd., of Invicta Works, Bow Common Lane, E., manufacturing chemists, to recover £2. 15s., a week's wages in lieu of notice.

Mr. Levey said the plaintiff had been in the employ of the firm for eight years. Just prior to being dismissed he worked in the yard for ten weeks. On May 17 he was discharged at an hour's notice. He also received a packet, in which was a week's money, and on it was written: "We

shall not require your services after to-day owing to slackness. Enclosed is one week's money in lieu of a holiday, to which you are entitled." Counsel said that the plaintiff claimed to be entitled to a week's notice money as well as the holiday. There was some correspondence, and in that the defendants wrote to say that if he had mentioned the matter at the time there was every probability that he would not have been treated unkindly, and they wound up by saying: "All we ask for is a fair week's work for a fair's week's money." Plaintiff said he had always been paid for holidays, bank holidays, etc., and it seemed to him an impossible position to take up to discharge a man like that at an hour's notice. He was quite willing to admit that it was a good firm to work for, and that they were generous to their employees. Plaintiff added that he had to attend to his horses on Sunday, and counsel said that under the recent Board of Arbitration decision a carman who looked after his horses on Sunday became a weekly servant.

Mr. A. A. Robinson, for the defence, produced a document which read as follows: "I hereby agree that I am a daily servant, and subject to dismissal at an hour's notice, notwithstanding that wages are paid for convenience weekly." Mr. Robinson said that was dated September 19, 1911, and asked plaintiff if he remembered signing it. Plaintiff said he supposed that he did, but that was years ago, and his conditions of employment had been altered very much since then.

Mr. Robinson: I submit it is a distinct agreement, and that there is nothing further to answer.

Mr. Levey: I cannot carry it further.

Judge Graham: Judgment for the defendants, with costs.

Grays Chemical Company, Ltd.

The petition for the compulsory winding-up of the Grays Chemical Company, Ltd., was again before Mr. Justice Astbury in the Companies Winding-up Court on Tuesday, after several adjournments.

Mr. Lavington now asked for the order to be made, as he had been told that the negotiations for the raising of capital to pay debts had broken down.

Mr. Vanneck, for the company, said a large sum was owing to the bank as a first charge, and another large sum was owing to the debenture holders, and the evidence was that there was no chance of the unsecured creditors getting anything at all unless some arrangement could be carried through.

His lordship granted another 14 days' adjournment on condition that the company did not pass a voluntary winding-up resolution.

Quality of Cream of Tartar.

Judgment has been given in the Sheriff Court, Glasgow, by Sheriff Lyell, in the complaint entered by Mr. William Weir, sanitary inspector, Rutherglen, against James Buchanan, grocer, 16, Main Street, Rutherglen, that on August 1 he sold cream of tartar which contained 0.003 per cent. (one-fifth grain per lb.) of lead, whereas genuine cream of tartar should not contain more than 0.002 per cent. (one-seventh grain per lb.) of lead. The case was reported in our last issue. The complaint was dismissed, Sheriff Lyell expressing the opinion that the unavoidable introduction of lead into the cream of tartar during the process of manufacture did not render the article different in nature, substance, and quality from the article demanded. It had been proved in the evidence, he said, that cream of tartar containing 0.004 per cent. of lead was just as harmless as that containing 0.002 per cent.

Colnbrook Chemical and Explosives Company.

At the London Bankruptcy Court on Tuesday, before Mr. Warley, Official Receiver, the statutory meeting of creditors and contributories was held under the liquidation of the Colnbrook Chemical and Explosives Company, Ltd., of Colnbrook, Middlesex, and 1, Queen Victoria Street, E.C.

The statement of affairs showed a total deficiency of £54,461. 17s. 9d., and this deficiency was accounted for in the following manner: Gross loss in carrying on business from date of formation of company to date of appointment of the Receiver, £14,161. 19s. 3d.; law costs had amounted to £746.; commission and bonus on debentures, £7,875.; interest on loans, bills discounted, and costs re overdue accounts, £1,049.; interest on debentures, £644.; and directors' fees, £1,200. The losses written off for depreciation amounted to £28,377. 6s. 2d. The company was registered in July, 1916,

with a nominal capital of £21,000., to carry on the business of manufacturers of gun-cotton, explosives, and munitions of war. The failure of the company was attributed to incorrect estimates of the company's engineers, late delivery of machinery, and further capital expenditure on plant required to meet the demands of the Ministry of Munitions.

After a lengthy discussion, it was decided to leave the estate in the hands of the Official Receiver, as liquidator, assisted by a Committee of Inspection consisting of the following gentlemen: Mr. Cooper (J. R. Wells and Co.), Mr. Messer (Wraysbury Chemical Works, Ltd), Mr. Rogers (Heron, Rogers and Son), Mr. Manville and Mr. Goodwin. At a meeting of contributors which was subsequently held a similar resolution was passed.

REPORTS OF COMPANIES.

Weardale Lead Company, Ltd.

The report for the year to September 30 last states: The year has been one of great difficulty in various respects, and particularly owing to the unstable condition of the lead market. In October, 1918, the mean price of lead was £29. per ton, and soon afterwards it advanced to £40. The latter figure, however, did not rule long, and during the greater part of the company's financial year the price remained low—namely, between £22. and £26. per ton. This condition of things, accompanied by higher working costs, has naturally militated against the results for the twelve months as compared with preceding years. At the time of making this report the market has recovered, lead is again quoted at well over £30. per ton; 2,837 tons of dressed lead ore have been produced during the year, 532 tons of ore purchased, and 2,175 tons of ore smelted. The produce from the smelt mill was 1,869 tons of pig lead, which was disposed of (mostly before the heavy fall in the lead market) at an average price of £31. 8s. 6d. per ton net. The company having entered into an advantageous arrangement over a period of years for the sale of its ores unsmelted, operations at the smelt mill have been suspended, and deliveries of ore commenced in May last. During the five months to September 30 the quantity of ore thus delivered amounted to 1,220 tons. The depressed state of the lead market adversely affected the value of this ore, which realised £15. 6s. 2d. per ton on an average price of £23. 15s. 2d. for pig lead—a relatively higher price for the ore than would have been obtained for the company's lead. The amount brought forward from September 30, 1918, was £7,177, from which has been deducted £2,798, leaving a net sum of £4,379. The profit for the present period, including interest, dividends on investments, etc., is £12,736., or, less tax, £7,421., making, together with above balance, £11,800. Out of this sum an interim dividend of 6d. per share has been paid, amounting to £2,448., leaving a balance of £9,352. The directors recommend that this sum be appropriated as follows: To pay a final dividend of 1s. per share, free of tax, making, with the interim dividend already paid, 7½ per cent. for the twelve months, which will absorb £4,896., carrying forward £4,456.

Castner-Kellner Alkali Company, Ltd.

The report for the year ended September 30 last states that the net profit, after allowing for the amount required for keeping up works, plant, and machinery to the highest state of efficiency, is £190,655., and £48,819. was brought in, making £239,474. Deducting debenture interest, £7,598., and interim dividend paid June 10, 1919, £60,000., the available balance is £171,876. The directors recommend placing £50,000. to depreciation reserve, increasing that account to £637,500., and final dividend of £7. per cent., making £13. per cent. for year, payable December 3, leaving £51,876. to be carried forward. The usual sum of £5,000. has been paid to the trustees for the debenture stockholders for sinking fund, and invested in their names.

Amelia Nitrate Company, Ltd.

Sir Bernard Greenwell, Bart., presiding at the meeting on Friday of last week, said that on the signing of the Armistice last November the purchase of nitrate by the Allied Governments had stopped suddenly; those Governments were left with very large stocks on hand, and until those had been liquidated producers were precluded from entering the market. The latter had all been left with heavy stocks, and

it was only late in the spring of the present year that the Government stocks had been absorbed by the consuming markets. In the meantime, at the request of the Chilean Government, a Producers' Association had been formed, with a view to controlling the output, export, and sale of nitrate. The great majority of producers had joined that Association, and were bound by its statutes for five years.

As to the prospects of the industry in general, it would be a rash proceeding to try to prophesy. He had no doubt that large quantities of nitrogenous fertilisers would be required all over the world during the next few years, but whether Chilean nitrate would hold the field as formerly or would suffer from the competition of the various artificial products prepared for the market it was impossible to foretell. Exchange, freight, and finances would have an important word to say in that connection.

Santa Catalina Nitrate Company, Ltd.

The reorganisation of the Nitrate Association was referred to at a meeting of the Santa Catalina Nitrate Company, Ltd., on November 20. Mr. F. G. Lomax (the chairman) said that since last year's meeting reorganisation had become an accomplished fact by the adhesion of all but the German producers, with whom negotiations were proceeding, and two American-owned companies which were debarred from joining owing to the United States Sherman Law. At first doubts had been entertained as to the Association's being able to accomplish its object, but it had made an auspicious start, having concluded during the past few weeks sales aggregating some 25 million quintals of nitrate for delivery during the coming season. Those sales were a beginning of the resumption of ordinary trade.

As to the outlook, in view of the high rates of freight and the financial and political conditions in Central Europe, it was impossible to arrive at any useful estimate. But if Germany and Austria were to take what they urgently needed, there would be a market for all that could be produced; but they were not yet in that position, and until they solved the problem of their currency in relation to international trading there seemed little prospect of an outlet for any considerable quantity of nitrate in those countries. In other directions prospects were encouraging.

Amalgamated Zinc (De Bavay's), Ltd.

The report for the half year ended June 30 states that 81,567 tons of tailings were treated, producing 22,016 tons zinc concentrates and 1,164 tons lead concentrates of average assay value. Owing to industrial disputes, the mill was operating during 18 weeks only. Profit on working account was £39,106., including £22,782. increased profit from adjustments in respect of previous periods. The balance to the credit of appropriation account at December 31 was £14,454., to which add £44,359. transferred from profit and loss account, making £58,813., out of which dividend No. 28, paid April 16, absorbed £25,000., £9,744. was transferred to reserve for depreciation, and £24,069. to equalisation reserve. Surplus of liquid assets over liabilities amounted to £184,213., not including payments on account of 365,000 tons of tailings paid for but untreated, or £283,435. paid up on 295,710 shares in the following companies: 160,000 in Electrolytic Zinc Company of Australasia Proprietary, Ltd.; 119,250 in Minerals Separation and De Bavay's Processes Australia Proprietary, Ltd.; 10,000 in Barrier Roaster Company Proprietary, Ltd.; 3,500 in Metals Prospecting Syndicate, N.L.; 2,000 in Zinc Investigation Proprietary, Ltd.; and 960 in Zinc Producers' Association Proprietary, Ltd. Operations at Risdon works were satisfactory until August 14, when the works were closed down through shortage of calcines due to shipping difficulties, but it is expected to resume operations the middle of December.

DIVIDENDS.

CASSEL CYANIDE COMPANY, LTD.—Final dividend of 1s. 6d. per share, making 2s. per share for the past year.

NON-FERROUS MATERIALS.—The following particulars show the stocks—exclusive of old metal and scrap—in this country in possession of the Minister of Munitions on November 1: Copper, 18,492 tons; spelter (G.O.B.), 14,727 tons; spelter (refined), 11,563 tons; aluminium, 9,353 tons; soft pig lead, 64,832 tons; nickel, 2,100 tons; antimony regulus, 3,200 tons. It is explained that a proportion of the above stocks is already sold to the trade for forward delivery.

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

November 17th to 22nd (inclusive).

Electrolytic Apparatus. Ashcroft, E. A. 28,845.
 Ferrochrome Alloys. B. Sestine, W. B. 28,763.
 Catalysts. Brochet, A. 29,002.
 Purification of Solutions of Zinc Sulphate. Compagnie des Produits Chimiques et Métaux de la Camargue. 28,471.
 Gas-fired Glass-making Furnaces. Curd, S. G. 28,886.
 Composition Paint. Dubois, U.; and Richard, J. 28,728.
 Metal Compound Powders. Heskett, W. P. 29,031.
 Purification of Sulphur. Hood, J. J. 28,489.
 Aluminium Alloys. Hurst, J. E. 28,546.
 Treatment of Petroleum, etc. Illing, V. C.; and Kelly, J. 28,614.
 Sub-limate for Borax or Boric Acid or Mixtures Thereof in Technical Processes. Jones, B. D.; and Kelly, A. A. 28,837.
 Presses for Food-stuffs. Jones, B. D.; and Kelly, A. A. 28,838.
 Manufacture of Boric Acid from Boron Ores. Jones, B. D.; and Kelly, A. A. 28,839.
 Manufacture of Borax or Boric Acid from Sodium Pentaborate. Jones, B. D.; and Kelly, A. A. 28,840.
 Non-inflammable Materials. Mandleberg, J. H.; Mandleberg and Co., J.; and Perkin, W. H. 28,593.
 Softening Water by Base-exchanging Bodies. Menzies, S. H. 29,137.
 Leaching and Separation of Ores. Middlemiss, E. T. 28,633.
 Cracking Hydrocarbon Oils, etc. Nelson, J. 28,575.
 Treatment of Ores, etc., by Flotation. Partington, J. W.; and Taylor, M. T. 28,999.
 Porous Charges for Containers for the Storage of Explosive Gases Dissolved in Liquids. Pintsch, Akt.-Ges., J. 29,003.
 Treatment of Lead Zinc Sulphide Ores. Stannard, O. J. 28,463.
 Motor Fuels. Stevens, E. W. 29,010.
 Centrifugal Separators. Sturgeon, R. A. 29,042.
 Tungsten. Vautin, C. T. J. 29,116.
 Treatment of Mixed Zinc Sulphide Ores. Vautin, C. T. J. 29,035.
 Manufacture of Thorium. Wade, H. (Lindsay Light Co.). 28,749.
 Process for Double Decomposition of Substances. Wang, L. M. E. 29,030.
 Destructive Distillation of Coal. Wellington, S. N. 28,863.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 6d. in stamps to the Comptroller, Patent Office Sales Branch, 25 Southampton Buildings, Chancery Lane, W.C.

The numbers in heavy type are those under which the Specifications will be printed and abridged and all subsequent proceedings will be taken.

1918.

Concentration of Ores. Scott, W. A. 13,259. **118,627**
 Apparatus for Quenching Coke. Wellington, S. N. 13,152. **134,867**
 Manufacture of Ice. Ryder, F.; and Pluperfect Refrigeration Co. 14,291. **134,868**
 Filtering or Otherwise Treating Air or Gases. Heenan and Froude; and Cruyt, L. 16,348. **134,873**
 Incandescent Gas Mantles. Wilson, J. 16,465. **134,875**
 Germicide Solution. Weeks, C. A. 16,606. **134,880**
 Magnesium Sulphate. Dutt, E. E.; and Dutt, P. C. 17,076. **134,884**
 Fixation of Atmospheric Nitrogen in a Blast Furnace. Haslam, E. W. 17,365. **134,885**
 Manufacture of Briquettes from Fine Dust, and the Products Resulting Therefrom. Michel, C.; and Raskin, V. 17,945. **134,886**
 Manufacture of Briquettes from Sawdust, and the Products Resulting Therefrom. Michel, C.; and Raskin, V. 17,946. **134,887**
 Recovery of Tungstic Acid from Ores. Imperial Trust for the Encouragement of Scientific and Industrial Research; and Stannard, O. J. 18,206. **134,891**
 Purification of Natural Graphites. Ridoni, E.; and Soc. Talco E. Grafiti Val Chisone. 18,330. **134,894**
 Hydrogen Generators. Griggs, A. R. 18,582 and 18,384. **134,901 and 134,902**
 Producing Combustible Gas. Pickard, W.; and Dobson, D. R. 18,430. **134,907**
 Electro-depositing Magnesium. Seward, G. O. 18,467. **120,908**
 Cleansing and Polishing Powder. Slaughter, L. V. 18,540. **121,592**
 Automatically Discharging Lime, Cement, and Like Kilns. Candiot, C. 18,542. **131,269**
 Recovering Potassium Compound in Connection with Cement Manufacture. Mond, A. (International Precipitation Co.). 18,554. **134,920**
 Alloying Furnaces. McGahan, F. L. 18,616. **134,927**
 Treatment of Gases Containing Sulphur Dioxide. Espenbahn, E. V. 18,772. **134,943**
 Centrifugal Separators. Sturgeon, R. A. 19,233. **134,966**
 Electrodes of Electric Furnaces. Soc. Electro-Metallurgique Française. 19,756. **121,282**
 Baking-powder and Self-raising Flour. Berry, A. E.; and Boake, Roberts, and Co., A. 19,815. **134,987**
 Production of Petrol. Tinker, F. 21,289. **135,015**

1919

Recovery of Lead and Tin from Their Solutions. Rumbold, W. G. 2,132. **135,052**
 Alloys Rich in Lead. Arend, J. P. 2,496. **135,056**
 Pure Electrolytic Copper from Cement Copper. Sandberg, A. G.; and Thomasson, T. E. 11,812. **135,125**
 Separating a Salt from Its Solution by Evaporation. Piccard, P. 12,292. **132,771**

Purification of Alkaline Chloride Solutions which are to be Electrolysed. Riiber, C. N. 14,875. **135,141**
 Purifying the Gases Intended for the Synthetic Production of Ammonia. L'Air Liquide, Soc. Anon. pour L'Étrude et L'Exploration des Procédés G. Claude. 16,996. **129,637**

COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

1919

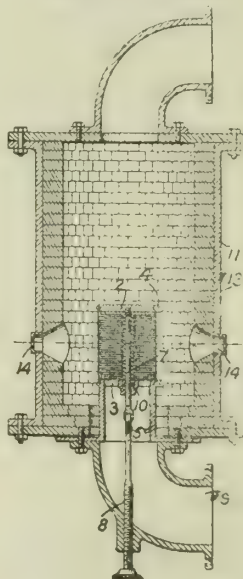
Slaking Lime. Spörri and Co. 26,354. **135,172**
 Manganese or Alloys of Manganese. Aktiebolaget Ferrolegeringar. 27,784. **135,186**
 Chromium or Alloys of Chromium. Aktiebolaget Ferrolegeringar. 27,785. **135,187**
 Converting Higher Molecular Hydrocarbons into Lower Molecular ones. Naamlooze Venootschap Nederlandsche Lichtie Olie Maatschappij. 28,072. **135,197**
 Producing a Spun Material Resembling Wool, Cotton, or Chappe, and also Films from Viscose Solutions. Glanzfaden Akt.-Ges. 28,190. **135,205**
 Wool Substitute from Cellulose and Similar Solutions. Glanzfaden Akt.-Ges. 28,191. **135,206**
 Coke Ovens. Soc. Anon. d'Ougree Marihaye. 28,360. **135,214**
 Filtering Apparatus for Gas-coal Media. Pictet, L. D. 28,366. **135,216**

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Potassium Permanganate. C. Dreyfus and J. J. Bloch, Manchester. British Patent, 132,842, of 1918.

In the manufacture of potassium permanganate, the sodium manganate employed as starting-material is first transformed by electrolysis into sodium permanganate, which is then converted into potassium permanganate by the interaction in solution with the quantitative amount of a potassium salt.

Catalytic Apparatus. L. C. Jones, Syracuse, New York; and C. L. Parsons, Washington, U.S.A. British Patent, 132,551, of 1918.



The oxidation of ammonia is effected without pre-heating of the gases by means of a contact element in the form of a hollow laminated body of fine gauze constructed of or carrying catalytic material arranged within a chamber having heat-reflecting inner walls. A strip of gauze is wound around an end piece 2 and spider 3 and secured in place by collars 4. The spider 3 forms the top of a cylinder 5 into which leads the gas inlet 9 through which passes a screwed rod 8 joined by a socket to a rod 7 for tightening the gauze laminations, the rod 7 being kept from rotating by a pin 10. The outer chamber 11 may be lined with glazed bricks 13, and is provided with sight-apertures 14.

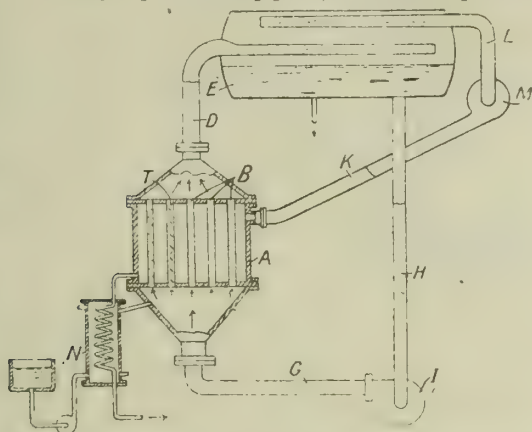
Potassium Salts. A. C. Auden, Westminster. British Patent, 132,855, of 1918.

Minerals such as feldspar, mica, micaceous schist, muscovite, pegmatite, china-stone, glauconite, and zeolites such as those found in a basalt matrix, are mixed with lime and salt, ground, and roasted at 900–1,000° C. for such a time that a small proportion of "dead lumps" are formed. The charge is spread out to cool and raked with wooden rakes. The cooled material is sifted, the "dead-lumps" being then ground, and treated again, while the fine material is leached in hot water; but when glauconite or the like is employed, the leaching is performed in an autoclave, steam being admitted until the temperature rises to 240–205° C. The evaporation of the solution is preferably effected in two evaporators in series when glauconite is employed, the first producing phosphate and the second chloride. The residue is mixed with ground—preferably unslaked—lime, and preferably with a small quantity of alum or aluminium sulphate,

kneaded, dried, and the heat gradually brought up to 1,100° C., the mass being firmly but not too tightly packed in the furnace. The mass is spread out to cool, raked with wooden rakes, sifted, and the coarse material ground. The product is white cement, but is somewhat sensitive, and is therefore mixed with a small quantity of ground gypsum, the mixture being spread on a floor, left for about a week, and then turned and mixed.

Evaporating Liquids. E. Morterud, Torderod, near Moss, Norway. British Patent, 132,893, of 1918.

In apparatus for evaporating liquids, in which the vapours generated from the liquid are compressed and used for heating the liquid, the liquid is circulated through the heater A under pressure to avoid vaporisation, and is admitted in the form of spray to a separate evaporating-chamber E kept at a lower pressure. The vapours are withdrawn from the evaporator E by a perforated pipe L, and are compressed by a



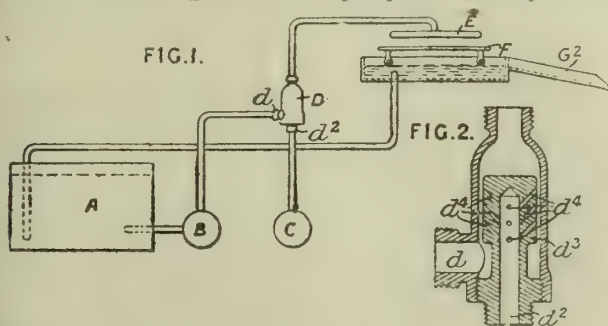
pump M through a pipe K into the heater A. The liquid is led from the evaporator by a pipe H, is forced by a pump I through a pipe G to the heater A, and is returned by a perforated pipe D to the evaporator. A turbulent motion is imparted to the liquid passing through the pipes B of the heater by means of baffles T. The liquid entering the system is preheated in an exchanger N by means of condensate formed in the heater A.

Varnishes. R. Gilmour and W. Dunville and Co., Belfast. British Patent, 132,996, of 1918.

Lacquers or varnishes are prepared by dissolving cellulose nitrate or celluloid in *n*-butyl, or isobutyl formate to which may be added other solvents or diluents such as acetone, ethyl acetate, or amylacetate.

Recovery of Colloidal Materials. T. W. Barber, London. British Patent, 132,947, of 1918.

Colloidal matter is separated from its solutions by projecting the liquid against a surface, preferably after first saturating it with gas. The colloidal solution, after being brought to a temperature of about 60–70° F., is forced from the tank A by a pump B into a mixer D, where it is charged with air or other gas from the pump C. The liquid then



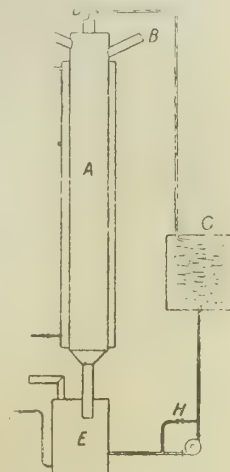
passes to a sprayer E, from which it is projected on to a plate F. The colloidal matter coheres and floats away by spout G², whilst the liquid is returned to the tank A for retreatment if necessary. The mixer D comprises a casing,

Fig. 2, in which is screwed a nozzle d³ provided with perforations d⁴, through which the gas entering at d² is forced into the liquid entering at d.

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Tetrachlorethane. Compagnie des Produits Chimiques d'Alais et de la Camargue, Paris. British Patent, 132,757. Convention date, March 12, 1919.

In the production of tetrachlorethane by passing acetylene and chlorine through a contact mass consisting of iron turnings mixed with inert materials—*e.g.*, broken quartz,—the contact mass is constantly sprinkled with a portion of the tetrachlorethane produced. Using the apparatus shown, acetylene and chlorine are admitted by pipes C, B to the water-cooled reaction tube A containing iron turnings and broken quartz. The tetrachlorethane collects in vessel E, from which a suitable quantity is pumped through a cooler G to the pipe D, which sprinkles it continuously over the contact mass. A by-pass H serves to regulate the amount delivered by the pump.

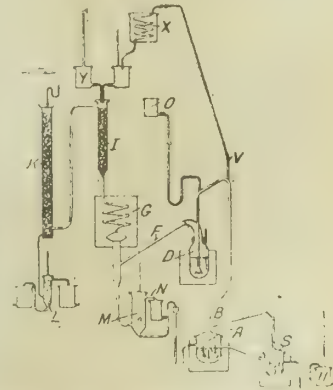


Halogen Compounds. Chemische Fabrik Flora, Dubendorf, Switzerland. British Patent, 132,245. Convention date, August 31, 1918.

Bromo and chloro compounds are prepared by treating amines or aminocarboxylic acids with a mixture of hydrobromic or hydrochloric acid and nitric acid. Mixtures of bromides or chlorides with nitric acid, or of hydrobromic or hydrochloric acid with a nitrate may also be used. The amino group is thus replaced by the halogen. Examples are given of the preparation of *α*-chlor- or *α*-brom-isobutylic acid from leucine, and of chlor- or brom-succinic acid from aspartic acid; alanine is also specified as a parent substance.

Chloracetic Acid. Compagnie des Produits Chimiques d'Alais et de la Camargue, Paris. British Patent, 132,042. Convention date, May 4, 1918.

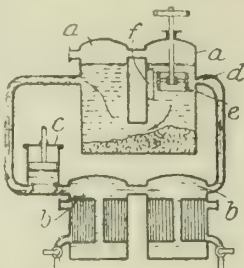
The production of chloracetic acid by the reaction of hot sulphuric acid upon trichlorethylene is rendered continuous by continuously supplying water to maintain the sulphuric acid at the proper concentration (about 90 per cent.) and removing the chloracetic acid as formed by means of an excess of trichlorethylene vapour. In the apparatus shown, trichlorethylene vapour from a boiler A bubbles through sulphuric acid in the vessel D; the escaping vapours (trichlorethylene, chloracetic acid, steam) and hydrochloric acid gas pass off by pipe F to a reflux condenser G; the condensate flows to the decanting-vessel M, where it separates into aqueous chloracetic acid which flows into vessel N and a mixture of chloracetic acid and trichlorethylene which is returned to the boiler A. The contents of the vessel N are added to the vessel O, which continuously supplies water to the vessel D. The chloracetic acid flows off from the boiler A to a similar boiler S, in which it is further freed from trichlorethylene, and passes to a container U. From the reflux condenser G the escaping hypochlorous acid gas passes to a tower I, in which it is washed with cold trichlorethylene to free it from chloracetic acid, and then passes to a second tower K, in which it



is condensed by cold water, the resulting liquid flowing to a decanting-vessel L in which the trichlorethylene is separated from the aqueous hydrochloric acid. The tower I is fed with trichlorethylene from a vessel Y and also from a condenser X which leads from a branch V of the pipe B. The reaction is carried out at 160-190° C.

Evaporating Solutions. P. Piccard, Geneva. British Patent, 132,771. Convention date, September 14, 1918.

Relates to an apparatus for evaporating saline solutions in which the solution is circulated by a pump *c* through heaters *b*, maintained under pressure, and an evaporator *a*, in which the solution as it enters by a nozzle *d* is subjected to a sudden reduction of pressure. The invention consists in causing the jet of solution entering the evaporator to impinge on a solid body *e* so that the salt crystals adhere to its surface and grow thereon until they are removed. The solid body *e* may be a rotary cylinder provided with a stationary scraper *f* for removing the deposited crystals. Alternatively, a rotating disc may be used, or a stationary solid body with a moving scraper. A U-shaped evaporator is preferably used to provide for the deposition of crystals remaining suspended in the solution.



Fatty Acids. Pardubitzer Fabrik der Akt.-Ges. für Mineralöl-Industrie vorm. D. Fanto and Co., Pardubitz, Austria. British Patent, 131,301. Convention date, September 2, 1916.

Fatty acids are obtained by prolonged passage of air, or other oxygen-containing gas, through paraffin wax; a temperature below 150° C.—say, 115-125° C.—is employed. When the reaction has started, the air supply may be regulated so that the heat of reaction is sufficient to keep the temperature constant. The reaction may be accelerated by adding to the charge a portion of previously oxidised paraffin wax. Apparatus for use in carrying out the process is described. The products can be used as substitutes for vegetable or animal fatty acids; the volatile acids may be converted into esters for perfumery. Prolonged passage of air at higher temperatures gives a brown rubbery mass, suitable for use in making varnishes.

NEW COMPANIES.

Corbacoral Mines, Ltd.—Capital £50,000... 5s. shares. Object: To prospect for, work and develop gold, platinum, lead, tin, wolfram, silver, coal, copper, iron and other mines, mineral, oil, and other rights and properties in West Africa or elsewhere, etc. Solicitors: Mayo, Elder and Co., 10, Drapers Gardens, E.C.

Bathgate Polish and Chemical Company, Ltd.—Private company. Capital £2,000., £1. shares. Registered office: Engine Lane, Bathgate.

South African Coal By-Products, Ltd.—Capital £6,000.. in 4,000 preference shares of 5s. each and 100,000 deferred shares of 1s. each. Registered office: 790-792, Salisbury House, E.C.

Clarendon Manufacturing and Engineering Company, Ltd.—Private company. Capital £5,000., in 3,000 preference shares of £1. each and 40,000 ordinary shares of 1s. each. Do-tinners, de-galvanisers, and de-enamellers, tin terne and black plate manufacturers, etc. Solicitor: R. A. Kendrick, 69, Park Street, Camden Town, S.W.

Everlasting Flooring Company, Ltd.—Private company. Capital £2,000., £1. shares. Manufacturers, importers, and exporters of, agents for, and dealers in metallic powder used in the process of rendering hard or non-porous the foundations, floors and pavements, buildings, etc. Registered office: 8, St. James' Street, Piccadilly, S.W.

Safety Celluloid Company, Ltd.—Capital £200,000., £1. shares. Object: To take over all or part of the undertaking and assets of the Safety Celluloid Company, Ltd. (in liquidation). Registered office: Abbey Road, Park Royal, Willesden, N.W. 10.

Regina Trading Company, Ltd.—Private company. Capital £25,000., £1. shares. Seed crushers, margarine and oil manufacturers, cake manufacturers, soap boilers, cattle food manufacturers, etc. Registered office: Mark Lane Station Buildings, E.C.

Moore, of Trafford Park, Ltd.—Private company. Capital £50,000., £1. shares. Object: To take over the business carried on by S. Moore at Westinghouse Road, Trafford Park, Manchester. Manufacturers, importers, and exporters of and wholesale and retail dealers in all kinds of dyes, dyestuffs, chemicals, drugs, paints, varnishes, etc. Solicitor: P. J. Sketton, 90, Deansgate, Manchester.

Herts Benzol Company, Ltd.—Private company. Capital £15,000., £1. shares. Registered office: Waters Hill, Hemel Hempstead, Herts.

CORRESPONDENCE.

***We do not hold ourselves responsible for the opinions expressed by our correspondents.*

New Vacuum Dryers.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—We have received several complaints from clients in connection with two advertisements in your journal under the above heading, replies to be addressed to "Box X.A." and "Box E.E.F." For some reason or other they have concluded that the advertisements are ours.

These advertisements offer new vacuum dryers, of American make, for spot delivery, and clients have assumed that they refer to Devine dryers.

We wish to point out that we are in no way associated with the advertisers or advertisements. Devine dryers are advertised by us every week in *The Chemical Trade Journal and Chemical Engineer* over our own name, and not in Box No. advertisements.

Where clients mention this matter to us, we are able to refute any connection with the advertisements, but as we are not always informed, we feel compelled to issue this disclaimer. We shall be glad if you will kindly insert the half-page official announcement we enclose herewith, in which you will notice we specially draw attention to the fact that we are the only authorised representatives of the J. P. Devine Company for Europe and the British Colonies, and that all advertisements in regard to their specialities bear our name and head office address.—Yours, etc.,

(FOR JAMES LIVINGSTON, LTD.)

G. DUNCAN G. CRIBB,
Managing Director.

London: Sardinia House, Kingsway, W.C. 2.
November 24, 1919.

White Lead and Zinc Oxide Pigments.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—We have a copy of your publication issue of September 27, 1919, on page 327 of which is an article by James Scott, entitled "Some Microscopical Features of White Lead." In one paragraph Mr. Scott writes as follows:—

The best white lead only needs from 11 to 15 parts of linseed oil to render it a satisfactory pigment. White lead paint does not eventually crack in the manner that zinc white and baryta white paints are liable to do. It is believed by many chemists that this admirable trait is due to the saponification of the white lead by the oil used in it; lead linoleate thereby forming.

While we recognise that, as we are outsiders, perhaps we should not presume to criticise editorial matter that appears in your publication, we feel that you, as publishers, will accept such criticism in a co-operative spirit.

When Mr. Scott states that "white lead paint does not eventually crack in the manner that zinc white and baryta white paints are liable to do," he is omitting amplification that leaves rather a misleading thought. This is so because neither we as manufacturers of zinc oxide, nor any other zinc-oxide manufacturers, recommend the use of zinc oxide exclusively in the manufacture of paints. We do, however, urge the use of zinc oxide with white lead in suitable proportions as the proper mixture of pigments wherein the very highest quality of paint can be produced. This overcomes cracking, and also reduces to a minimum chalking of paint, which is so common when white lead alone is used as a pigment. In other words, a suitable combination of zinc oxide and white lead overcomes the faults, if you please to call them such, of either one or the other of these pigments.—Yours, etc.,

C. A. STEDMAN,

THE NEW JERSEY ZINC COMPANY.

New York, November 6, 1919.

GAZETTE NEWS.

MORTGAGES AND CHARGES.

Elstree Chemical Works, Ltd.—Registered November 11, £1,000. debts. balance of £15,000.; general charge.

LIMITED COMPANIES.—Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions, Orders, and Official and Other Notices.

British Salicylates, Ltd., London, E.C.—Proofs for intended dividend to H. de V. Broughton, 33, Carey Street, W.C., liquidator, by December 2.

Colnbrook Chemical and Explosives Company, Ltd., London, S.W.—1st meeting of creditors, Bankruptcy Court, November 25.

Petrol Process Syndicate, Ltd., London, E.C.—Proofs for intended dividend to H. E. Burgess, 33, Carey Street, W.C., liquidator, by December 2.

Safety Celluloid Company, Ltd.—Claims to W. Barton, Abbey Road, Park Royal, N.W. 10, liquidator, by December 15.

Transparent Glue Company, Ltd., Middlesbrough.—C. Chipchase ceased to act as receiver November 3.

Union Chemical Company (Walcden), Ltd.—Proofs for intended dividend to J. G. Gibson, Byrom Street, Manchester, Official Receiver and liquidator, by November 26.

COMING EVENTS.

The Technical Inspection Association.—Meeting, rooms of the Society of Arts, John Street, Adelphi, **Friday, December 5, 7.30 p.m.** Paper: "Inspection and Testing of Materials," by Messrs. R. D. Summerfield and H. J. Davey.

Chemical Engineering Group (Society of Chemical Industry).—Conference, **Monday, December 15, Newcastle-on-Tyne**, on "The Transport and Distribution of Liquids in Chemical Works."

Society of Chemical Industry (Manchester Section).—Meeting, Grand Hotel, **Friday, December 5, at 7 p.m.** Papers: "The Activated Sludge Process of Sewage Purification," by E. Arden, D.Sc.; "A New Method for Determining the Relative Temperatures of Spontaneous Ignition of Coal: the Influence of Degree of Fineness and Volatile Matter on the Results," by Captain F. S. Sinnatt and Mr. Burrows Moore.

Society of Chemical Industry (London Section).—Meeting, Burlington House, **Monday, December 1, at 8 p.m.** Papers: "The Technical Applications of Ethyl Chloride," by A. Henning; "The Influence of Impurities in Lead when it is Heated with Concentrated Sulphuric Acid," by C. E. Barrs.

The Chemical Society.—Meeting, Burlington House, **London, Thursday, December 4, at 8 p.m.** Papers: "Di-phenanthryl," by H. Henstock; "A New Sulphuretted Hydrogen Generator," by B. D. Steele and H. G. Denham.

MARKET REPORTS.

TAR AND AMMONIA PRODUCTS.

WEDNESDAY.

Benzole: London, 90%, 2s. to 2s. 1d.; North, 1s. 11d. to 2s.; 50%, 1s. 10d. to 1s. 11d.; North, 1s. 9d. to 1s. 10d., naked; pure, 3s., naked, at works. Carboic acid, crude, 60%, East and West Coast, nominally 1s. 7d. to 1s. 8d.; crystals, 39-40%, 3½d. to 9d., f.o.b. Crude tar, London, 45s. to 50s.; Midlands, 44s. to 46s.; North, 45s. per ton, ex works. Refined tar, 32s. 6d. per barrel. Pitch, 80s.; East Coast, 70s. to 75s., f.o.b.; West Coast, 62s. 6d. to 65s., f.a.s. Solvent naphtha, naked, London, 90-190%, 2s. 5d.; North, 2s. 3d. to 2s. 4d.; 95-160%, naked, London, 2s. 6d.; North, 2s. 4d. to 2s. 5d. Crude naphtha, naked, 30%, 9d.; North, 8d. to 8½d. Refined naphthaline, £16. to £18.; salts, £6. to £7. Toluol, naked, London, 2s. 6d.; North, 2s. 5d. Creosote, naked, London, 6½d.; North, 5½d. to 5½d.; heavy oil, 6½d. Anthracene, 40-45%, 7d. per unit. Cresylic acid, 95%, 2s. 5d. to 2s. 6d.; 97-99%, 2s. 7d. to 2s. 8d., ex works, London, and f.o.b. other ports. Sulphate of ammonia: home trade, November £20. 15s., basis 24½%. Nitrate of soda, £22. 10s. to £22. 15s.

FERTILISER MATERIALS.

LIVERPOOL, THURSDAY.

Nitrate of soda is dearer, and the quotation on spot for 95/96% quality has been advanced to £20. 12s. 6d. per ton net cash, f.o.r., prompt delivery. East Indian bone meal: There is no change to report in this market, the quotation for November-December shipment being £17. 10s. per ton, whilst that for January-February shipment is £15. per ton, net cash, ex ship Liverpool, for 4½% ammonia and 52% phosphates. On spot Liverpool, holders ask £17. 10s. per ton, net cash, for 4½% and 45% quality. Mineral phosphates are without alteration, and values at present are only nominal. Dried blood scarce, the value being about 5s. per unit of ammonia per ton, net cash.

LONDON METAL MARKET.

THURSDAY.

Copper: Standard brands, £95. 10s. to £95. 15s., cash; £97. to £97. 5s., three months; electrolytic, £109. to £112. **Tin:** Standard, £295. 5s. to £295. 10s., cash; £296. 15s. to £297. three months; Straits, £295. 5s.; English, £293. to £294. **Lead:** Soft foreign, £36. 5s.; English, £37. 10s. **Spelter,** £48.; hard, £33. to £34. **Antimony,** English regulus, 90%, £47. 10s. **Aluminium,** £150. **Nickel,** £215., ex warehouse. **Quicksilver,** £17. 5s. to £17. 10s. **Bismuth,** 12s. 6d. **Platinum,** 442s. per oz. **Wolfram,** 32s. 6d. per unit.

SWANSEA MARKET REPORT.

THURSDAY.

Tinplates in steady request, with quotations very firm on the basis of 45s. 6d. per standard box, f.o.b. Copper firmer, with better business passing at £98. 15s. prompt and

£100. 15s. three months. Tin prices are strong, and the metal is in better request at £288. 15s. early delivery and £290. 10s. three months. Lead active, with orders over a period at £36. 15s. per ton and £37. prompt; English, £37. 15s. **Spelter** firm, with fair business at £47. 10s. per ton delivery over December. Zinc sheets in good inquiry, with English steady at £67. and American £68., f.o.b. New York. **Antimony,** English regulus 90%, £47. 10s. prompt; foreign, £44., c.i.f. **Aluminium** very steady, and good business passing at £150. per ton. **Quicksilver** dearer at £17. 15s. per bottle. **Nickel** more active at £205. delivered London, or equal. **Sulphate of copper** remains very quiet but steady at £41. per ton, in casks, less 5%, f.o.b. **Sulphate of ammonia** steady at £20. 15s. per ton prompt and £21. forward. **Nitrate of soda** steady at 21s. 6d. per cwt., in bags. **Palm oil** quiet and steady: Lagos, £88.; softs, £87. 10s.; Benin, £86.; and hards, £85. **Turpentine,** £6. 8s. per cwt. **Oxalic acid** very quiet at 1s. 0½d. per lb. **Arsenic** quiet at £60. per ton for white powdered, in bags, f.o.b. Pitch in better supply and rather easier at 62s. 6d. at ship. **Bone meal** 17s. 6d. per cwt. **Copperas** more active from £3. 10s. upwards, according to delivery.

TURPENTINE MARKET REPORT.

Messrs. James Watt and Son, Ltd., of 101, Leadenhall Street, London, E.C. 3, report that the stocks of turpentine on November 22 were: American, 30,545 barrels, compared with 2,962 barrels at the corresponding date of 1918; French, 716 barrels (751 barrels); and Spanish, 297 barrels (1,081 barrels). Deliveries during the week ended November 22 were 2,051 barrels, against 573 barrels last year; and since January 1, 67,816 barrels, compared with 23,034 barrels in 1918. The price on Saturday last was 126s. per cwt., compared with 103s. at the corresponding date of last year. January-April (1920) delivery was quoted at 128s. 9d., and May-August 116s.

MANCHESTER CHEMICAL MARKET.

THURSDAY.

Business in heavy chemicals continues good, and values all round are well maintained with an upward tendency. Demand for caustic soda is very strong, and £27. is asked for resale lots of 70%. Refined bicarbonate of soda is scarce at £11. 5s. 58% alkali at £10. 15s. per ton. Contract quotations for home trade remain unaltered. Bleaching powder in short supply at £17. per ton on rails. Chlorate of soda easy at 5½d. per lb. Potash 1s. per lb. Supplies of bichromate soda are scarce and price firm at 10½d. for spot parcels. Recovered rock sulphur £17. on rails. For sulphate of copper the demand continues quiet, and price nominally £40. per ton f.o.b. Nitrite of soda dearer at £62. basis 100%. Concentrated sodium sulphide higher at £24. per ton. Phosphate £29. per

ton. Commercial hyposulphite, £18. 10s. per ton. Supplies of white powdered arsenic continue scarce, and price of Cornish brands firmly held at £65. per ton. Yellow prussiate of potash has been advanced to 2s. 1d. per lb., but there is only small inquiry. Prussiate of soda steady at 1s. 1d. per lb. Acetic acid in good request, and makers are well engaged with orders. Acetate of soda unchanged at £48. per ton. Lead salts are quiet, but quotations unchanged at recent rates. English brown acetate of lime has been advanced to £14. 10s. per ton and grey £20. per ton. Miscible naphtha, 10s. 6d. per gallon. Oxalic acid is firmer at 1s. 1½d. to 1s. 2d. per lb., carriage paid according to quantity.

LIVERPOOL CHEMICAL MARKET.

THURSDAY.

Business in chemicals has again been active, the demand on home trade account having been well maintained, and more inquiries having been made on export account. The shortage of stocks of some articles much in demand continues, and manufacturers are having inconvenience over apportioning such supplies as they have, and over arranging for the distribution of such as they are likely to have within the next two months. This condition is making an opportunity for fresh offerings of American products, but the prices quoted for them are high, so that a very limited business has been done in them. Bleaching powder has been in somewhat freer inquiry, and in still in short supply. For home trade uses, £17. per ton, free on rail or conveyance, in buyers' packages; and for export £15. to £18. per ton is being quoted. Chloride of calcium has been in fair demand, and is £8. to £11. per ton, in casks, f.o.r. Caustic soda has been much in demand. Prices are £24. per ton for 76%, £22. per ton for 70—72%, and £21. per ton for 60%. Nitrate of soda has been more inquired for, and is £21. to £22. per ton. Saltcake has sold more readily, and is £6. 10s. per ton, in casks, f.o.b. Soda crystals have again sold freely. The price is £5. 10s. per ton, in 2cwt. bags, f.o.r., at works. Bicarbonate of soda has been in fairly active demand, and is £8. 5s. to £10. per ton, according to terms of delivery. Borax has been steadily called for, and is £39. per ton for ordinary and £40. per ton for powdered, in bags, less 3% for lots of not less than 50 tons. Ammonia alkali has again been in good request, but has been in very short supply. It is £6. 10s. to £6. 15s. per ton, f.o.r., at works. Hyposulphite has been in moderate request, and is £18. 10s. per ton for ordinary and £22. per ton for pea crystals, in 1cwt. kegs. Sulphite of sodium has been more inquired for, and is £10. per ton for ordinary and £16. to £18. per ton for pea crystals, in 1cwt. kegs. Sulphide of sodium has been in fair demand, and is £22. per ton in casks and £23. per ton in drums. Prussiate of soda has been in quietly steady request, and is 1s. per lb. Bichromate of soda has sold more readily, and is 9½d. per lb. Phosphate has been in fair demand, and is £27. per ton. Chlorate of potash has been in moderate request, and is 1s. to 1s. 1d. per lb. Permanganate has had a limited sale, and is 3s. 6d. per lb. Sulphate of potash has moved but slowly, and is £25. per ton. Carbonate of potash has again had a moderate sale, and is £95. to £100. per ton for 80—85%. Caustic potash has been steadily called for, and is £120. per ton. Nitrate of potash has been more in request, and the price has hardened. Refined is from £60. to £62. per ton, and ordinary £40. per ton. Canadian potashes have been very quiet. First quality Montreal are £200. to £220. per ton, and second quality £190. to £210. per ton. Bichromate of potash has been rather more in request, and is 1s. 6d. to 1s. 7d. per lb. Yellow prussiate of potash has met with a fair inquiry, and is 1s. 9d. to 1s. 10d. per lb. Sal ammoniac has been in quietly steady demand, and has been scarce. Prices have been advanced. First quality lump is £95. per ton, second quality is £90., and crushed £5 per ton extra. Sulphate of ammonia has moved but slowly, and stocks in hand have been very small. Prices are £21. per ton for December, £21. 7s. 6d. for January (1920), £21. 15s. for February, and £22. per ton for March to May (1920). Carbonate of ammonia has been rather more in request, and is 6½d. per lb. Muriate has been but little called for, and is £45. to £50. per ton, according to grade. Magnesia has had a moderate sale. Carbonate is £2. 5s. per cwt., and sulphate £11. to £16. per ton. Alum has been in good request, and is still scarce. The price for the home trade is £18. 10s. per ton. For export, £18. 10s. to £19. 10s. per ton is quoted. Aluminoferric has been quiet, and is £8. 10s. to £12. per ton. Sulphate of alumina has been in moderate request, and is £12. to £17. per ton, according to grade. Sulphur has been well inquired for. English flowers are £32. per ton; roll is £28. per ton; and rock £22. per ton, in bags, f.o.r. Sicilian

grades are: Flowers, £28. per ton; roll, £22. 10s. per ton; and rock £17. 15s. per ton. Cream of tartar has been in improved demand, and is slightly dearer. From £12. 10s. to £13. per cwt., according to test, is being quoted. Tartaric acid has been steadily called for, and is 3s. to 3s. 2d. per lb. Boracic acid has been rather more in request. Crystals are £72. per ton, and powdered is £74. per ton; £2. to £3. extra being charged for casks. Oxalic has had a moderate sale, and is 1s. 2d. to 1s. 3d. per lb. Citric acid has been in quietly steady demand, and is 4s. 3d. per lb. White acetate of lead has been but little called for, and is £83. to £85. per ton. Arsenic has been more in request, and has been in short supply. Prices have been irregular. White powdered is from £60. to £63. per ton. Sulphate of copper has been in somewhat better request. For the home trade, £42. per ton is quoted, and for export £42. to £43. per ton, less 5%, in casks, f.o.b., at Liverpool.

TYNE CHEMICAL REPORT.

TUESDAY.

Market continues very steady, and the inquiry both for home and export is well maintained, caustic soda and bleaching powder being in good request. Locally soda crystals are firm, and in demand at £5. 10s. per ton, 2cwt. bags. Sulphur still very scarce. The following prices are per ton, net: Bleaching powder, softs and hards, £17.; caustic soda, 76—77%, £25.; do., 74—76%, £24.; do., 70%, £22.; do., 60%, £20.; recovered sulphur, 2cwt. bags, £23. 10s.; hyposulphite of soda, 5—7cwt. casks, £19.; do., 1cwt. kegs, £20.; sulphite of soda, 5—7cwt. casks, £12.; do., 1cwt. kegs, £20.; silicate of soda, 75° Tw., £9. 12s. 6d.; do., 100° Tw., £10.; do., 140° Tw., £10. 10s.; soda crystals, 2cwt. bags, £5. 10s.; sulphate of soda, saltcake, in bulk, £4.; pure white sulphate of alumina, £19. 10s.; blanc fixe, £22.; sulphide of sodium, crystals, £18.; do., refined concentrated solid, 60—62%, £25.; hydrate of barium, crystals, £56.

COALS.—Market is very firm, and, with a substantial arrival of tonnage over the week-end and good forward prospects, trade is extremely brisk. Export quotations are as under: Best Northumberland steam, 95s. to 100s. per ton; do., seconds, 90s. to 95s.; Northumberland small coals, 75s. to 80s.; do., seconds, 70s. to 72s. 6d.; best Durham gas coals, 80s. to 85s.; do., seconds, 65s. to 75s.; Durham bunker coals, 70s. to 80s.; do., seconds, 60s. to 65s.; foundry coke, 100s.; gas coke, 95s.

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Wednesday.

During the past week there has been a noticeable tendency towards increased business, and some very important orders are reported, with the anticipation that this state of affairs will continue for some time. Prices are kept at a firm level, and several articles are again to the dear side, such as chlorate of potash (which has advanced from 1s. 1d. to 1s. 2d. per lb.) and saltpetre (which has advanced from £3. 2s. to £3. 4s. per cwt.) Quotations at the moment of writing are as follows: Arsenic, £64. per ton, net, Glasgow; bicarbonate of soda, £10. 10s. and £12. 10s. per ton for 6-8cwt. casks and 1cwt. kegs. net, Liverpool; boracic acid crystals, English refined, £72. for 2cwt. bags; and borax crystals, £39. for 2cwt. bags, carriage paid; caustic soda, white, 70-72%, £25. per ton, net, Glasgow; chlorate of potash, 1s. 2d. per lb., net, Glasgow; chlorate of soda, 8d. per lb., net, Glasgow; citric acid, 4s. 4d. per lb., 5%, Glasgow; cream of tartar, 98%, £12. per cwt., net, Glasgow; paraffin wax, U.K. deliveries, 125°, 6½d. to 6½d.; 121-3°, 5½d. to 5½d.; 118-20°, 5d.; 110-12°, 4d. to 4½d.; and 98-102°, 4d. to 4½d.; sal ammoniac, £95. and £85. per ton, net, any port, for first and second lump respectively; sal ammoniac crystals, £70. per ton, net, Glasgow; saltpetre, £3. 4s. per cwt., net, Glasgow; tartaric acid, 3s. 3d. per lb., 5%, Glasgow.

Among the sea oils there is also considerable activity, but prices are more or less maintained at the level of the past few weeks. Whale oils are selling at the old prices of 94s. for pale and 76s. for brown; but black variety has stiffened to 75s., as against 74s. previously. Yellow is still unobtainable. Other prices are Newfoundland cod at 80s.; pale seal at 96s.; and Menhaden at 80s., and everything on offer is quickly finding buyers.

In the coal trade the demand is still greater than the supply and, both from the household and from the industrial point of view, inquiry is very brisk. Fuel as it comes to the pithead is quickly allocated, and there is never any surplus.

IMPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

GLASGOW.

Week ending November 30.

BARIUM SULPHATE—
Antwerp, 200 bgs.

DYESTUFFS—
Myrabolan Extract
Calcutta, 816 bgs.
Myrabolans
Calcutta, 3,072 pkts.

GLUE—
Antwerp, 60 pkgs.

MAGNESITE—
Montreal, 400 bgs.

PHOSPHATE—
Sfax, 3,400 t.

POTASH SALTS—
Rotterdam, 1,710 bgs.

POTASSIUM MURIATE—
Rotterdam, 1,500 pkgs.

POTASSIUM SULPHATE—
Rotterdam, 300 bgs.

ROSIN—
Nantes, 905 cs.

SALT—
Rotterdam, 3,573 bgs.

TARTAR—
Nantes, 126 cks.

ULTRAMARINE—
Antwerp, 6 cks.

ZINC OXIDE—
Antwerp, 60 brls.

GRANGEMOUTH

Week ending November 30.

POTASSIUM MURIATE—
Rotterdam, 900 bgs.

SODIUM NITRATE—
Christiania, 16 cks.

GRIMSBY.

Week ending November 22.

DYESTUFFS (otherwise undescr.)
Antwerp, 52 cks., 473 pkgs.

HULL.

Week ending November 22.

CARBONATE OF LIME—
Naples, 120 bgs.

CREAM OF TARTAR—
Genoa, 8 brls.

DYESTUFFS—
Sumac
Palermo, 950 bgs.

FERRO VANADIUM—
Bordeaux, 2 cs., 76 cks

LITHOPONE—
Rotterdam, 20 cks.

MAGNESITE—
Christiania, 204 bgs.

OXALIC ACID—
Christiania, 12 cks.

TARTARIC ACID—
Naples, 5 cks.

ZINC ASH—
Copenhagen, 27 cks.

LIVERPOOL.

Week ending November 30.

ACETATE OF LIME—
Baltimore, 3,263 bgs.

ANTIMONY ORE—
Melbourne, 14,110 bgs.

ARSENIC—
Lisbon, 40 brls.; Rotterdam, 40 cks.

BARIUM SULPHATE—
Antwerp, 340 bgs.

BARYTES—
Barcelona, 400 bgs.; Tarragona, 800 bgs.

BORATE OF LIME—
Mejillones, 6,827 bgs.

CAUSTIC POTASH—
Rotterdam, 75 drms.

CREAM OF TARTAR—
Barcelona, 127 brls.; Genoa, 24 kgs.; Tarragona, 4 brls.

DEXTRINE—
New York, 3,318 bgs.

DYESTUFFS—
Argols
Naples, 203 cks.
Chestnut Extract
Genoa, 200 cs., 600 brls.; New-
port News, 648 brls.
Cochineal
Las Palmas, 56 bgs.

Dye Extracts (otherwise undescr.)
Baltimore, 100 brls.

Dyewood Extract
Baltimore, 50 brls.

Fustic Extract
New port News, 25 brls.

Logwood Extract
Baltimore, 50 brls.

Myrabolan Extract
Calcutta, 820 bgs.

Myrabolans
Calcutta, 12,005 pkgs.; Bombay, 1,240 bgs.

Tanning Extract
Newport News, 100 brls., 83 bgs.

Valonia
Smyrna, 2,698 bgs.

MANGANESE ORE—
Seccondee, 397 t.

MINERAL MANGANESE
Oporto, 50 cs., 42 cks.

MINERAL WHITE—
Genoa, 3,100 bgs

MURIATE—
Rotterdam, 2,525 bgs.

OLEO STEARINE—
New York, 325 brls.

PARAFFIN SCALE—
New York, 1,215 brls

ROSIN—
Lisbon, 83 brls.; Pasages, 1,512 brls.

ROSIN OIL—
Jacksonville, 25 brls.

SCALE WAX—
Baltimore, 300 brls.

SOAP—
Melbourne, 100 cs.; Newport
News, 930 brls.; New York, 168 brls.

SODIUM ACETATE—
New York, 145 brls.

SODIUM NITRATE—
Iquique 10,719 sks.; Tocopilla, 10,073 sks.

TALLOW—
Adelaide, 941 cks.; Hankow, 470 cks.; Melbourne, 105 pkgs.;
Shanghai, 3,117 cks.

TAR—
Jacksonville, 25 brls.

TAR (PINE)—
Jacksonville, 50 brls.

TARTAR—
Messina, 15 cks

WAX—
New York, 59 bgs.

ZINC WHITE—
Sydney, 400 bgs.

LONDON.

Week ending November 22.

AMMONIUM PHOSPHATE
Holland, £280.

ARSENIC—
Japan, 99 cs.; Straits, 80 cks.

BARYTES—
Belgium, 600 bgs.

BEESEWAX—
British India, 3 t. 7 c.

CALCIUM CARBIDE—
Norway, 589 t. 10 c.

CALCIUM CYANIDE
Norway, 500 bgs.

CAMPHOR—
Holland, 35 cks.; Morocco, 25 cks.

CAUSTIC SODA—
Holland, 769 c.

CHLOROPHYLL—
Holland, 1 ck.

CITRATE OF LIME—
British Guiana, 50 pkgs.

COPPER OXIDE—
Germany, 4 drms.

DYESTUFFS—
Aniline Dye
Holland, 5 cks.; Switzerland, 1 kg., 104 pkgs.; Straits, 7 pkgs.

Argols
France, 193 pkgs.

Chestnut Extract
Italy, 200 cs.

Cochineal
Canary Islands, 7 pkgs.

Cutch
Straits, 300 pkgs.

Dyewood Extract
Switzerland, 14 cs.

Manganese Bark
Natal, 997 t.

Myrabolans
British India, 2,574 pkgs.

Sandalwood
British India, 3 t.

Tanner's Bark
France, 6 t.; W. Australia, 60 t.

Turmeric
British India, 127 pkgs.; Hol-
land, 184 pkgs.

Wattle Bark
Cape, 246 t.

FISH OIL—
Cape, 336 drms.; Japan, 2,035 cs.; Victoria, 530 cs.

FORMALDEHYDE
U.S.A., £32.

FORMIC ACID—
Holland, £20.

GELATINE—
Belgium, £161.; France, £1,057.

GLUE—
France, £570.; Holland, £450.;
U.S.A., £602.

LITHOPONE—
Holland, 40 cks.

MERCURY PRECIPITATE—
Italy, £200.

OCHRE—
U.S.A., 5 bxs.

PARAFFIN WAX—
Burma, 40 t.

PLUMBAGO—
Ceylon, 102 brls.; Anglo-Egypt-
ian Sudan, 73 bgs.; France,
168 bgs.; Japan, 150 cks.

POTASSIUM BROMIDE—
Germany, 10 cs.

ROSIN—
France, 50 cks.; Portugal, 23 brls.

SOAP—
Channel Islands, £11.; France,
£200.; Spain, £40.; U.S.A., £24.

SODA—
Germany, 2 c.

STEARINE—
Argentine Republic, 564 bgs.

SULPHUR—
Italy, 70 t.

SULPHUR (ROLL)—
Italy, £38.

TALLOW—
Argentina, 170 t.; N.Z., 374 t.
9 c.; Victoria, 66 t. 9 c.

TANNIC ACID—
Switzerland, 33 cks.

TAR—
Sweden, 200 brls.

TARTARIC ACID—
Italy, 100 pkgs.

ULTRAMARINE—
Belgium, 8 cks.; Holland, 20 cks.

WAX—
Madagascar, 98 bgs.; U.S.A.,
65 bgs.

WHITE LEAD—
U.S.A., 256 kgs., 465 cks.

WOOD OIL—
Hong Kong, 500 drms.

MANCHESTER.

Week ending November 30.

IRON PYRITES—
Fallonica, 3,000 t.

SOAP—
Valencia, 280 cs.

STEARINE—
Rotterdam, 63 pkgs.

TARTAR—
Bordeaux, 80 bgs.

MIDDLESBROUGH.

Week ending November 22.

NIL.

NEWCASTLE-ON-TYNE

Week ending November 22.

CARBIDE—
Bergen, 199 drms.

FATTY ACIDS—
Rotterdam, 680 brls.

OXALIC ACID—
Gothenburg, 13 brls.

WOOD TAR—
Gothenburg, 150 brls.

N. & S. SHIELDS.

Week ending November 22.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

BRISTOL.

Publication of Official Returns
Suspended.

GLASGOW.

Week ending November 30.

ALUMINA SULPHATE—
Dunedin, £73.

ALUMINA SULPHATE—
Gothenburg, 60 t. 16 c.

AMMONIUM CARBONATE—
Dunedin, £41.

AMMONIUM SULPHATE—
Kobe, 100 bgs.

BASIC SLAG—
Oporto, 99 t. 19 c.

BEESWAX—
Antwerp, £58.

CHEMICALS (*otherwise undescribed*)
Antwerp, 104 pkgs.; Bilbao, 215 pkgs.; Bombay, 97 pkgs.; Kobe, 370 pkgs.; Hong Kong, 100 pkgs.; Lytleton, 3 pkgs.; Mosel Bay, 5 pkgs.; Oporto, 1,192 pkgs.; Rio de Janeiro, £3,276.

COAL PRODUCTS (*otherwise undes.*)
Antwerp, £725.; Bombay, £135.; Bilbao £5,563.; Brest, £1,830.; Calcutta, £80.; Gothenburg, £125.

DISINFECTANTS (*otherwise undes.*)
Bombay, £44.

DYESTUFFS (*otherwise undescribed*)
Gothenburg, £319. Oporto, £63.

GLUE, SIZE, AND GELATINE—
Penang, £13. Pt. Swettenham, £13.

MAGNESITE (CALCINED)—
New York, £182.

PARAFFIN WAX—
Antwerp, 15 t. Santos 1 t. 2 c.; Rio de Janeiro, 3 t.

POTASSIUM BICHROMATE—
Gothenburg, £323.; Santos, £130.

POTASSIUM CHROMATE—
Rio de Janeiro, £528.

SHEEP DIP—
Santos, £758.; Rio de Janeiro, £205.

SOAP—
Antwerp, 200 bxs.; Rio de Janeiro, 125 bxs.

SODA ASH—
Gothenburg, 20 t.

GOOLE.

Week ending November 22.

NIL.

GRANGEMOUTH.

Week ending November 22.

DYESTUFFS—
Tanning Extract
Copenhagen, 8 kgs., £13.

PARAFFIN WAX—
Christiania, 5 t. 6 c.; Copenhagen, 5 t. 3 c.; Gothenburg, 4 t. 10 c.

POTASSIUM BICHROMATE—
Christiania, 7 c.

SOAP—
Christiania 5 t. 8 c.

SODIUM BICARBONATE—
Christiania 5 t.

GRIMSBY.

Week ending November 22.

NIL.

HULL.

Week ending November 18.

BORAX—
Antwerp, 30 bgs.

CAUSTIC SODA—
Constantinople, 312 drms.

CHEMICALS (*otherwise undescribed*)
Antwerp, 8 bds.; Copenhagen, 1 cs., 1 ck., 6 brls.; Constantinople, 34 cs., 106 brls. Gothenburg, 175 cs., 40 cks., 100 pkgs., 30 bgs.; Malta, 40 drms.; Piraeus, 100 cks.; Rotterdam, 50 bgs., 24 cks., 1 bx.; Stockholm, 2 cs.

COAL PRODUCTS—
Benzole
Rotterdam, 91 drms;

GLUE—
Copenhagen, 60 bgs.; Gothenburg, 1 bx.

PITCH—
Constantinople, 100 brls.; Piraeus, 100 cks.; Smyrna, 50 cks.

SOAP—
Constantinople, 6 brls.; Gothenburg, 124 cs.; Rotterdam, 500 brls.

SULPHUR—
Stockholm, 20 bgs.

TAR—
Gothenburg, 15 cks.; Piraeus, 100 cks.; Rotterdam, 110 brls.; Smyrna, 28 cks.; Salonica, 75 cks.

WOOD PRESERVATIVE—
Constantinople, 99 drms.

LEITH.

Week ending November 22.

ALUM (LUMP)—
Seville, 1 t., £19.

AMMONIUM SULPHATE—
Yokohama, 1,190 t., £28,916.

BORAX—
Rotterdam 5 t. 10 c., £225.

BORIC ACID—
Bilbao, 8 t. 9 c., £629.; Rotterdam, 2 t. 7 c., £178.

CAUSTIC SODA—
Amsterdam, 76 t. 1 c., £1,525.

COAL PRODUCTS (*otherwise undes.*)
Gothenburg, 17 t., £86.; Faroes, 8 c., £9.

POTASSIUM BICHROMATE—
Copenhagen, 16 c., £129.; Gothenburg, 7 c., £63.; Rotterdam, 1 t. 4 c., £195.

SODA ASH—
Amsterdam, 44 t. 2 c., £330.

SODIUM BICHROMATE—
Rouen, 51 t. 19 c., £2,182.

LIVERPOOL.

Week ending November 20.

ACETIC ACID—
Las Palmas, 4 c., £20.; Lisbon, 2 c., £26.; Oporto, 1 c., £6.; Stamboul, 5 t., £510.

ALUM—
Antonina, 3 t., £52.; Bilbao, 2 t., £36.; Callao, 4 t. 8 c., £80.; Dunedin, 10 c., £12.; Galatz, 19 c., £18.; Oporto, 16 c., £45.; Rio de Janeiro, 2 t. 17 c., £63.

ALUMINA SULPHATE—
Buenos Ayres, 128 t. 9 c., £2,191.; Bilbao, 1 t., £16.; Calcutta, 4 t. 10 c., £192.; Monte Video, 20 t., £300.; Trondhjem, 11 t. 8 c., £106.

ALUMINA SULPHOCYANIDE—
Rio de Janeiro, 2 t., £150.

ALUMINOFERRIC—
Pt. Swettenham, 10 c., £6.; Rosario, 37 t. 11 c., £341.

AMMONIA—
Porto Alegre 1 t. 10 c., £136.; Opobo, 1 c., £5.; Rio de Janeiro, 11 c., £63.

AMMONIA (ANHYDROUS)—
Lisbon, 6 c., £99.

AMMONIUM CARBONATE—
Adelaide, 2 t. 10 c., £158.; Brisbane, 14 c., £50.; Buenos Ayres, 6 c., £36.; Barcelona, 2 t., £135.; Bilbao, 4 t. 10 c., £279.; Dunedin, 18 c., £66.; Kobe, 5 t., £304.; Lisbon, 1 t. 10 c., £91.; Lytleton, 2 t., £141.; Maceio, 9 c., £48.; Melbourne, 10 c., £34.; Moji, 2 t. 19 c., £183.; Madras, 8 t. 3 c., £667.; Naples, 5 t., £315.; Payta, 9 c., £50.; Para, 2 c., £12.; Pernambuco, 10 c., £42.; Sydney, 12 c., £41.; Valencia, 10 c., £30.; Yokohama, 7 t., £460.

AMMONIUM CHLORIDE—
Galatz, 5 t. 2 c., £284.; Piraeus, 9 c., £36.; Sydney, 2 t., £116.; Yokohama, 30 t. 3 c., £1,586.

AMMONIUM HYDRATE—
Accra, 1 c., £7.; Cabinda, 1 c., £3.; Lome, 1 c., £3.; Warri, 1 c., £6.

AMMONIUM MURIATE—
Barcelona, 2 t. 4 c., £115.; Bombay, 2 t. 10 c., £139.; Cairo, 4 c., £11.; Corfu, 2 c., £5.; Genoa, 10 t. 3 c., £445.; Galatz, 9 t. 19 c., £518.; Gothenburg, 5 t. 1 c., £224.; Melbourne, 2 t. 19 c., £141.; Moji, 5 t., £295.; Patras, 2 t. 9 c., £129.; Rouen, 4 t. 19 c., £253.; Shanghai, 5 t. 1 c., £283.

AMMONIUM NITRATE—
Belveil, 100 t. 4 c., £2,756.; James Isles, 100 t. 2 c., £2,755.; Mauritius, 150 t., £6,250.

AMMONIUM SULPHATE—
Bombay, 10 t. 2 c., £182.

ANTIMONY—
Madeira, 1 ck., £3.; Porto Alegre, 1 t., £40.; Antonina, 2 c., £5.

ANTIMONY SALTS—
Barcelona, 8 c., £160.

ANTIMONY SULPHIDE—
Helsingfors, 2 c., £9.; Naples, 5 t., £170.

ARSENIC—
Bahia, 5 t. 19 c., £897.; Calcutta, 8 t., £600.; Porto Alegre, 1 t., £66.; Pelotas, 2 t., £132.; Piraeus, 1 c., £29.

BARIUM CHLORIDE—
Barcelona, 5 t., £103.

BARIUM SULPHIDE—
Barcelona, 4 c., £27.

BLEACHING POWDER—
Barcelona, 6 t. 6 c., £98.; Bordeaux, 40 t. 16 c., £491.; Calcutta, 35 t., £532.; Dunedin, 50 t. 3 c., £579.; Dunkirk, 50 t. 13 c., £623.; Durban, 1 t., £18.; Huelva, 6 c., £13.; Lisbon, 5 t., £88.; Nantes, 65 t. 19 c., £908.; Oporto, 8 t. 7 c., £132.; Rio de Janeiro, 4 t. 4 c., £70.; Rouen, 4 t. 18 c., £61.; St. John's, N.F., 1 c., £2.; Secondee, 5 c., £5.; Valparaiso, 2 t., £46.

BORAX—
Antwerp, 5 t., £205.; Cologne, 38 t. 10 c., £2,429.; Pt. Limon, 1 c., £2.

BORIC ACID—
Lisbon, 2 c., £8.; La Guaira, 1 c., £4.; Quita, 8 c., £43.

CALCIUM CARBIDE—
Opobo, 1 c., £7.; Piraeus, 5 t., £122.

CALCIUM CARBONATE—
Accra, 10 c., £18.; Oporto, 8 c., £12.; Sapele, 2 c., £3.

CALCIUM CHLORIDE—
Bombay, 10 t. 2 c., £77.; Calcutta, 5 t. 2 c., £35.; Christiania, 2 qrs., £2.; Colombo, 15 t. 3 c., £76.; Lytleton, 20 t. 1 c., £138.; Palermo, 101 t. 17 c., £724.; Pernambuco, 1 t., £90.; Napier, 1 t. 1 c., £8.; Singapore, 5 t. 1 c., £39.; Rouen, 5 t. 1 c., £36.

CAMPOR—
Copenhagen, 5 c., £600.

CARBONATE OF LIME—
Buenos Ayres 10 t., £320.

CAUSTIC SODA—
Adelaide, 37 drms.; Bangkok, 10 drms.; Bari, Italy, 149 pkgs.; Beira, 12 drms.; Bilbao, 3 drms.; Bombay, 339 drms.; Braila, 28 drms.; Christiania, 4 drms.; Genoa, 20 drms.; Manaus, 9 pkgs.; Melbourne, 1,037 drms.; Naples, 66 drms.; Penang, 20 drms.; Porto Alegre, 250 drms., 400 cs.; Pt. Said, 60 drms.; Pt. Swettenham, 30 drms.; Samarang, 50 drms.; Singapore, 43 drms.; Stockholm, 135 drms.; Venice, 40 pkgs.

CELLULOSE ACETATE—
New York, 1 t. 7 c., £937.

CHEMICALS (*otherwise undescribed*)
Alicante, 1 t. 19 c., £77.; Bilbao, 3 t., £117.; Calcutta, 7 t. 9 c., £291.; Genoa, 1 t. 1 c., £75.; Rotterdam, 7 t. 13 c., £437.; Santander, 2 t. 19 c., £118.; Secondee, 6 c., £30.

CHINA CLAY—
Bombay, 1,344 cks.

CITRIC ACID—
Buenos Ayres, 1 c., £25.; Seville, 1 t., £480.

COAL PRODUCTS—
Carbolic Acid
Bombay, 12 lbs., £1.; Calcutta, 2 c., £54.; Genoa, 15 t., £812.; Kobe, 30 t. 4 c., £1,692.; Rio de Janeiro, 17 c., £32.; Yokohama, 4 t. 14 c., £371.

COAL PRODUCTS—

Creosote
Mollendo, 10 gals., £3.
Cresylic Acid
Buenos Ayres, 19 c., £40.; Montreal, 9 t. 8 c., £450.

Naphtha
Mombasa, 1 c., £21.
Naphthalene
Buenos Ayres, 4 t. 18 c., £202.; Genoa, 10 c., £62.; Las Palmas, 2 t., £40.

Pitch
Bordeaux, 400 t., £2,400.; Cadiz, 50 t., £1,700.; Sierra Leone, 10 c., £6.

Tar
Accra, 2 t., £23.; Abonema, 8 c., £3.; Attuaboe, 8 c., £7.; Bissau, 16 c., £3.; Christiania, 55 t. 19 c., £510.; Dakar, 2 t. 14 c., £25.; Half Assinie, 1 t., £8.; Kilindini, 1 t. 6 c., £13.; Lome, 80 gals., £4.; Lagos, 4 c., £2.; Pt. Swettenham, 3 t. 16 c., £40.; Sapele, 8 c., £3.; Saltpond, 3 c., £5.; Secondee, 2 t. 10 c., £45.; Tanosu, 5 c., £1.

COPPER ARSENATE—
Genoa, 2 t., £150.

COPPER PRECIPITATE—
Genoa, 2 t., £150.

COPPER SULPHATE—
Algiers, 48 t. 14 c., £1,850.; Bougie, 8 t. 15 c., £280.; Callao, 2 t., £80.; Karachi, 2 t. 10 c., £100.; Nantes, 9 t. 15 c., £300.; Talcahuano, 3 t., £117.; Toulouse, 47 t. 10 c., £2,400.

CREAM OF TARTAR—
Christiania, 2 c., £25.; Copenhagen, 1 t., £250.; Halifax, 2 t. 1 c., £408.; St. John, N.F., 6 t. 10 c., £767.; Toronto, 11 c., £72.

CREOLINA—
Bahia, 12 t. 12 c., £1,121.; Caracas, 1 t. 5 c., £80.; Maceio, 16 c., £76.; Maracaibo, 1 t. 3 c., £87.; Porto Cabello, 7 c., £22.; Porto Alegre, 1 t., £106.

CRYOLITE—
Gijon, 2 c., £6.; Santander, 8 c., £23.; Valencia, 1 t. 10 c., £83.

DISINFECTANTS (*otherwise undes.*)
Abonema, 1 c., £4.; Bilbao, 6 c., £55.; Christchurch, 14 c., £35.; Calcutta, 2 t. 7 c., £38.; Chamberico, 108 gals., £26.; Ciudad, Bolivar, 1 t., £80.; Hong Kong, 4 c., £13.; Huelva, 20 lbs., £1.; Iddo, 1 c., £5.; Kingston, 1 t. 2 c., £25.; Koko 18 lbs., £2.; Las Palmas, 1 t., £60.; Loanda, 11 c., £23.; Opobo, 13 c., £33.; Oporto, 1 t. 3 c., £52.; Pt. Harcourt, 3 c., £13.; Porto Cabello, 7 t. 10 c., £589.; Porto Novo, 2 c., £9.; Pt. Stanley, 5 c., £15.; Rangoon, 16 c., £30.; Sapele, 7 c., £18.; Secondee, 8 c., £40.; Tientsin, 14 c., £35.

DYESTUFFS (*otherwise undescribed*)
Bahia, 2 c., £115.; Bilbao, 1 t. 1 c., £353.; Calcutta, 7 c., £221.; Chefoo, 1 t. 9 c., £1,210.; Genoa, 10 t., £6,596.; Havre, 2 t. 2 c., £871.; Kobe, 12 t. 10 c., £4,183.; Montreal, 11 c., £281.; Nantes, 5 c., £80.; Porto Cabello, 1 c., £42.; Oporto, 7 t. 13 c., £2,902.; Penang, 20 lbs., £8.; Rio de Janeiro, 5 t. 17 c., £2,387.; Rangoon, 4 c., £106.; Shanghai, 22 t. 11 c., £6,022.; Salonica, 6 c., £40.; Santos, 17 c., £420.; Saigon, 1 t. 18 c., £280.; Yokohama, 1 t. 6 c., £1,168.; Porto Colombia, 11 c., £318.

DYESTUFFS—
Aniline Dye
Copenhagen, 1 t. 6 c., £822.; Smyrna, 19 c., £170.

FERRO MANGANESE—
Baltimore, 458 t.; B. Ayres, 1 t.

FORMIC ACID—
Barcelona, 4 c., £25.

GLUE, SIZE, AND GELATINE—
Bombay, 15 pkgs.; Galatz, 20 pkgs.; Lagos, 1 pkg.; Santos, 28 pkgs.; Singapore, 12 pkgs.; Tientsin, 100 pkgs.

HYDROFLUORIC ACID—
Bahia, 3 c., \$17.; Santos, 2 c., \$12.

LEAD ACETATE—
Buenos Ayres, 6 c., \$30.; Naples, 1 t. 5 c., \$110.; Oporto, 2 c., \$10.; Quita, 2 c., \$20.

MAGNESIUM CHLORIDE—
Lisbon, 3 t., \$55.; Porto Alegre, 1 t., \$25.

MAGNESIUM SULPHATE—
Accra, 1 c., \$2.; Antonina, 10 c., \$7.; Buenos Ayres, 1 t., \$24.; Cape Coast, 1 c., \$3.; Madeira, 1 c., \$2.; Opobo, 10 c., \$17.; Quita, 2 c., \$7.; San Juan del Sur, 4 c., \$8.; Secondee, 2 c., \$5.; Madeira, 1 c., \$2.; Pt. Harcourt, 3 c., \$5.

MANGANESE BIXIDE—
Havre, 60 t. 16 c., \$3,049.

MANGANESE PEROXIDE—
Lisbon, 2 t., \$50.

NICKEL SALTS—
Calcutta, 6 c., \$384.

NICKEL SULPHATE—
Barcelona, 10 c., \$31.; Shanghai, 5 c., \$16.

OXALIC ACID—
Barcelona, 2 c., \$14.; Gothenburg, 1 c., \$10.

PHOSPHORUS—
Kobe, 9 t. 15 c., \$1,130.

PHOSPHORUS (AMORPHOUS)—
Rio de Janeiro, 1 t. 3 c. \$213.; Vera Cruz, 2 t. 8 c., \$513.

PITCH—
Antwerp, 201 t. 14 c., \$1,000.; Punta Arenas, 2 qrs., 10s.;

POTASSIUM BICHRIMATE—
Buenos Ayres, 15 c., \$120.; Oporto, 2 t. 12 c., \$337.

POTASSIUM BINOXALITE—
Valencia, 2 c., \$20.

POTASSIUM CHLORATE—
Bahia, 15 c., \$69.; Bilbao, 10 c., \$54.; Delagoa Bay, 1 t., \$110.; Lisbon, 10 c., \$66.; Oporto, 13 c., \$86.; Para, 5 c., \$34. Parana, 19 t. 12 c., \$1,377. Quita, 4 c., \$36.; Rio de Janeiro, 17 t. 13 c., \$1,155.; Salónica, 3 c., \$13.; Santos, 7 t. 17 c., \$513.

POTASSIUM CYANIDE—
Maceio, 44 lbs., \$9.

POTASSIUM NITRATE—
Punta Arenas, 12 c., \$49.; Seville, 8 c., \$54.

POTASSIUM PRUSSATE—
Barcelona, 11 c., \$100.; Buenos Ayres, 2 c., \$67.; Oporto, 2 c., \$25.; Rio de Janeiro, 10 c., \$106.

POTASSIUM SULPHATE—
La Union, 1 c., \$13.

POTASSIUM TARTRATE—
Christiania, 20 lbs., \$2.

SALAMMONIAC—
Bahia, 5 c., \$21.; Barcelona, 3 t. 19 c., \$281.; Bombay, 3 t. 15 c., \$265.; Galatz, 5 t., \$290.; Naples, 2 t., \$170.; Rio de Janeiro, 1 t., \$82.; Serbia, 1 t. 19 c., \$141.; Piraeus, 9 c., \$36.; Smyrna, 3 t., \$192.

SALT—
Newcastle, 500 t.; Norrköping, 250 t.; Okopedi, 60 t.; Onitsha, 89 t.; Opela, 35 t.; Pt. Harcourt, 40 t.; Sapele, 4 t.; Sherbro, 25 t.; Stockholm, 20 t.; Sierra Leone, 50 t.; Trondhjem, 140 t.; Victoria, W.C.A., 3 t.; Warri, 145 t.; Wellington, 64 t.

SALTPETRE—
Buenos Ayres, 1 c., \$3.; Elmina, 1 c., \$3.; Vigo, 3 t. 14 c., \$184.

SHEEP DIP—
Belize, 5 c., \$16.; Buenos Ayres, 166 t. 5 c., \$8,136.; Falklands, 3 t. 12 c., \$240.; La Cerba, 19 c., \$65.; La Guaira, 12 c., \$41.; Talcahuano, 3 t. 9 c., \$200.

SILVER NITRATE—
Tammerfors, 2 qrs., \$93.

SOAP—
Accra, 50 bxs., 127 cs.; Aden, 27 cs.; Algiers, 1,535 cs.; Alexandria, 250 bxs., 335 cs.; Amboina, 100 cs.; Amoreang, 200 bxs.; Amsterdam, 150 cs.; Ampenam, 100 bxs.; Antofagasta, 36 cs.; Antwerp, 4,500 bxs., 4,882 cs.; Arica, 100 cs.; Auckland, 9 bxs., 45 cs.; Balik Pappan, 156 bxs.; Barcelona, 3 bxs.; Barbados, 750 bxs., 1,900 cs.; Bas Konolon, 38 cs.; Basra, 150 bxs.; Batavia, 225 cs.; Bathurst, 40 bxs., 3,904 cs.; Belawan Deli, 600 bxs.; Belize, 7 cs.; Benoa, 150 bxs.; Beyrouth, 25 cs.; Bolleleng, 100 bxs.; Bombay, 428 cs.; Bonny, 250 bxs.; Bordeaux, 2,050 cs., 6 brls.; Buenos Ayres, 1,259 cs.; Cape Town, 100 bxs.; Calcutta, 4 bxs.; Christiania, 6,846 cs.; Colombo, 22 bxs.; Colon, 101 cs.; Constantinople, 1,279 cs.; Copenhagen, 120 cs.; Dongalla, 100 bxs.; Dakar, 50 cs.; Delhi, 10 cs.; Galatz, 640 bxs., 4,018 cs.; Genoa, 1,210 bxs., 751 cs.; Gibraltar, 7 bxs., 628 cs.; Hong Kong, 500 bxs., 1 cs.; Hamburg, 30 cs.; Helsingfors, 2,500 bxs., 326 cs.; Iquique, 1 cs.; Las Palmas, 50 bxs., 224 cs.; Marseilles, 2,000 cs.; Macassar, 850 cs., 500 bxs.; Marinique, 898 cs.; Menada, 725 cs., 1,000 bxs.; Monte Video, 50 cs.; Nantes, 2,000 cs.; Nelson, N.Z., 10 bxs.; Oporto, 155 cs.; Oran, 3,605 bxs.; Padang, 410 bxs.; Panama, 100 bxs.; Paris, 10 bxs.; Penang, 9 cs., 18 bxs.; Pt. Said, 1,110 bxs.; Pt. au-Prince, 5 bxs.; Porto Novo, 2 bxs.; Pt. Sudan, 2 bxs.; Quittah, 1 bx.; Rabat, 100 bxs.; Reval, 60 bxs.; Rio de Janeiro, 5 bxs.; Rotterdam, 60 bxs.; St. Kitts, 180 pgs.; St. John's N.F., 130 bxs.; St. Louis, 100 pgs.; St. Vincent, 150 bxs.; Samarang, 40 bxs.; Samarinda, 725 pgs.; San Fernando, 10 pgs.; Santos, 3 bxs.; Sassandra, 75 pgs.; Secondee, 3 cs., 600 bxs.; Sherbro 24 pgs.; Stamboul, 29 pgs.; Surinam, 50 pgs.; Talcahuano, 135 cs.; Tangiers, 150 bxs.; Teneriffe, 50 bxs., 75 cs.; Trondhjem, 20 bxs., 10 brls.; Varna, 1,526 cs.; Valencia, 20 cs.; Velo, 15 cs.; Valparaíso, 300 cs., 100 drms.; Vera Cruz, 1 cs.; Vigo, 40 cs.; Vladivostok, 32 bxs.; Winneba, 2 cs.; Wellington, 5 bxs.; Yokohama, 12 bxs., 8 cs.

SODA ASH—
Adelaide, 50 pgs.; Auckland, 125 pgs.; Bari, Italy, 451 pgs.; Buenos Ayres, 482 pgs.; Calcutta, 1,600 pgs.; Karachi, 400 pgs.; Kobe, 15,315 pgs.; Melbourne, 247 pgs.; Moji, 1,682 pgs.; Padang, 50 pgs.; Patras, 300 pgs.; Rio de Janeiro, 380 pgs.; Samarang, 340 pgs.; Santos, 722 pgs.; Shanghai, 3,010 pgs.; Stockholm, 2,200 pgs.

SODA CRYSTALS—
Karachi, 100 pgs.; Madras, 300 pgs.; Piraeus, 127 pgs.; Singapore, 28 pgs.

SODIUM BICARBONATE—
Adelaide, 184 pgs.; Bari, Italy, 155 pgs.; Brisbane, 214 pgs.; Calcutta, 350 pgs.; Christiania, 290 pgs.; Copenhagen, 250 pgs.; Galatz, 50 pgs.; Madras, 500 pgs.; Moji, 215 pgs.; Perth, 67 pgs.; Penang, 20 pgs.; Salónica, 100 pgs.; St. John's N.F., 200 pgs.; Santos 20 pgs.; Sao Paulo, 20 pgs.; Tammerfors, 10 pgs.; Timaru, 20 pgs.

SODIUM SILICATE—
Calcutta, 64 pgs.; Christiania, 10 pgs.; Genoa, 135 pgs.; Kobe, 193 pgs.; Lisbon, 65 pgs.; Melbourne, 87 pgs.; Nantes, 100 pgs.; Para, 30 cs.; Piraeus, 120 pgs.

SODIUM SULPHATE (GLAUBER SALTS)—
Secondee, 1 c., \$6.

SODIUM SULPHIDE—
Abo 3 c., \$4.; Nantes, 4 t. 18 c., \$111.

STRONTIUM NITRATE—
Seville, 1 c., \$6.

SULPHUR—
Abo, 10 c., \$5.; La Guaira, 1 t., \$30.; Maceio, 4 c., \$10.; Secondee, 2 c., \$3.; Tammerfors, 2 t., \$60.

SULPHURIC ACID—
Natal, 8 c., \$16.; Rio de Janeiro, 4 c., \$36.

TALLOW—
Marseilles, 21 brls.; Neuss, 30 cs.

TANNIC ACID—
Antwerp, 2 t., \$223.

TAR (SWEDISH)—
Monte Video, 2 t., \$88.

TARTARIC ACID—
Karachi, 1 t. 1 c., \$346.; New York, 1 t. \$328.; Oporto, 1 c., \$11.

TIN CRYSTALS—
Montreal, 15 c., \$154.

WOOD TAR—
Alexandria, 1,140 gals. \$175.

WOOD PRESERVATIVE—
Bilbao, 4 t. 16 c., \$80.; Kingston, 1 t. 2 c., \$22.

ZINC CHLORIDE—
Samboe, 5 t. 5 c., \$278.

LONDON.

Week ending November 19.

ACETANILID—
Amsterdam, 1 ck., \$46.; Antwerp, 1 ck., \$40.; Bangkok, 1 cs., \$63.; Calcutta, 1 cs. (pt.), \$9.

ACETIC ACID—
Alexandria, 1 brl., \$12.; Auckland, 9 cs., \$24.; Amsterdam (F.), 3 cs., \$40.; Fremantle, 2 cs., \$5.; Hamburg, 2 cs., \$8.; Lisbon, 2 cs., \$10.; Paris, 12 cs., \$167.; Rio de Janeiro, 16 cs., \$66.; Rotterdam (F.), 6 cs., \$80.; Wellington, 4 cs., \$14.

ACETO SALICYLIC ACID—
Bangkok, 1 cs., \$131.; Brisbane, 1 cs. (pt.), \$13.; Genoa, 1 cs., \$30.; Gothenburg, 10 cs., \$225.

ACETONE—
Barcelona, 2 drms., \$56.; Rotterdam, 1 dr., \$28.

ALUM—
Adelaide, 2 c., \$9.; Amsterdam, 1 kg., \$6.; Barbados, 5 c., \$9.; Delagoa Bay, 5 c., \$8.; Florianopolis, 6 c., \$9.; Mollendo, 5 c., \$7.; Nantes, 4 t. 18 c., \$115.; Pernambuco, 5 c., \$9.; Wellington, 5 c., \$6.

AMMONIA—
Accra, 6 cs., \$11.; Calcutta, 5 cs., \$10.; Delagoa Bay, 6 cs., \$12.; Durban, 20 cs., \$39.; Piraeus, 4 drms., \$14.; Rangoon, 5 cs., \$10.; Santos, 4 cs., \$16.; Valparaíso, 5 cs., \$9.

AMMONIUM ACETATE—
Bombay, 1 cs., \$5.

AMMONIUM BROMIDE—
Auckland, 1 cs., \$16.; Bombay, 1 cs., \$20.; Sydney, 2 cs. (pt.), \$17.

AMMONIUM CARBONATE—
Bangkok, 17 c., \$98.; Beyrouth, 1 c., \$6.; Florianopolis, 8 c., \$43.; Guayaquil, 4 c., \$20.; Mollendo, 1 c., \$5.; Penang, 13 c., \$76.; Pt. Swettenham, 4 c., \$22.; Rio de Janeiro, 2 t. 3 c., \$224.; Singapore, 11 c., \$67.

AMMONIUM CITRATE—
Calcutta, 1 cs., \$14.

AMMONIUM CHLORIDE—
Antwerp, 50 pgs., \$285.; Cape Town, 2 kgs., \$8.; Galatz, 7 kgs., \$130.

AMMONIUM FLUORIDE—
Durban, 3 drms., \$28.

AMMONIUM HYDRATE—
Lytleton, 1 cs. (pt.), \$6.; Sydney, 1 cs. (pt.), \$9.

AMMONIUM MOLYBDATE—
Cape Town, 1 cs. (pt.), \$10.

AMMONIUM MURIATE—
Antwerp, 1 t., \$82.; Constantinople, 10 c., \$23.; Kobe, 4 t. 19 c., \$292.; Rouen, 3 t., \$225.; Wellington, 2 c., \$6.

AMMONIUM PERSULPHATE—
Durban, 8 cs., \$500.

AMMONIUM PHOSPHATE—
Algiers, 3 cs., \$53.; Barcelona, 1 t. 3 c., \$37.

AMMONIUM SULPHOCYANIDE—
Paris, 2 c., \$25.

AMYL ACETATE—
Brussels, 1 dr., \$15.; Hong Kong, 40 cs., \$70.

AMYL BUTYRATE—
Hong Kong, 2 cs., \$20.

ANTIMONY—
Rio de Janeiro, 11 c.

ANTIMONY REGULUS—
Calcutta, 10 c.

ANTIMONY SULPHIDE—
Antwerp, 12 brls., 1 ck., \$333.; Aracaju, 2 cs., \$5.; Bahia, 5 cs., \$12.; Dunkirk, 34 cs., \$529.; Malmo, 3 cs., \$100.; New York, 10 cs., \$454.; Paris, 5 cs., \$104.

ARSENIC—
Auckland, 5 c., \$16.; Bahia, 2 c., \$18.; Calcutta, 2 t. 5 c., \$318.; Fiji, 2 c., \$8.; Mazagan, 3 c., \$28.

BARBITONE—
Melbourne (F.), 2 cs. (pt.), \$10.

BARIUM CHLORIDE—
Oporto, 3 pgs., \$34.

BARIUM CHROMATE—
Rio de Janeiro, 1 ck. (pt.), \$8.

BARIUM CHROMATE—
Rio de Janeiro, 2 cs., \$45.

BENZOIC ACID—
Genoa, 1 ck., \$21.

BISMUTH—
Alexandria, 1 cs. (pt.), \$9.; Amoy, 1 cs. (pt.), \$7.; Bombay, 1 cs. (pt.), \$11.; Rotterdam, 1 cs. (pt.), \$34.

BISMUTH & ACETO SALICYLIC—
Novorossisk, 4 cs., \$300.

BISMUTH CARBONATE—
Christchurch, 1 cs. (pt.), \$87.; Genoa, 3 cs. (pt.), \$11.

BISMUTH CITRATE—
Christchurch, 1 cs. (pt.), \$11.

BISULPHITE OF LIME—
Wellington, 10 hds., \$39.

BISMUTH SALICYLATE—
Cape Town, 1 cs. (pt.), \$9.; Calcutta, 1 cs. (pt.), \$20.; Charkeff, 6 cs., \$280.; Genoa, 3 cs. (pt.), \$34.

BISMUTH SUBGALLATE—
Amsterdam, 1 cs., \$42.; Buenos Ayres, 1 cs., \$17.; Lisbon, 1 cs. (pt.), \$12.

BISMUTH SUBNITRATE—
Calcutta, 1 cs. (pt.), \$40.; Cape Town, 1 cs. (pt.), \$10.; Copenhagen, 10 cs., \$755.; Genoa, 3 cs. (pt.), \$169.; Lisbon, 1 cs. (pt.), \$26.; Rotterdam, 1 cs., \$46.

BISMUTH SUBSALICYLATE—
Pelotas, 1 cs. (pt.), \$22.

BORAX—
Amsterdam, 4 t., \$200.; Belgrade, 5 c., \$13.; Gefle, 5 t., \$195.; Genoa, 15 t., \$590.; Galatz, 10 c., \$21.; Gothenburg (F.), 1 t. 10 c., \$59.; Nantes, 1 t., \$50.; Rio de Janeiro, 15 c., \$36.; Rotterdam (F.), 4 t. 18 c., \$197.; Rotterdam, 19 t. 16 c., \$983.; Paris, 39 t. 19 c., \$1,560.; Teneriffe, 1 c., \$5.

BORIC ACID—
Bangkok, 5 c., \$28.; Bombay, 10 c., \$38.; Calcutta, 2 c., \$9.; Durban, 5 c., \$25.; East London, 10 c., \$38.

CALCIUM CARBIDE—
Accra, 20 drms., \$24.; Colombo, 1 t., \$24.; Galatz, 11 c., \$14.; Secondee, 17 c., \$21.

- CALCIUM CARBONATE**—
Bangkok, 10 cks., £50.
- CALCIUM CHLORIDE**—
Aden, 4 t. 5 c., £40.; Bordeaux, 6 t., £201.; Marseilles, 1 t. 10 c., £15.; Piraeus, 2 c., £8.; Port Swettenham, 1 t. 5 c., £63.
- CALCIUM HYPOPHOSPHATE**
Genoa, 1 cs. (pt.), £7.
- CALCIUM PHOSPHATE**
Rotterdam, 1 kg., £5.; Sydney, 1 ck., £16.
- CALCIUM SULPHIDE**—
New York, 1 cs., £25.
- CARBON (RIEFTORT)**—
Dieppe, 145 t., £788.
- CAUSTIC POTASH**—
Auckland, 1 cs. (pt.), £14.; Copenhagen, 9 drms., £375.
- CAUSTIC SODA**—
Penang, 8 c., £15.
- CERESINE WAX**—
Gothenburg, 1 t.; Sydney, 10 c.
- CHEMICALS (otherwise undescribed)**
Antwerp, 6 cs., £1,479.; Basra, 2 cs. (pt.), £48.; Bombay, 1 cs. (pt.), £20.; Buenos Ayres, 1 cs. (pt.), £15.; Calcutta, 2 cs., £20.; Colombo, 1 cs., £6.; Delagoa Bay, 6 cs., £17.; Florence, 6 drms., £24.; Lyttleton, 1 cs., £57.; New York, 8 kgs. (pt.), £181.; Rio de Janeiro, 1 ck., £21.; Sydney, 12 cks., £120.
- CHINA CLAY**—
Antwerp, 2 t.; Havre, 5 t.
- CHLORIDE OF LIME**—
Talcahuano, 13 c., £13.; Valparaiso, 19 c., £19.
- CHROME SULPHATE**—
Rotterdam, 1 ck., £15.
- CHROMIC ACID**—
Constantinople, 1 cs., £44.
- CITRIC ACID**—
Barbados, 1 cs. (pt.), £6.; Buenos Ayres, 5 t. 2 c., £2,192.; Durban, 2 c., £33.; Guayaquil (F.), 1 c., £27.; Pt. Elizabeth, 8 c., £224.; Rotterdam, 1 t., £448.; Sydney, 2 t., £869.; Valparaiso, 10 c., £226.
- COAL PRODUCTS**—
Accelerine
Italy, 1 cs., £47.
Alizarine
Barcelona, 1 kg., £7.; Dunedin, 3 kgs., £71.; Lyttleton, 5 pkgs., £202.; New York, 50 cks., £1,500.; Timaru, 3 cks., £126.; Wellington, 1 kg., £28.
Aniline Colour
Durban, 3 cs. (pt.), £44.; Paris, 1 ck., £55.; Pt. Elizabeth, 7 pks., £292.
Aniline Dye
Adelaide, 1 cs. (pt.), £26.; Bahia, 1 cs. (pt.), £15.; Auckland, 1 ck., £54.; Bombay, 4 pkgs., £66.; Brussels, 2 kgs., £42.; Buenos Ayres, 1 cs., £16.; Cape Town, 1 cs., £26.; Christchurch, 2 cs. (pt.), £39.; Cochinchina, 5 drms., £99.; Dunedin, 2 cs. (pt.), £108.; Lyttleton, 8 pkgs., £294.; Ostend, 5 pkgs., £74.; Rio de Janeiro, 1 cs., £8.; Shanghai, 3 cs., £61.; Wellington, 1 cs., £18.; Yokohama, 1 cs., £58.
Aniline Oil
Barcelona, 31 drms., £1,500.
Benzole
Durban, 50 drms., £125.
Betanaphthol
Rio de Janeiro, 20 cs., £260.
Carbolic Acid
Bahia, 2 cs., £11.; Bombay, 3 cs. (pt.), £7.; Durban, 25 drms., £21.; Halmstad, 85 cks., £780.; Hankow, 4 cs. (pt.), £12.; Rio de Janeiro, 2 cs., £8.; Rotterdam, 1 brl., £8.; Santos, 2 cs., £9.
Cresosote
Calais, 218 t., £1,845.; Demerara, 1 ck., £5.; Selzaete, 180 t., £1,004.
Dyes
Baltimore (F.), 2 drms., £117.; Bordeaux, 3 kgs., £86.; New York, 17 cks., £1,455.
- COAL PRODUCTS**—
Naphthalene
Aden, 30 cs., £65.; Bahia, 1 ck., £6.; Bombay, 4 cks., £66.; Durban, 6 pkgs., £17.; Paris, 15 drms., £250.
Nitrosine
Barcelona, 8 cks., £373.
Paranitraniline
Osaka, 180 kgs., £6,054.
Pitch
Alexandria, 600 brls., £461.; Antwerp, 246 t., £1,000.; Boulogne, 345 t., £1,150.; Belgium, 170 t., £680.; Calais, 954 t., £3,558.; Caen, 735 t., £2,900.; Cebu, 10 kgs., £6.; Constantinople, 23 cks., £33.; Dunkirk, 250 cks., £1,032.; Naples, 7 cks., £8.; Rotterdam, 1,640 t., £5,600.; St. Servan, 500 t., £2,000.
Pyridine
Durban, 50 drms., £119.
Tar
Beira, 20 rnlts., £52.
Malmö, 500 cks., £830.
Mauritius, 40 pkgs., £101.
- COPPERAS**—
Cape Town, 14 cks., £21.
- COPPER SUBOXIDE**—
Malmö, 6 drms., £60.
- COPRA ACID**—
Dunkirk, 30 brls., £550.
- CREAM OF TARTAR**—
Alexandria (F.), 1 c., £14.; Beira (F.), 1 cs. (pt.), £9.; Bombay (F.), 1 cs., £7.; Desterro, (F.), 2 c., £26.; Corinto (F.), 1 cs., £6.; Durban (F.), 2 c., £37.; Gothenburg (F.), 15 c., £200.; Guayaquil (F.), 1 c., £15.; Pt. Moresby (F.), 1 c., £13.; Townsville, 2 c., £27.; Auckland (transit) (F.), 1 t. 10 c., £990.; Brisbane (transit) (F.), 1 t., £180.; Dunedin (transit) (F.), 3 t. 10 c., £630.; Lyttleton (transit) (F.), 1 t. 5 c., £225.; Melbourne (transit) (F.), 22 t. 8 c., £32.; Sydney (transit) (F.), 1 t., £180.
- DISINFECTANTS (otherwise under)**
Bahia, 5 c., £13.; Bombay, 3 t. 16 c., £123.; Buenos Ayres, 17 c., £52.; Calcutta, 5 c., £13.; Canterbury, 1 c., £7.; Colombo, 3 t. 14 c., £95.; Copenhagen, 19 c., £47.; Durban, 11 c., £25.; Fremantle, 4 t. 11 c., £191.; Hong Kong, 19 c., £59.; Jamaica, 4 t. 10 c., £154.; Melbourne, 9 c., £145.; Montreal, 3 c., £41.; Pt. Moresby, 4 c., £13.; Rio de Janeiro, 18 c., £54.; Rangoon, 4 t. 6 c., £91.; Rotterdam, 3 t., £170.; St. Johns, N.Y., 1 t. 19 c., £112.; Santos, 5 c., £13.; Sydney, 2 t., £75.; Toronto, 1 c., £8.; Trinidad, 2 c., £10.
- ETHER**—
Canton, 1 cs., £8.; Piraeus, 61 cs., £261.
- ETHER (ACETIC)**—
Rio de Janeiro, 1 cs., £14.
- ETHER (SULPHURIC)**—
Santos, 8 cs., £91.
- ETHYL ACETATE**—
Hong Kong, 14 cs., £263.
- ETHYL BUTYRATE**—
Hong Kong, 7 cs., £245.
- ETHYL CHLORIDE**—
Bangkok, 1 cs., £20.
- FATTY ACID**—
Nantes, 53 t. 9 c.; Paris, 18 t.
- FERRO TUNGSTEN**—
Gothenburg, 2 t.
- FORMALDEHYDE**—
Alexandria, 1 ck., £25.; Colombo, 2 cs., £19.; Suez, 1 cs. (pt.), £7.
- FORMIC ACID**—
Montreal, 1 crbys., £23.; Perth (F.), 27 cs., £179.
- FULLER'S EARTH**—
Baltimore, 120 t.; Barcelona, 30 t.; Malaga, £20.; Naples, £14.; New York, 107 t.
- GLUE**—
Delft, 5 t.; Yokohama, 25 t.
- GLUE (PITCH)**—
Calcutta, 10 t.
- GLUE, SIZE, AND GELATINE**—
Accra, 2 c.; Alexandria, 5 t. 10 c.; Antwerp, 59 t. 9 c.; Auckland, 1 t.; Barcelona, 9 c.; Brisbane, 10 c.; Bombay, 2 t. 8 c.; Calcutta, 3 t. 4 c.; Cape Town, 6 t. 5 c.; Christiania, 1 t. 7 c.; Cologne, 2 t.; Chinde, 5 c.; Copenhagen, 3 t. 10 c.; Durban, 1 t. 16 c.; East London, 2 t.; Fremantle, 2 c.; Italy, 10 c.; Kobe, 7 t. 1 c.; Karachi, 2 c.; Leghorn, 2 t.; Madras, 1 t.; Malmö, 1 c.; Malta, 1 c.; Rotterdam, 16 t. 10 c.; Stockholm, 5 t.; Sydney, 9 c.
- GLYCERINE**—
Bahia, 1 c., £10.; Buenos Ayres, 2 c., £15.; Calcutta, 2 c., £12.; Delagoa Bay, 40 t. 17 c., £4,200.; Durban, 1 c., £9.; Karachi, 1 c., £11.; New York (F.), 5 t. 19 c., £320.; New York, 4 t. 19 c., £220.; Novorossisk, 4 t. 18 c., £545.; Piraeus, 4 c., £27.; Pt. Elizabeth, 1 c., £7.; Tientsin, 1 c., £7.
- GLYCEROPHOSPHATES**—
Alexandria, 1 cs. (pt.), £16.
- HYDROCHLORIC ACID**—
Bombay, 1 c., £5.; Jaffa, 1 t., £20.
- HYDROFLUORIC ACID**—
Calcutta, 1 cs., £5.
- HYDROGEN PEROXIDE**—
Kilindini, 1 cs., £8.
- IODINE**—
Genoa, 4 cs., £408.; Sao Paulo, 1 ck. (pt.), 1 cs. (pt.), £69.
- IODINE (RESUBLIMED)**—
Charkoff, 4 cs., £200.; Calcutta, 1 ck. (pt.), £26.; Durban, 1 ck. (pt.), £13.; Lisbon, 1 ck. (pt.), £17.; Shanghai, 2 cs. (pt.), 1 ck., £77.; Singapore, 1 cs. (pt.), £10.; Sydney, 1 cs., £31.
- IRON AND AMMONIUM CITRATE**
Santos, 1 cs. (pt.), £7.; Sydney, 4 cs. (pt.), £11.
- IRON GLYCEROPHOSPHATE**—
Rio de Janeiro, 1 ck. (pt.), £8.
- IRON HYPO**—
Genoa, 1 cs. (pt.), £7.
- IRON PERCHLORATE**—
Brussels, 1 kg., £12.; Santos, 1 cs., £6.
- KIESELGUHR**—
Bordeaux, 10 t., £180.
- LACTIC ACID**—
Cape Town, 4 pkgs., £77.; Madras (F.), 5 cks., £92.
- LEAD ACETATE**—
Bombay, 160 cs., £518.; Santos, 1 kg., £8.
- LEAD ARSENATE**—
Callao, 31 cks., £542.
- LEAD CARBONATE**—
Belgrade, 2 kgs., £8.
- LEAD SULPHIDE**—
New York, 7 cks., £71.; Paris, 2 cks., £42.
- LITHIUM CARBONATE**—
Boulogne (F.), 2 cks., £216.
- LITHIUM CARBONATE & BENZOATE**—
Paris, 4 cs., £310.
- MAGNESIA**—
Melbourne, 5 cs., £18.
- MAGNESIA (CALCINED)**—
Bahia, 1 cs., £19.; Rio de Janeiro, 2 cs., £40.; Sao Paulo, 3 cs., £50.; Santander, 2 cs., £52.; Santos, 4 cs., £37.; Sydney, 1 cs., £6.
- MAGNESIUM CARBONATE**—
Christchurch, 1 ck., £10.; Durban, 2 cs. (pt.), £5.; Launceston, 2 cs., £6.; Rio de Janeiro, 10 cs., £81.; Sao Paulo, 3 cs., £50.; Santos, 18 cs., £134.; Sydney, 1 cs., £5.
- MAGNESIUM CITRATE**—
Bangkok, 2 cs., £16.; Beyrout, 1 ck. (pt.), £9.; Malaga, 5 cs., £90.; Sydney, 10 cs., £79.; Wellington, 1 cs., £21.
- MAGNESIUM GLYCEROPHOSPHATE**—
Auckland, 1 cs. (pt.), £6.
- MAGNESIUM HYPOPHOSPHATE**—
Genoa, 1 cs. (pt.), £8.
- MAGNESIUM SULPHATE**—
Auckland, 3 c., £8.; Bombay, 8 c., £21.; Cairns, 1 t. 6 c., £49.; Durban, 10 c., £21.; Guayaquil, 5 c., £12.; Rockhampton, 1 t. 19 c., £77.; Sydney, 1 t. 2 c., £44.
- MANGANESE HYPOPHOSPHATE**—
Genoa, 1 cs. (pt.), £122.
- MANGANESE SULPHATE**—
Hamburg, 1 cs., £8.; Pt. Said, 3 cks., £51.
- MERCURALS**—
Santos, 1 cs. (pt.), £7.; Shanghai, 1 cs. (pt.), £10.
- MERCURY BICHLORIDE**—
Amsterdam, 3 cs., £180.; Charkoff, 3 cs., £115.; Paris, 11 cs., £660.
- MERCURY CHLORIDE**—
Paris, 2 cks., £25.
- MERCURY OXYDATE**—
Amsterdam, 1 cs., £72.; Malmö, 1 cs., £80.
- MERCURY SUBCHLORIDE**—
Charkoff, 5 cs., £171.
- METHYL ALCOHOL**—
Durban (F.), 50 drms., £282.
- METHYL SALICYLATE**—
Bombay (F.), 2 cs., £29.; Charkoff, 25 cs., £280.; Constantinople, 22 pkgs., £400.; Genoa, 1 cs., £22.
- MINERAL WAX**—
Gothenburg, 1 t.; Nantes, 3 t.
- MYRBANE OIL**—
Sydney, 93 cs., £291.
- NICKEL SULPHATE**—
Brussels, 24 cks., £311.
- NITRIC ACID**—
Bombay, 2 c., £8.; Colombo, 3 c., £14.; Calcutta, 13 c., £81.
- OXALIC ACID**—
Florence, 2 cks., £72.; Monte Video, 1 cs., £5.
- PARAFFIN SCALE**—
Antwerp, 36 t.
- PHOSPHATE OF LIME**—
Paris, 10 c., £70.
- PHOSPHORIC ACID**—
Durban, 2 cs., £10.; Switzerland, 1 crby., £13.
- PHOSPHORUS AMORPHOUS**—
Rio de Janeiro, 4 cs., £59.
- PLUMBAGO**—
Antwerp, 1 t. 13 c.; Gothenburg, 4 c.
- POTASH**—
Concepcion, Uruguay, 5 c., £13.
- POTASSIUM ACETATE**—
East London, 1 cs. (pt.), £6.; Santos, 1 ck. (pt.), £7.
- POTASSIUM BICARBONATE**—
Brisbane, 1 c., £8.; Bombay, 1 c., £8.; Sydney, 1 kg., £7.; Wellington, 1 kg., £10.
- POTASSIUM BICHROMATE**—
Monte Video, 5 cs., £98.
- POTASSIUM BROMIDE**—
Bombay, 2 cs., £50.; Brisbane (F.), 1 cs. (pt.), £11.; Genoa, 1 cs. (pt.), £4.; Jamaica, 1 cs., £13.; Pelotas, 1 cs. (pt.), £7.; Shanghai, 1 cs., £25.; Sydney, 2 cs. (pt.), £23.
- POTASSIUM CARBONATE**—
Durban (F.), 2 cs., £10.
- POTASSIUM CHLORATE**—
Colombo, 1 c., £7.
- POTASSIUM CHLORIDE**—
Alexandria, 2 c., £16.; East London, 2 c., £11.
- POTASSIUM CITRATE**—
Brisbane, 1 cs. (pt.), £7.; Shanghai, 1 cs. (pt.), £7.; Sydney, 4 cs. (pt.), £78.; Wellington, 1 cs. (pt.), £7.
- POTASSIUM CYANIDE**—
Bombay, 1 cs., 30 c., (pt.), £29.; Calcutta, 3 c., £41.; Sao Paulo, 2 c., £40.; Wellington, 1 pkg., £16.
- POTASSIUM HYDROXIDE**—
Yokohama, 9 cs., £163.

POTASSIUM HYPOPHOSPHATE—
Genoa, 1 cs. (pt.), £21.

POTASSIUM IODIDE—
Bombay, 1 cs. (pt.), £6.; Bris-
bane, 1 cs. (pt.), £22.; Buenos
Ayres, 2 cs. (pt.), £33.; Calcutta,
1 ck. (pt.), £37.; Charkoff, 5 cks.,
£550.; Genoa, 11 cks., £997.;
Lisbon 1 ck. (pt.), £15.; Rotter-
dam 1 ck. (pt.), £85.; Shanghai,
2 cks. (pt.), £108.

POTASSIUM METABISULPHITE—
Dunedin, 1 c., £13.

POTASSIUM PERMANGANATE—
Alexandria, 1 cs., £9.; Rio de
Janeiro, 1 cs., £14.; Santos, 1 cs.,
£20.

POTASSIUM PRUSSATE—
Bahia, 6 c., £54.; Concepcion,
Urug. 2 cs., £26.; Constantinople,
1 c., £34.

POTASSIUM SULPHATE—
Calicut (F.), 40 t., £1,060.; Pt.
Elizabeth, 1 c., £7.

POTASSIUM SULPHITE—
Melbourne, 2 kgs., £29.

POTASSIUM TARTRATE—
Lisbon, 1 cs. (pt.), £9.

PYRO ACID—
Rangoon 1 cs., £72.

QUININE—
Bombay, 3,426 ozs.; Brisbane,
90 ozs.; Calcutta, 35,528 ozs.;
Karachi, 100 ozs.; Madras, 160
ozs.

SALAMMONIAC—
Alexandria, 2 c., £10.; Shanghai,
5 c., £20.; Singapore, 3 c., £10.

SALICYLIC ACID—
Bombay, 4 cs., £88.; Copen-
hagen, 7 cs., £68.; Genoa, 1 cs.,
£8.; Shanghai, 1 cs., £8.;
Sydney, 2 cks., £28.

SALT—
Bombay, 3 t. 2 c.; Durban, 1 t.;
Karachi, 1 t.

SALTCAKE—
Sando (Sweden), 200 t., £350.

SALTPETRE—
Antwerp, 1 t., £55.; Bahia,
4 t. 18 c., £300.; Buenos Ayres,
2 t. 10 c., £125.; Barcelona, 2 t.,
£105.; Florianopolis, 15 c., £56.;
Gothenburg, 2 t., £116.; Oporto,
3 t. 14 c., £195.; Paris, 1 t., £70.;
Pernambuco, 3 t. 8 c., £204.;
Santos, 1 t., £78.; Teneriffe,
2 c., £9.

SHEEP DIP—
Auckland, 5 t., £175.; Buenos
Ayres, 41 t. 3 c., £2,457.;
Durban, 4 t. 14 c., £175.;
East London, 2 c., £7.; Gisborne,
2 t. 10 c., £88.; Philadelphia,
9 t. 9 c., £276.; Pt. Elizabeth,
23 t. 7 c., £875.; Santos, 7 c.,
£34.; Wellington, 12 t. 10 c.,
£438.

SILVER NITRATE—
Lisbon, 1 cs. (pt.), £9.; Santos,
1 ck. (pt.), £14.

SOAP—
Accra, 4 c.; Adelaide, 3 t. 13 c.;
Aden, 3 c.; Alexandria, 16 c.;
Algiers, 16 c.; Antwerp, 346 t.;
Auckland, 6 c.; Bangkok, 3 c.;
Bombay, 5 t. 18 c.; Boulogne,
20 t. 11 c.; Brisbane, 5 c.;
Bushire, 2 c.; Casablanca, 3 c.;
Calcutta, 1 t. 4 c.; Cape Town,
7 c.; Chinde, 4 c.; Christchurch,
3 t. 4 c.; Christiania, 17 c.;
Christiansund, 3 c.; Cologne,
177 t. 7 c.; Colombo, 4 t. 8 c.;
Constantinople, 6 c.; Copen-
hagen, 1 c.; Danzig, 3 t. 18 c.;
Dalny, 4 t. 10 c.; Demerara,
8 c.; Dominica, 1 c.; Dunedin,
3 c.; Dunkirk, 35 t. 5 c.; East
London, 14 c.; Genoa, 3 t. 8 c.;
Ghent, 11 c.; Guayaquil, 6 t.
14 c.; Hamburg, 219 t. 7 c.;
Hong Kong, 1 t. 6 c.; Hankow,
6 c.; Italy, 1 t. 6 c.; Jaffa, 1 c.;
Jamaica, 12 c.; Kilindini, 9 c.;
Karachi, 4 t. 9 c.; Launceston,
2 c.; Leghorn, 3 t. 8 c.; Lytle-
ton, 1 c.; Madras, 2 t. 4 c.;
Malta, 1 c.; Marseilles, 4 c.;
Mauritius, 1 c.; Mazagan, 28 t.
5 c.; Napier, 5 c.; Melbourne,
3 t. 5 c.; Naples, 15 c.

SOAP—
N. York, 11 t. 11 c.; Ostend, 15 c.
Oporto, 1 c.; Oran, 2 t. 8 c.;
Penang, 1 c.; Paris, 3 t. 4 c.;
Philadelphia, 7 c.; Piraeus,
3 t. 10 c.; Rangoon, 3 c.; Rio
de Janeiro, 5 c.; Rotterdam,
18 t. 13 c.; Sao Paulo, 1 c.;
Shanghai, 1 c.; Singapore, 3 c.;
Suez, 1 t. 1 c.; Trinidad, 7 c.;
Trondhjem, 1 t. 8 c.; Valencia,
2 c.; Wellington, 1 c.

SODA ASH—
Betwood, N.F., 10 t., £100.;
Christiania (F.), 5 t. 12 c., £110.;
Genoa 8 t., £70.; Rotterdam,
10 t., £90.

SODA CRYSTALS—
Christiania, 14 t. 15 c., £98.;
Gibraltar, 1 t. 17 c., £18.;
Guayaquil, 10 c., £7.; Iquique,
10 c., £7.

SODIUM ARSENITE—
Durban, 8 t. 16 c., £546.

SODIUM BENZOATE—
Genoa, 1 cs. (pt.), £8.; Rio de
Janeiro (F.), 2 cs., £16.; Sao
Paulo (F.), 1 ck. (pt.), £14.

SODIUM BICARBONATE—
Bombay, 2 c., £7.; Cologne,
19 t. 8 c., £220. Constantinople,
11 c., £31.

SODIUM BROMIDE—
Bangkok, 1 cs., £20.; Melbourne,
1 cs., £29.; Sydney, 1 cs., £15.

SODIUM BISULPHATE—
Pelotas, 1 cs. (pt.), £6.

SODIUM BISULPHITE—
Antwerp, 1 t., £24.; Bordeaux,
4 t. 17 c., £160.; Constantinople,
1 t., £33.; Fiji, 2 cs., £7.; Paris,
5 t. 3 c., £120.

SODIUM CARBONATE—
Piraeus 5 t., £55.; Shanghai,
10 c., £5.

SODIUM CHLORATE—
Oporto, 1 c., £7.

SODIUM CITRATE—
Alexandria, 1 cs. (pt.), £5.

SODIUM HYPO—
Constantinople, 10 c., £16.;
Karachi, 4 c., £7.; Paris, 3 t. 13 c.,
£63.

SODIUM HYPOPHOSPHATE—
Genoa, 1 cs. (pt.), £8.

SODIUM HYPOSULPHITE—
Antwerp, 5 t., £85.

SODIUM IODIDE—
Bombay, 1 cs. (pt.), £11.; Genoa,
5 cs. (pt.), £41.; Lytleton,
1 cs. (pt.), £6.; Sao Paulo,
2 cks. (pt.), £38.

SODIUM PHOSPHATE—
Amsterdam, 1 c. £6.; Brussels,
3 cks., £16.; Rio de Janeiro,
2 t. 2 c., £84.; Rotterdam,
1 kg., £6.

SODIUM PRUSSATE—
New York, 50 t. 3 c., £5,295.

SODIUM PYROPHOSPHATE—
Amsterdam, 1 c., £6.; Melbourne,
18 c., £58.

SODIUM SALICYLATE—
Bombay, 3 cs., £72.; Durban,
1 cs. (pt.), £10.; East London
1 cs. (pt.), £10.; Wellington,
1 kg., £21.

SODIUM SILICATE—
Durban, 3 c., £5.

SODIUM SULPHATE—
Shanghai, 9 c., £12.

**SODIUM SULPHATE (GLAUBER
SALTS)**—
Santos, 16 c., £6.

SODIUM SULPHITE—
Durban, 5 c., £6.; Dunedin,
11 c., £28.; Pt. Swettenham,
5 t., £125.; Rio de Janeiro 1 c.,
£7.

SULPHUR—
Bahia, 10 c., £15.; Cape Town,
3 c., £7.; Florianopolis (F.),
11 c., £28.; Helsingfors (F.),
5 t., £137.; Lisbon, 1 t. 17 c.,
£66.; Rio de Janeiro (F.), 10 t.,
£15.; Restoff (F.), 1 t., £29.

SULPHUR (FLOWERS)—
Antwerp, 2 c., £25.; Paranagua,
(F.), 4 c., £10.; Paris, 1 t., £23.

SULPHUR (PRECIPITATE)—
Amsterdam, 2 c., £10.

SULPHURIC ACID—
Alexandria, 12 c., £75.; Bombay,
2 c., £6.; Hong Kong, 5 c., £7.;
Pernambuco, 2 t. 8 c., £186.;
Pt. Swettenham, 1 t. 5 c., £35.;
Rio de Janeiro, 2 t. 7 c., 4 cs.,
£371.; Singapore, 15 c., £18.

SULPHUROUS ACID—
Rotterdam, 100 cks., £263.

**SUPERPHOSPHATES (otherwise
undescribed)**—
Channel Islands, 10 t., £80.;
Cape Town, 50 t., £536.

TALLOW—
Accra, 2 c.; Antwerp, 93 t.

TANNIC ACID—
Piraeus (F.), 1 cs. (pt.), £6.

TAR—
Durban, 11 t.

TARTARIC ACID—
Beira (F.), 1 c., £12.; Canterbury,
1 c., £12.; Constantinople, 2 t.,
£969.; Coronel (F.), 1 c., £12.;
Durban (F.), 1 cs. (pt.), £6.;
Guayaquil (F.), 1 c., £21.;
Karachi (F.), 2 c., £45.; Per-
nambuco, 2 c., £49.; Rotterdam,
1 t. 10 c., £460.; Santos, 1 c., £14.

**THEOBROMINE SODIUM SALI-
CYLATE**—
Santos, 1 ck. (pt.), £5.

WAX—
Amsterdam, 10 c.; Bordeaux,
£199.; Christiania, 10 c.; Calais,
£600.; Galatz, 2 t.; Lytleton,
1 t. 16 c.; Oporto, 1 t.; Paris,
9 c.; Yokohama, £73.

WHITE LEAD—
Antwerp, £107.; Bombay, £1,902;
Buenos Ayres, £13.; Boulogne,
£207.; Callao, £32.; Calais,
£300.; Calcutta, £15.; Cape
Town, £374.; Channel Islands,
£61.; Constantinople, £65.; Fre-
mantle, £110.; Gibraltar, £51.;
Greenmouth, £114.; Havre, £11.;
Hilo, £100.; Kilindini, £3.;
Lagos, £72.; Malacca, £22.;
Malmo, £260.; Marseilles, £14.;
Oporto, £480.; Paris, £300.;
Piraeus, £61.; Pt. Sudan, £30.;
Rangoon, £339.; Rotterdam,
£36.; Singapore, £316.; Tangiers,
£37.; Tientsin, £217.

WOOD OIL—
Hamburg, £310.

ZINC SULPHATE—
Sydney, 3 cks., £6.

MANCHESTER.

Week ending November 19.

ALUMINA SULPHATE—
Antwerp, 540 cks.

AMMONIA—
Rouen, 30 drms.

AMMONIUM CARBONATE—
Tunis, 2 cks.

AMMONIUM MURIATE—
Montreal, 15 cks.

ARSENIC ACID—
Antwerp, 1 drms.

BARIC SULPHOCYANIDE—
Boston, 4 cks.

BLEACHING POWDER—
Bombay, 100 drms.; Montreal,
325 cks

BORAX CRYSTALS—
Rotterdam, 50 bgs.

CAUSTIC SODA—
Malmo, 106 drms.; Montreal,
400 bgs.; Tunis, 35 drms.; Rot-
terdam, 204 drms.

COAL PRODUCTS (otherwise undes.)
Alexandria, £244.; Antwerp,
£4,699.; Aviles, £4,084.; Bom-
bay, £4,236.; Dunkirk, £383.;
Gion, £1,753.; Galveston,
£43,244.; Havre, £473.; Jaffa,
£201.; Melbourne, £2,270.; Rouen,
£191.; Smyrna, £140.; San
Esteban de Pravia, £3,528.

FERRO MANGANESE—
Philadelphia, 2,292 t.

GLYCERINE—
Beyrout, 5 c.

IRON OXIDE—
Antwerp, 37 cks.

MAGNESIUM SULPHATE—
Rouen, 50 bgs.

MANGANESE SULPHATE—
Rouen, 25 cks.

POTASSIUM BICHRIMATE—
Antwerp, 3 brls.; Calais, 13 cks.

SALAMMONIAC—
Beyrout, 60 c.; Montreal, 8 cks.

SALT—
Auckland, 7,600 bgs.; Ghent,
10,200 bgs. Malmo, 1,602 bgs.;
Quebec, 3,200 sks.; Wellington,
3,600 bgs.

SALTCAKE—
Quebec, 1,100 bgs.

SOAP—
Alexandria, 16 cs.; Bombay,
65 cs.; Antwerp, 54 cs.; Mon-
treau, 58 pkgs.; Tunis, 10 cs.

SODA ASH—
Montreal, 600 bgs.; Quebec,
35 cks. Rotterdam, 195 bgs.

SODA CRYSTALS—
Beyrout, 20 pkgs.

SODIUM SILICATE—
Tunis, 32 cks.

SODIUM SULPHIDE—
Antwerp, 22 drms.

SULPHUR (FLOWERS)—
Rouen, 133 bgs.

TARTARIC ACID—
Montreal, 4 cks.

ULTRAMARINE—
Montreal, 1 br.

ZINC CHLORIDE—
Antwerp, 7 cks.; Bombay, 4 cks.

MIDDLESBROUGH.

Week ending November 22.

AMMONIUM SULPHATE—
Yokohama, 1,940 t., £41,818.

CAUSTIC SODA—
Madras, 50 t., £875.

CHEMICALS (otherwise undescribed)
Calcutta, 36 t., £523.

COAL PRODUCTS—
Benzole
Rotterdam 50 t., £1,250.

Naphthalene
Hong Kong, 1 t., £38.

HYPO & SODIUM SULPHITE—
Bombay, 10 c., £14

PITCH—
Antwerp, 2,926 t., £8,201.; Rot-
terdam, 1,637 t., £5,321

SALT—
Norresundby, 470 t., £1,382.

SODIUM SILICATE—
Hong Kong, 9 t. 19 c., £115.

SODIUM SULPHATE—
Gothenburg, 283 t., £920.

NEWCASTLE-ON-TYNE

Week ending November 22.

GLUE—
1 t.

RED LEAD—
Bergen, 1 t. 3 c.

SOAP—
1 t. 1 c. 3 qrs.

SODA COMPOUNDS—
15 t.

N. & S. SHIELDS.

Week ending November 22.

NIL.

SWANSEA.

Week ending November 22.

COPPER SULPHATE—
Bordeaux, 341 t., £27,350.

PRICES CURRENT.

THURSDAY, Nov. 27, 1919.

PREPARED BY MESSRS. HIGGINBOTTOM AND CO., 21, SPRING GARDENS, MANCHESTER.

The values stated are F.O.R. at makers' works, or at usual ports of shipment in U.K., unless otherwise specified
The prices in different localities may vary.

Acids:—

	£	s.	d.
*Acetic 40% and 60% ... per cwt.	31/-	&	46/-
" " Glacial ... per ton	85	0	0
Arsenic, S.G. 2,000 ² ... per ton	75	0	0
Boric, Crystals ...	72	0	0
*Fluoric ... per lb.	0	0	7
*Muriatic (Tower Salts), 23° Tw. ... per carboy	0	7	0
*Nitric, 80° Tw. ... per ton	32	0	0
Oxalic ... per lb.	0	1	2
Phosphoric, 1,750° ...	0	1	9
*Sulphuric (fuming, 70%) ... per ton	—	—	—
" " (Pyrites, 168°) ...	7	18	9
" " (" 140°) ...	4	10	0
" " (free from arsenic, 144°) ...	5	7	4
Tannic (commercial) ... per lb.	0	2	6
Tartaric (crystals) ...	0	3	0
*Acetone ... per ton	85	0	0
*Alum, loose lump (delivered) ...	16	10	0
Alumina Sulphate (pure) ...	16	10	0
Aluminoferic (in slabs) ...	8	10	0
Aluminium (Ingot Metal, 98/99%) ... per ton	150	0	0
*Ammonia, Anhydrous ... per lb.	0	2	0
" " 880 ... per ton	33	0	0
" " 920 ...	20	0	0
" " Carbonate ... per lb.	0	0	6½
" " Muriate (grey) ... per ton	47	0	9
" " (salammoniac) 1st & 2nd, per cwt.	80/-	&	75/-
" " Nitrate ... per ton	60	0	0
" " Phosphate ...	110	0	0
" " Sulphate (grey), London, net	—	—	—
" " " Hull ...	—	—	—
" " " Manchester.	—	—	—
*Aniline Oil (pure) ... per lb.	0	1	6
Aniline Salt ...	0	1	6
Antimony ... per ton	45	0	0
" " (tartar emetic), 43/44% ... per lb.	0	3	1
" " (golden sulphide) ...	0	1	3
Arsenic, white powdered ... per ton	65	0	0
Barium Chloride (in casks) ...	22	10	0
" " Carbonate (native), 92/94% ...	11	0	0
" " Sulphate (native levigated) ...	£7 to £14		
Baryta Chlorate ... per lb.	0	1	1
*Bisulphide of Carbon ... per ton	55	0	0
*Bleaching Powder, 35% ...	17	0	0
" " Liquor, 7% ...	6	0	0
Casein (commercial) ...	85	0	0
Chromium Acetate (crystals) ... per lb.	0	1	0
Calcium Chloride ... per ton	8	0	0
China Clay (at Runcorn), in bulk ...	70/-	to	90/-

Coal-tar Products and Dyes:—

Alizarine (artificial), 20% ... per lb.	0	2	0
Magenta ...	18/-	to	35/-
Anthracene, 40/50% A, f.o.b., L'don, per unit,	0	0	7
Benzol, 90's (naked) ... per gal.	0	2	0½
" " 50/90's ...	0	1	10½
Carbolic Acid (crude, 60°) ...	0	1	7½
" " (crystallised, 40°) ... per lb.	0	0	9½
" " Acid (pale liquid, 97/98%) ... per gal.	0	2	9
*Creosote (ordinary), naked ...	0	0	6½
*Crude Naphtha, 30% at 120°C. ...	0	0	9
*Grease Oils, 18° Tw. (naked) ... per ton	6	10	0
Pitch, f.o.b., Liverpool or Garston ...	3	2	9
*Solvent Naphtha, 90% at 160° ... per gal.	0	2	6
Copper ... per ton	98	0	0
" Sulphate ...	40	0	0
Dross Salts ...	39	0	0
*Glycerine (crude), 80% ...	72	0	0
" " (industrial, S.G. 1,260) ...	110	0	0
*Iodine ... per oz.	0	1	0
*Iron Nitrate, 80° Tw. ... per ton	12	0	0
" Sulphate (copperas), delivered ...	4	5	0
" Sulphide ...	9	0	0
Lead (Foreign Pig) ...	36	10	0
" Litharge Flake ...	49	0	0
" Acetate (white) ...	83	10	0
" " (brown) ...	67	0	0

Lead, Carbonate (White lead), pure ... per ton	52	10	0
" Nitrate ...	55	0	0
Lime, Acetate (brown) ...	14	10	0
" " (grey), 80% ...	20	0	0
Magnesium Chloride ...	15	10	0
" Carbonate (light) ... per cwt.	2	7	6
" Calcined Magnesite ... per ton	21	10	0
" Sulphate (Epsom Salts) (coml.) ...	12	0	0
" " (druggists) ...	16	0	0
Manganese, Sulphate ...	75	0	0
" Borate ...	110	0	0
*Methylated Spirit, 64° (industrial) ... per gal.	0	5	7
*Naphtha (Wood), Solvent ...	0	10	0
" " Miscible, 60° p. ...	0	10	6

Oils:—

*Cottonseed ... per ton	95	0	0
*Linseed, Raw ...	98	0	0
Stearine, 115-120° M.P. ...	105	0	0
Potassium, Bichromate ... per lb.	0	1	6
" Carbonate, 85% ... per ton	100	0	0
" Chlorate ... per lb.	0	1	0
" Hydrate (Caus. Pot.) 88/30% ... per ton	105	0	0
" " 75/80% ...	95	0	0
" Potash Hydrate Liquid, 50° B ² ...	65	0	0
" Nitrate (refined) ...	55	0	0
" Permanganate (commercial) per lb.	0	3	3
" Prussiate (yellow) ...	0	2	1
" " (red) ...	0	5	5
" Sulphate, 90% (ex ship) ... per ton	25	0	0
" Muriate, 80% ...	25	0	0
Silver (metal) ... per oz.	0	6	3½
Sodium (metal) ... per lb.	0	1	3
" Acetate ... per ton	48	0	0
" Arseniate, 45% ...	62	0	0
" Borate (Borax), Crystals ...	39	0	0
" Bicarbonate (2 cwt. bags) ...	8	5	0
" Bichromate ... per lb.	0	0	11
" Carb. (Caustic Soda-ash), 48% Per ton	12	10	0
" " (Alkali), 58% (bags) ... f.o.r.	6	10	0
" " (Soda Crystals), (bags) car. pd., wks.	5	10	6
" Chlorate ... per lb.	0	0	6
" Cyanide (100% basis) for export ...	0	0	11
" Hydrate (76% C. Soda) (f.o.r.) ... per ton	24	0	0
" " (74% C. Soda) ...	23	5	0
" " (70% C. Soda) ...	22	0	0
" " (60% C. Soda) ...	21	0	0
" " (pure liquid, 90° Tw.) ...	10	2	6
" 77/78% Powdered (99%) Hydrate ...	24	10	0
" Hyposulphite (commercial) ...	19	0	0
" Manganate, 25% ...	65	0	0
" Nitrate, 96%, reld., f.o.r., L'pool ...	21	0	0
" Nitrite, 100% ...	62	0	0
" Phosphate ...	29	0	0
" Prussiate ... per lb.	0	1	0½
" Silicate (glass) Alkaline ... per ton	12	5	0
" " (liquid, 100° Tw.) ...	9	10	0
" Sulphate (Saltcake), delivered ...	3	10	0
" " (Glauber's Salt) ...	4	0	0
" Sulphide (conc.), 60/65% casks ...	24	0	0
" Sulphite ...	12	10	0
Sulphocyanide, Ammonium, 95% ... per lb.	0	2	0
" Barium, 95% ...	0	1	4
" Potassium ...	0	2	4
" Alumina ...	0	0	9
Sulphur, (Flowers) ... Sicilian per ton	23	0	0
" (Roll Brimstone) ...	22	10	0
" Brimstone (best thirds) ...	13	10	0
" (ex ship) ...	110	0	0
Tallow ...	110	0	0
Tin Crystals ... per lb.	0	2	1
" English Ingots ... per ton	295	0	0
Titanium, Potass. Oxalate ... per lb.	0	1	6
Titanous Chloride ... per cwt.	4	10	0
Zinc (Spelter) ... per ton	48	0	0
" Powder, 88/92% ...	75	0	0
* " Chloride (solution, 102° Tw.) ...	24	0	0
" Sulphate, Crystal ...	21	0	0

* Packages extra or returnable; otherwise, prices usually include packages.

THE CHEMICAL TRADE JOURNAL AND CHEMICAL ENGINEER.

No. 1,698.

LONDON, SATURDAY, DECEMBER 6, 1919.

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NOTICES.

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EDITORIAL NOTICES.

Readers are invited to forward items of intelligence, company reports and balance-sheets, or cuttings from local newspapers of interest to the trades concerned.

Articles, reports, and correspondence on all matters of interest to the chemical and allied industries, home and foreign, are solicited. Correspondents should condense their matter as much as possible, write on one side only of the paper, and in all cases give their names and addresses, not necessarily for publication. Sketches should be sent on separate sheets.

Communications for the Editor, if intended for insertion in the current week's issue, should reach the office not later than Wednesday morning.

CURRENT TOPICS.

DEPARTMENT OF OVERSEAS TRADE.

FEW Government departments, probably, have met with greater criticism at the hands of the business community than the Department of Overseas Trade, unless it be some of our war-time departments. The Department of Overseas Trade, however, is a permanent department, designed primarily as the result of the greater knowledge obtained during the war of Germany's commercial methods—although they were only too well known to most business men long before—to assist British trade overseas, as its name implies. The Government put it forward as meeting the demand for a Ministry of Commerce, and why such a separate Ministry was not set up nobody outside Government circles knows to this day. Difficulties seemed to beset the new department from the start, principally because it was held in certain quarters that the Consular Service, which clearly forms part of our overseas trade organisation, should come under the control of the new department, whilst in other directions it was contended that the Foreign Office should retain control of the Consular Service. The arrangement made by the Government was that the Consular Service should come under the control of the Foreign Office, but that there should be a joint Parliamentary Secretary, who would represent both the Board of Trade and the Foreign Office in the House of Commons. The first gentleman appointed to this post, Sir Arthur Steel-Maitland, soon got tired of the job and resigned, and he has been succeeded by Sir Hamar Greenwood. It is a characteristic of all Englishmen that after the fight is over they are willing to shake hands and make the best of the position as it then stands, and we are inclined to think that that is the attitude which the British business community ought to take in this matter. We have had the oppor-

tunity recently of listening to several speeches by the President of the Board of Trade himself and Sir Hamar Greenwood, and there can be no illusion on the ground that these gentlemen are doing all that is humanly possible to assist British trade abroad. The point is whether British traders and others are making full use of the facilities which the Department offers here. We recollect, also, that when Sir Albert Stanley was President of the Board of Trade he also begged our business men to make every demand upon the resources of the Department of Overseas Trade, but judging from what Sir Hamar Greenwood said only a few days ago to the leading members of another important industry, this is not being done. At the recent dinner of the Chemical Industry Club Mr. Ferguson urged the chemical industry to make use of the admirable foreign trade intelligence organisation of the Federation of British Industries, and we wonder whether the bulk of British industries are now so organised within the Federation that the services of the Department of Overseas Trade are really becoming superfluous. We hardly think that that can be the case, and yet there is the point in favour of the Federation that whereas the information which it collects is sent to the various members, in the case of the Department of Overseas Trade anyone desiring information has to ask for it. Frankly, we do not consider that an objection, but it does become a question whether the Department and the various foreign trade intelligence systems which are being set up by such bodies as the Federation of British Industries, and even by some of the individual trade societies, are not clashing to such an extent that full value is not being obtained from any of them, and that definite and close co-operation is necessary. Sir Hamar Greenwood has strong views on the aims and achievements of the Department of Overseas Trade, and is not afraid to express them. He puts it bluntly to British trade that his Department has only one aim—that of serving the interests of trade abroad; it is, he says, the taxpayers' money which is being spent in running it, and if it is not giving a commensurate return then it ought to be shut down. That is plain language for any Minister, be he, as Sir Hamar Greenwood says he is, a minor Minister, or be he a Minister with full Cabinet rank, and it seems to be due from the business men of the country definitely either to work loyally with the Department or to ask that it should be shut down. There is no half-way course for destructive criticism, and to that extent Sir Hamar Greenwood has placed the onus on the business community. It is the fact that the Department has collected an enormous mass of material bearing on foreign trade which is being utilised to but quite a small extent. Perhaps the secret of that, at the moment, is to be found in the charge recently made by Sir Auckland Geddes that too many manufacturers are ignoring the foreign market because of the fine bait offered by the home market. Production is admittedly far below what is demanded and prices are correspondingly high, for notwithstanding the general withdrawal of restrictions upon imports, apart from the specified key industries, the conditions in other countries are no better

than they are here, and really serious foreign competition cannot be looked to yet, except perhaps in one or two special directions.

SOCIETY OF GLASS TECHNOLOGY.

THE November meeting of the Society of Glass Technology was held in the University, Sheffield, Dr. M. W. Travers, F.R.S., presiding. The first paper was entitled

"THE REVERSIBLE EXPANSION OF REFRACTORY MATERIALS,"

by Mr. H. J. Hodsmann, M.Sc., and Professor J. W. Cobb, O.B.E., and was read by Professor Cobb.

Silica refractories, said the authors, on firing have a permanent expansion, whilst fireclay refractories have a permanent contraction. On subsequent heat treatment both types of refractories undergo expansion which is reversible on cooling. The paper dealt with this reversible expansion. The authors briefly expounded methods of measuring expansion at high temperatures, and described in full the methods actually employed in the particular work under discussion. The range of temperature through which reversible expansion had been investigated was 15° to 1,000° C., and some very remarkable results had been obtained. It was shown that alumina and kaolin expanded regularly within the above temperature range. Silica, whilst having approximately the same mean expansion between 15° and 1,000° C., behaved very differently at intermediate temperatures. Thus between 15° and 500° C. it expanded regularly at a rate slightly greater than that for kaolin. Between 500° and 600° C. its mean coefficient of expansion was greatly enhanced, whilst between 600° and 1,000° C. its expansion was practically nil. The anomalous behaviour between 500° and 600° C. was probably due to a change α quartz to β quartz. There was nothing in the results to indicate the formation of tridymite between 600° C. and 1,000° C.

Curves were shown indicating the behaviour of various materials between 15° and 1,000° C. A mixture of 80 per cent. ganister and clay behaved like silica. Fireclay and potclay behaved similarly to silica, the behaviour being nearer that of silica than that of kaolin, and it was of the nature of the silica curve. Ball clay, alundum and carborundum, behaved similarly to kaolin. In conclusion the authors discussed the bearing of the results upon the arching and subsequent heating of glasshouse pots and other refractories.

A second paper was read, entitled

"A PROPOSED STANDARD FORMULA FOR A GLASS FOR LAMP WORKERS,"

by Mr. F. W. Branson, F.I.C., and Mr. F. H. Branson, A.I.C.

The authors reviewed their early work of investigation on pre-war tubing for lamp-workers, and gave an analysis of the tubing they considered most suitable for lamp-workers, together with a batch which on melting would give this glass. Tubing had been made from this batch, which was satisfactory in every way. It could be reborn many times without devitrification, and was especially suitable for making plugs, stopcocks, and bulbs. It joined easily with all the best British-made glasses, including the resistant varieties, and was quite suitable for the repair of pre-war imported chemical glassware. The glass was quite free from appreciable colour, and did not darken in the blowpipe flame.

SOME DEVELOPMENTS IN CHEMICAL ENGINEERING.*

By A. E. MARSHALL.

THE war-time demand for the products of the chemical industry has of necessity resulted in improvements in chemical engineering practice during the last three years. The inability of the factories in existence at the outbreak of the war to cope with war requirements was responsible for the erection, in the United States and in England, of plants designed to produce large tonnage outputs of specific finished materials. As the desired capacity was known in advance, and as the product was definite, the designers of these plants had opportunities in arrangement of units which are lacking to a certain extent in the design of factories which have an indefinite future capacity and which necessarily will have to be extended at a later date to take care of new products and by-products.

An inspection of a number of the war-time American factories, and six weeks spent in the English factories during the early summer of this year, have resulted in the conclusion that full advantage was not taken of routine operations and of labour-saving devices, which in other industries had reached advanced stages of development. The imperative need for production and the necessity for adapting equipment available during the building of the plants have to be taken into account, and a full knowledge of the difficulties in securing prompt supplies of adequate machinery would doubtless modify in some measure conclusions based only on a study of the completed plants.

WIDER STUDY OF ENGINEERING PROBLEMS.

Even with such allowance, a survey of the latest development of chemical engineering leaves a sufficient reason for the suggestion that the chemical engineer should broaden his lines of study from the limited one of the purely chemical field to the wider viewpoint of engineering work and operation in other industries which present problems analogous to the manufacture of chemicals. The chemical engineer, or the chemical plant executive, is prone to believe that his manufacturing problems are peculiar not only to the chemical industry, but even to his specific branch of the industry, whereas other industries have had similar problems and have reached solutions of these problems which are capable of adaptation to the needs of the chemical factory.

In the past the average chemical plant has started out as a producer of one or of several standard chemical products, and with the development of the business, new but usually inter-related products have been added to the factory output. Invariably the original design was a complete unit so that even an increase in the output of the original products necessitated the addition of separate complete units without the possibility of effecting economies through the use of labour-saving devices applicable only to tonnage movements. When extensions through the multiplication of products became necessary the situation was much worse, as the new additions had to be located externally to the original plant unit, and the conveyance of materials produced in the original plant to the new units in which they were to be utilised

was necessarily reduced to primitive forms of transportation. There are few industries to-day other than chemical manufacture which present the anachronism of linking up the travel of the semi-finished product of one operation to its final point of utilisation by manual means.

A generalisation of this nature must of course be qualified by exceptions in the case of plants designed to produce large tonnages of the low-priced chemical staples, or, as they are more generally termed, "heavy chemicals." Such factories invariably have labour-saving tonnage-movement devices, although they are not always in the forward state of development of the means used in other industries.

HANDLING MATERIALS.

This difference in chemical factories is clearly evident in comparing the facilities for moving raw and finished materials in, say, a modern large-tonnage ammonia-soda plant, and a plant producing six or eight products by stages. The soda plant will move its materials progressively with mechanisms which require the smallest amount of human labour, whereas the average several-product factory makes each separate movement discontinuous instead of following the easily possible lines of regulated progression. Between the various inter-related units of a several-product chemical factory there is frequently a bottle-neck of transportation of materials.

A study of what has been accomplished in the automobile industry in the way of linking up producing departments so that a constant output of finished automobiles is obtained, should open up to the chemical engineer a new vista of possibilities. The South furnishes through its fertiliser industry excellent examples of discontinuous work. A fertiliser plant can be as well ordered in its progressive stages of manufacture as an automobile plant, but the majority of the fertiliser factories move their entire output at least once, and sometimes twice, during the stages of manufacture, by hand labour in buggies. Labour in the South was once cheap, and the incentive to the use of labour-saving devices and the proper layout and routine of departments was lacking. These conditions have changed with apparently no chance of return, and so the fertiliser manufacturer, and the chemical engineer specialising in fertiliser plant design, will be forced to build new plants in which economies in labour are possible.

This brings up the point of the original design of chemical plants and the necessity for designing with an eye to the future. Some chemical plants built within the last five years will find it difficult to make extensions which permit of a lowered cost of production or even a cost equal to the original plant, for reasons such as lack of strength in the building structure preventing the employment of mono-rail cranes or similar mechanisms to convey supplies of raw materials moving from the original storage bins or piles to the new extensions. Time can more profitably be spent in designing the present to suit the future than in trying to

* Paper read before the American Institute of Chemical Engineers.

add in the future to a completed unit which has no outlets for expansion.

ADAPTATION OF IMPROVEMENTS IN OTHER INDUSTRIES.

The statement made in the early part of this paper that other industries can furnish useful ideas to the designer and the operator of chemical plants is intended as a suggestion. To cover in detail the comparisons which present themselves would require several papers, so that an attempt will be made simply to draw attention to some developments in other industries which are just finding their way into the chemical field or which are still awaiting proper recognition. As a preliminary, there are some useful guide-posts on the road along which the industry has passed.

Take the "Chemical Catalogue," which is issued under the auspices of this Institute, and compare the mechanical and labour-saving devices shown in the first volume (1916) with the much greater variety in the present (1919) volume. The manufacturers are not listing plant equipment in 1919 that was not in existence in 1916, but rather they are listing equipment which in 1916 was used only in other industries. Compare also the advertising pages of the chemical journals from, say, 1912 to the present time, and note the introduction into chemical advertising of filters which had found extensive use in the metallurgical field, of grinding machinery primarily developed for metallurgical plants and cement mills, belt conveyors, mono-rail cranes, grab buckets, and other mechanical devices for handling materials which were introduced into chemical manufacturing processes after they had become standard parts for other industries. And to-day other industries have in use types of equipment which would solve many of the problems we consider solely as chemical engineering problems.

First, there is the matter of moving materials through the cycle of the plant operation. The movement, at the lowest possible cost, of large tonnages of raw and finished materials has assumed great importance in industries where there is close price competition. The progress of chemical manufacture with the consequent increase in size of chemical plants will make this feature of plant design of vital interest to the owners of these plants. Water-front factories bringing in their raw material by steamer will be forced to adopt unloading methods equivalent to those used in the iron and steel industry. Factories in the interior will have to be arranged so that railroad cars can be placed directly at the discharging or loading points so that double handling of material is avoided. The linkage of materials, moving from one part of the plant to another, and referred to in the earlier part of this paper, will have to be changed from manual to mechanical means, and the plant units so arranged that the intervals to be bridged in the movement occupy the shortest possible distance while still permitting the future growth of the units.

All of these improvements in handling have become part of the routine design of other industries, and the chemical engineer, by extending his observation outside of the chemical field, can usually find an operation with characteristics similar to the project he is interested in, which has developed handling facilities adaptable to the needs of the chemical plant.

POWER PLANT.

In the case of the chemical engineer concerned in the layout of a furnacing operation, a study of a modern

central station power plant will often suggest improvements over existing chemical practice. There are many chemical plants which use as much coal under furnaces each day as a larger power plant does under its boilers. The power plant is in the business of utilising coal for profit, so it has, in the movement of coal, displaced manual labour by mechanical methods. The power plant unloads its coal into storage with grab buckets operated from gantry or overhead cranes, and has developed other forms of mechanical equipment to convey the coal from storage to the boiler-room and to the individual mechanical stokers. The ash from the boilers is gathered by either drag conveyors or pressure or suction devices, and is delivered to hoppers, which discharge direct into cars or ash scows.

The arrangement of the average chemical plant carrying on furnacing operations effectually prevents the use of a complete scheme of mechanically handling coal and ashes, as the furnaces have grown topsy-like in various parts of the factory, and even the coal storage itself has usually to be placed remote from the furnaces.

The control of combustion, which is essentially a chemical problem, has progressed to a greater extent in power plants than in chemical factories, and it is the unusual chemical factory which has a complete equipment of CO₂ recorders, pyrometers, and draft-gauges on its furnaces.

Further suggestions along these same lines are afforded by the study of flow sheets of metallurgical works. The flow sheet of a modern smelter, with its allied leaching and flotation plants, represents a development in low-cost movement far ahead of the average large chemical plant, although the equipment used in the smelter is in many instances equally serviceable in chemical factories. Leaching by counter-current decantation in its present efficient state is a development due to metallurgical engineers who were faced with the problem of economically treating low-grade ores. The same apparatus will serve the chemical manufacturer for the production of solutions or an insoluble precipitate through the inter-action of a solid and a solvent or solution. The various types of classifier have made closed-circuit grinding a possibility, and the chemical manufacturer can adopt from the metallurgist without change a method of operation which gives a continuous finely-ground product without a distinct intermediate separation.

Brief mention has already been made of filters used in metallurgical work and of their adoption in chemical processes. The continuous removal of a solid product from a waste liquid or the continuous separation of a solution from a waste solid in suspension means a great reduction in cost as compared with the use of intermittent plate and frame presses.

TREATMENT OF GASES.

The various processes of illuminating-gas manufacture afford useful study, and some interesting developments should result from the adoption by the chemical industry of gas washers of the Feld type. Feld-type washers have provided the gas engineer with a compact mechanism which gives an intimate contact between the gas and an absorbing or scrubbing liquid, while the arrangement of the washer permits the liquid to reach a high concentration in solid particles without danger of stoppage. A cast-iron washer of this type would, as an example, remove chlorine, using caustic soda solution as the liquid, from the exit of a chlorination

operation, and going for the moment outside the strictly chemical field, it might serve in an absorption method of recovering gasoline from natural gas, in place of the present expensive compressor plants.

Made of acid-proof materials, and somewhat modified in arrangement, this same type of washer might be used to replace one of the unsatisfactory details in a sulphuric acid chamber plant—the Gay-Lussac tower.

As an illustration of the satisfactory use of mechanisms developed in other industries, an instance at the factory with which the writer is connected may be cited. One portion of the plant operation depends on the continuous supply of large tonnages of raw material. Prior to 1918 this raw material had always been delivered at the plant in steamers—and a complete scheme of mechanical unloading had been installed and had given excellent results. The shipping strike and the shortage of steamers in 1918 made it necessary to change over from steamer to box-car conveyance, and as the raw material was used at the rate of 600 tons a day it meant either excessive hand labour in unloading the cars or the adoption of some mechanical unloading device.

A review of practice in the chemical industry did not afford any suggestions, neither did the usual engineering catalogues or trade publications refer to a machine which would solve the problem. Consideration of materials that were moved in tonnages in box-cars led to an investigation of the grain industry, and it was found that the grain elevators had been using a mechanical box-car unloading device for at least 10 years, and that this device could be adapted without change to the conditions we had to meet.

The grain unloaders were installed, and as a result of their use the movement of incoming raw material kept pace with the consumption. The congestion of plant facilities through the inevitable delays which would have occurred under hand-unloading conditions were avoided, and most important of all, the cost of putting the material into the plant was kept down to a reasonable figure.

In bringing this paper to an end, the examples which have been selected do not exhaust the possibilities of comparison, but they will serve the writer's purpose if they are accepted as evidence in support of the conclusions which were advanced in the first paragraphs—that the chemical engineer can study to his advantage engineering progress in other lines of industry.

ELECTRO-PLATING WITH ARSENIC SOLUTIONS.

IN a paper read by Mr. O. P. Watts before the American Electro-Chemical Society it is recorded that it has been discovered recently that by immersing iron for a few moments in an acidified solution of arsenious oxide, an adherent copper-plate may be deposited from an acid electrolyte, but no adequate explanation had been offered for this unique effect of arsenic. It is shown that certain solutions of lead and antimony may be substituted for the arsenic dip, previous to direct-current plating of copper on iron from copper sulphate. It appears to be impossible to obtain a perfect plate on iron from solutions of bismuth chloride by the usual methods of electro-plating; but use of the arsenic or antimony dip is attended with the same success as in copper plating. The successful substitution of solutions of antimony and lead for arsenic, and the application of

these dips to plating on iron with bismuth, show that the beneficial effect of the arsenic dip is not due to a property peculiar to arsenic alone, but is the result of coating the iron with a metal whose potential in acid solutions is so near to that of copper that it is possible to deposit a good copper plate upon it, yet whose potential is not so far below iron that it will deposit on iron in a powdery, non-adherent form.

ETHYL CHLORIDE.

AT a meeting of the London Section of the Society of Chemical Industry on Monday, Mr. Julian Baker presiding, Mr. Albert Henning read a paper on "Ethyl Chloride."

The author said the object of the paper was to dispel the false ideas which existed in certain quarters on the part of both engineers and chemists as to ethyl chloride, which was too often regarded as a troublesome material with cheapness as its only advantage. These ideas, however, were quite inaccurate. Ethyl chloride was prepared originally almost entirely for medicinal purposes, and the extent of its manufacture before the war was seen in the fact that one German factory alone turned out 250,000 kilos per annum, and another 80,000 kilos. That, however, was obviously not intended for anæsthetic purposes, but was chiefly required for ethylation in dyestuffs and also for refrigeration and as a solvent. Ethyl chloride was now being produced in France, Switzerland, and Canada, and a factory had been started in Australia. Compared with other ethylating agents, ethyl chloride was the cheapest by about 60 per cent.

CONTAINERS.

There was an erroneous impression that ethyl chloride had to be stored in high pressure cylinders, but far from that being the case, it was supplied in syphons, and could be poured out of a jug without the slightest danger. As an instance of the type of container in which it could be placed, he showed a slide of a milk-churn container, a number of which had been seized on a German vessel in the early days of the war whilst on its way to the Argentine with a large quantity of material for a hospital out there. It could also be stored in ordinary bottles, and several Winchester bottles with ordinary corks had been used. Elaborate high-pressure apparatus was not necessary, and he was glad to say that the railway regulations for the transport of ethyl chloride had been amended.

As demonstrating the slow rate of evaporation, he filled two tumblers with ethyl chloride and allowed them to remain on the lecture table during the meeting, and mentioned that the evaporation of a sample which had been left on a mantle-piece over a gas fire for six hours showed an evaporation which dropped from 0.15 in the first ten minutes to 0.07 per cent. at the end of the six hours. It was only inflammable over a comparatively narrow range and had withstood attempts to obtain an explosion. A cigarette dropped in a beaker of ethyl chloride would be extinguished.

USE AS REFRIGERANT.

Describing the use of ethyl chloride as a refrigerant, the author said that in America the Board of Fire Underwriters had approved its use, and it was being used in the United States Navy. The principle uses of ethyl chloride were stated as follows: (1) In the

synthesis of dyestuffs and drugs as an ethylating agent; (2) as a working substance in refrigerating machinery; (3) as a solvent for extraction purposes; (4) in research work and laboratory practice.

A large number of slides were shown illustrating types of apparatus now in use; and emphasis was laid on the point that it does not become acid on storage if properly stabilised during manufacture. There was, said the author, too little recognition of the importance of ethyl chloride and too much tendency to refer to the more expensive methyl derivatives, an enormous quantity of which were made in Germany before the war, although he doubted if these methyl derivatives were always methyl, though so labelled. It was highly probable that they were sometimes ethyl.

He claimed that the paper gave, for the first time, a complete set of figures with regard to the use of ethyl chloride in the design of refrigerating machinery, relating to the thermal properties, vapour pressure, latent heat, specific volumes, etc. Instead of an elaborate compressor plant a simple rotary pump could be used. For a simple ethyl chloride machine with cooling water at 65° F., an 18in. diameter rotary pump running at 150 to 300 r.p.m. could be employed. In this country ethyl chloride was practically unknown as a refrigerant, but in America it had been known and used for several years, and 150 plants were running there. The Canadian Government had 20 plants, and the French Government had six or seven warships fitted. The oldest ethyl-chloride machine for refrigeration purposes had been in use for nine years at the Hanover Bank, New York, and it had been removed in order that a larger one might be fitted. A very promising development in this connection was in the direction of small plants for household use, having a capacity of 500kg.-calories per hour, which could be driven by a $\frac{1}{4}$ H.P. electric motor. Ammonia or CO₂ plants would be positively dangerous in private houses owing to the high pressure necessary, whereas with ethyl chloride the highest pressure was 15lb. per square inch.

One reason for the bias against its use in laboratories was the fact that it had not been supplied hitherto in convenient packages, but that difficulty had been got over. As a solvent in the laboratory it had many advantages, whilst its low boiling-point rendered it extremely useful as a cooling agent for small laboratory use in the absence of ice.

The paper, as prepared by the author, was an extremely lengthy one and contained some 30 lantern slides, but it was delivered in far too hurried a manner. It was, no doubt, this fact which resulted in the discussion being so poor.

DISCUSSION.

The Chairman asked the author how the refrigerating process employing ethyl chloride compared as regards cost with the ammonia machine.

Captain Nash asked whether, in extracting fats from seeds and nuts, chloride extracted the pure oil, or were other matters extracted with the oil? Was the process more in the nature of ether or petroleum ether in regard to the extraction of matter other than fat?

The author said there were other by-products as well, but they could be got rid of. He could not compare it with petroleum ether, because he had made no comparative tests.

Mr. Tallantyne said that in using ethyl chloride as an ethylating agent he believed it was usually dissolved in alcohol at 150° C., but he had found that at about 140° quite a considerable amount of acidity was developed in the ethyl chloride in alcohol, which attacked iron slightly.

Mr. Gardner said he used a certain amount of ether for promoting rapid crystallisation by pouring it into the satu-

rated solution, and after the crystals had separated out he boiled the solution in ether. Could he use ethyl alcohol in the same way?

Mr. Garrard, speaking with regard to the ethylation of amines, asked whether it was possible to introduce any number of groups into the diamine, or was there a limit to the number?

The Chairman, in asking the author to reply, said that he took it that what Captain Nash meant was that if they were extracting such a substance as cocoa butter by ethyl chloride, it would also probably remove the cocoa red as well.

Mr. Henning, replying to the discussion, said the chairman was right in his last remark. He had there some otto of roses, and there was a large quantity of the pure colour of the red rose. With regard to the comparative cost of the ethyl chloride refrigeration process and the ammonia process, he would ask Mr. Bishop, who had gone into this question very largely, to deal with that matter. There were not sufficient ethyl chloride machines at work to give a very precise comparison. There were probably 200 or 300 machines, but they did not enable a very exhaustive statement to be made as to comparative cost, because the comparative data was not available. In answer to Mr. Garrard, there had not yet been very much time, and he had only been able to deal with a few. He had samples there of phenetol, diethylaniline, benzylethylaniline, and monoethylaniline; and although he had tried others, he thought they must be content with these for the present. A great many experiments had been made, however, and he would be pleased to answer any further questions in writing if the members were interested, and, indeed, to make experiments for them. With regard to the use of ethyl chloride instead of ether in connection with crystallisation, that could be done.

Mr. Bishop, speaking on the question of the comparative cost of ethyl chloride plants for refrigeration with other systems, said he had built a number of plants, and from his experience he should say that the ethyl chloride plants were from 5 to 7½ per cent. more expensive than the carbonic anhydride system. These plants, however, were only small ones, and they probably, owing to their range of size, cost more than ammonia, carbonic acid, or SO₂ systems, but there were the advantages of simplicity, speed, and automatic operation. The difference of from 5 to 7½ per cent. was in the capital cost; the cost of running was practically the same.

A hearty vote of thanks was accorded the author.

ALUMINIUM ALLOYS.

THE United States Bureau of Standards has recently issued two papers on aluminium alloys. In Technologic Paper No. 132, P. D. Mercia, R. G. Waltenberg, and A. N. Finn deal with the properties of ternary alloys of aluminium and magnesium with copper, manganese, or nickel. The alloys were rolled out in sheet and tested as cold-rolled, after annealing, and also after quenching at 500° C. and aging at ordinary temperature. In the tensile tests the copper alloys came out decidedly best, and they were further improved by heat treatment, which improved the nickel alloys only a little and the manganese alloys not at all. For the corrosion tests the alloys were sprayed with salt water for two months. In these tests the Al-Mg alloys behaved better than aluminium itself and than other Al alloys, and the ternary manganese alloy proved least corrodible, the copper alloy coming next in order. Annealed commercial aluminium was more resistant to corrosion than the hard-rolled metal, but it did not compare favourably with most of the alloys. The "Heat Treatment of Duralumin" is the subject of Scientific Paper No. 347, by Mercia, Waltenberg, and H. Scott. The temperature of quenching should not exceed the eutectic point of CuAl₂, about 520° C., but should be kept near that temperature and be followed by quenching in boiling water and, for hardening the metal, by aging at 100° for five days.

EXPLOSIBILITY AND INFLAMMABILITY OF DYES.*

By B. HUMISTON, W. S. CALCOTT, AND E. C. LATHROP.

THE following work was taken up with the view of eliminating, or at least reducing, the danger of fire and explosion in the finishing of dyes and intermediates. Although the Du Pont Company has not experienced any serious difficulty occasioned by fire or explosion, we have been informed that a number of accidents have occurred throughout the country, and because of the risks involved considerable work was carried out along this line. Aside from eliminating the loss of life, there are also the possibilities, of course, of eliminating the loss of material and increasing the capacity of the various units used in finishing operations. Very little data of any sort were available from which it could be predicted under what conditions dyes or intermediates were likely to explode or decompose, other than a certain amount of plant experience. The problem was, therefore, attacked from the laboratory point of view, with the idea of developing methods by which the element of risk in each step of the finishing operation could be accurately determined.

The dyes or intermediates, as delivered to the finishing department, consist of a wet mass, usually a press cake, with a widely varying amount of moisture. To prepare it for the market it is necessary that it be dried, ground to a fineness depending upon the individual material, and standardised—that is, brought to the correct shade and strength. These three operations combined are referred to as the finishing of the material. For the sake of clearness, each of these three operations will be taken up separately.

DRYING.

In drying, little danger is encountered from moistures of dust and air, as very few of the dryers used for dyes or intermediates cause the formation of any appreciable amount of dust, except *in vacuo*. Any trouble encountered in this operation is therefore likely to be due to the effect of the temperature upon the mass of the material. This effect may manifest itself as an oxidation, which may cause the material to become heated, or it may consist of a decomposition which may be accompanied by the evolution of gases. This latter may also be sufficiently rapid to become explosive. A good illustration of the oxidising type of dye is sulphur black. This in the moist form oxidises so readily that it is almost sure to fire if dried in the presence of air. In fact, it will frequently oxidise sufficiently to materially injure the shade on simply storing in paste form, if the amount of water present is insufficient to form a slime. If, however, it is dried and cooled in the absence of air, it becomes quite stable and may be kept indefinitely without any change in shade. Victorian green, on the other hand, is a good illustration of the type of material which decomposes without taking fire if overheated at temperatures above 100° C. In the case of Victoria green, an exothermic reaction sets in, the dyestuff being reduced to the leuco base by the oxalic acid present, and carbon dioxide mixed with some carbon monoxide is given off freely. As the reaction is strongly exothermic, it could quite easily become explosive in a confined system.

This investigation did not include slight oxidation of the materials concerned, but only cases in which the oxidation was sufficiently rapid to cause the materials to

take fire. The apparatus used for determining both these points and the liability to decomposition without oxidation consisted essentially of a large test tube enclosed in an air bath and capable of being heated to a temperature of 500° C. A small amount of the dye or intermediate is placed in the test tube, a thermocouple immersed in the dye, a slow current of air passed, and the temperature gradually raised. The point at which the dyestuff takes fire is determined, although, as a rule, smoke or fumes can be noted before ignition takes place. The results can be checked with a fair degree of accuracy.

For determining the danger of decomposition of the dye, with or without the evolution of gases, a similar apparatus is used, excepting that no air is passed through and a delivery tube is connected to the test tube, so that any gases given off are conducted to a gas burette. The temperature of the test tube is raised until decomposition begins, and it is then noted whether the reaction is endothermic or exothermic, as indicated by the development of higher temperatures in the dye than in the air bath with which it is heated. The point of initial decomposition can be quite readily determined, provided gases are given off under decomposition or if the decomposition is exothermic. Dyes which decompose exothermically are, of course, much more dangerous to handle than those which decompose endothermically, as the dyes, being in the dry state, are very poor conductors of heat, and being surrounded by the heated vessel, the conditions are very favourable to the development of high temperatures, which result in fires or explosions. Of course, after the point at which decomposition or rapid oxidation sets in has once been determined, it is a simple matter to eliminate this element of risk in the plant by working at a sufficiently low temperature. This should, in general, be not less than 25° to 30° C. below the temperature of exothermic decomposition or ignition, allowing for variations in the quality of the various batches of dyes and for faulty temperature control.

GRINDING.

In grinding, in addition to the effect of temperature on the mass of the material, there must also be considered the effect of temperature upon the mixture of dust and air which is invariably present in grinding and drying solids, and also the probability of the occurrence of sparks in the mill. A certain amount of heat must be developed in any grinding operation, and the work done in reducing the size of the particles must reappear in the form of heat, unless provisions are made for removing this heat as fast as liberated, which is not usually the case. There will be a rise of temperature in the grinder, the extent of the rise depending, of course, on the material being ground and on the mill being used for the purpose, so that it is difficult to fix any limits on the temperatures to be expected in grinding operations. It may be stated safely, however, that temperatures up to 75° C. may be experienced in the ball mill type of grinder, and temperatures well over 100° in the impact crusher type. In the ball mill the possibility of sparks can be largely reduced, as suitable choice of the material of the mill itself and of the balls, copper mills with copper balls being almost free from risk of this sort. In the impact crusher type of mill, however, for example, where the dye is disintegrated by being submitted to blows from a revolving beater arm, the accidental intrusion of foreign particles can easily cause sparking through being struck by the rapidly revolving beater. Sparks due to static electricity must also be considered in grinding.

* Paper read before the Dye Section of the American Chemical Society, and published in the *Jour. of Ind. and Eng. Chem.*

The method for determining the effect of heat on the mass of dye in grinding is, of course, identical with that used for the corresponding factor in drying. It is obviously necessary, however, in grinding to determine the effect of the additional factors introduced, the effect of temperature on the mixture of dust and air. In order to determine the stability of the dust and air mixture, there is employed the apparatus developed by the Bureau of Mines for the determination of the explosibility of coal dust and air mixtures. This consists essentially of a 1,000cc. bulb containing a small, hollow cylinder of platinum, heated from the interior by means of a platinum coil, the temperature of the platinum cylinder being accurately determined by means of a thermocouple. The dye under investigation is placed in a funnel at the bottom of the bulb and the dust cloud is carried by blowing air upward through the funnel. This delivers the dust cloud around the heated platinum cylinder. The explosion point is taken as the temperature at which a noticeable development of pressure takes place, which is registered on a gauge connected with the apparatus. At this temperature a visible flame is seen to develop and spread through the bulb. By a slight modification of this apparatus, the dust cloud is subjected to the effect of sparks from an induction coil or from a small emery wheel. Little work has been done on this latter method of testing, however, but from the former—that is, the use of the platinum cylinder—results ranging from 400° to 1,100° C. have been obtained as the explosion points of dusts with varying amounts of air, and it is possible to check these results within about 50°. The results obtained are in fair agreement with plant experience, as regards the relative safety of the different dyes so far investigated. This apparatus, however, has the weak point that the dust-air mixture used is not necessarily that most sensitive or most likely to explode.

Somewhat more reliable results are therefore given by a modification of the apparatus for determining the decomposition temperature. This apparatus consists essentially of a large test tube immersed in an air bath with a tube for admitting air to the bottom of the test tube. The test tube is gradually heated up, while passing through it is a current of air sufficiently rapid to keep the tube completely filled with dust. The temperature of spontaneous ignition is determined by inspection. Usually the decomposition is very noticeable, being detected by change in colour and development of fumes. The increased sensitivity of this apparatus over the Bureau of Mines type is shown by the fact that the temperatures at which explosions occur in the Bureau of Mines apparatus range from 400° to 1,100° C., while the temperature range for the same series of dyes in this apparatus is from 250° to 550° C. The data obtained from the two forms of apparatus, however, give a very clear idea of the relative stability or instability of the dye, as the Bureau of Mines apparatus gives the relative ease with which the different dyestuffs will propagate an explosion, once started, whereas the so-called spontaneous ignition temperature gives fairly definitely the order of stability of the different dyes or intermediates when heated in the presence of air. Little difficulty has been experienced in obtaining concordant results with this apparatus, checking within 10° to 15°.

STANDARDISING.

In the standardisation of dyes explosion risks are very much the same as in grinding, although, of course, to a much lesser extent, as the temperatures encountered are

much lower and the risks of striking sparks in the mixture are, of course, much less than the risks of striking sparks in the grinding, whether of the ball mill or impact type. An additional factor is introduced, however, in that standardising reagents are usually added to bring the mixture to the proper strength. Stability of these reagents and the possibility of a reaction between the reagents used and the dye or intermediate has to be considered; for instance, the accidental addition of soda ash to Victoria green would probably result in a vigorous reaction between the oxalic acid of the Victoria green and the soda ash, with the possibility of raising the temperature to the decomposition point of Victoria green.

This investigation is still in the preliminary stages and the methods used are tentative. They are being used, however, pending the development of more satisfactory methods for covering these points, or other points which may be brought up. They are believed to be of considerable value, however, as each method has been developed to answer some definite problem known to have occurred, and only after having given a satisfactory answer to an original problem have they been applied to the solution of similar problems for other materials. One difficulty which has been encountered is the lack of satisfactory standards with which to compare the laboratory results. Certain materials—as, for example, alizarine yellow—are known to be unsafe, while certain others are believed to be safe, and in default of more satisfactory data these materials have been temporarily taken as standards in carrying out this work. It is realised, of course, that the mere fact that the material has been safe to date does not prove that it will remain safe indefinitely, and that some of the dyes now passed as perfectly safe may eventually be discovered to be dangerous. However, it is believed that by continuing this investigation along these lines, it will be possible to establish fairly definite limits as regards temperature and the proper type of mill for grinding each material, and in cases where the element of risk warrants it, to state which of these materials should be segregated or handled in small lots, or in extreme cases handled in the paste condition. An incidental advantage which has already been gained to some extent has been the selection of the proper temperatures in drying, so as to give the maximum speed of drying with the minimum of danger, thereby increasing the capacity of the drying units. We hope later to communicate more fully on this subject.

SOUTH AUSTRALIAN PHOSPHATE DEPOSITS.

THE latest bulletin of the geological survey of South Australia deals with the phosphate deposits of South Australia, and is the work of the Assistant Government Geologist (Mr. R. Lockhart Jack). Mr. Jack says South Australia is fortunate in having supplies of phosphate rock scattered over a wide area, which, although not equal to the imported material, so far as having been yet discovered, can be made available to supply part of the demand. In a few isolated cases specimens or small pockets assaying over 80 per cent. tricalcic phosphate may be found, but first-grade rock is regarded as over 60 per cent., the best running from 65 to 70 per cent. Second-grade rock falls to 55 per cent., but some is used as low as 50 per cent., the definition of what constitutes usable rock varying with the purpose

for which it is intended, and the nature of the impurities. The lower grade material is used for direct application after fine grinding, and is exported both prior and subsequent to grinding for use in wetter regions. So far the bulk of this low-grade rock has been utilised in a raw state finely ground, and in some cases mixed with a proportion of superphosphate or other fertilisers. It has also been used to some extent in the State in conjunction with high-grade imported rock to make a blend that would produce superphosphate conforming to the percentage of soluble tricalcic phosphate of a brand registered under the Fertiliser Acts of 1900. The output of phosphate rock in South Australia to the end of 1918 was 89,456-tons, valued at £96,095.

INFLUENCE OF IMPURITIES IN LEAD WHEN HEATED WITH CONCENTRATED SULPHURIC ACID.

A PAPER on this subject was read by Mr. Charles E. Barr at a meeting of the London Section of the Society of Chemical Industry on Monday.

The paper contained the results of experiments which the author hopes will be of use to sulphuric acid manufacturers and other users of lead for chemical purposes. Two grades of lead were analysed, and they proved to be very different in their resistance to the solvent action of sulphuric acid. The tests showed that those samples of lead in which copper predominated as the impurity were most resistant when heated with sulphuric acid. Experiments were also carried out to see at what temperature sulphuric acid attacked various other metals, and several tables of figures are given in the complete paper. The general result shown by the experiments was that, the purer the lead, the less liable it is to attack. It had, however, been found desirable to add a small percentage of copper, 0.2 to 0.5, in order to ensure obtaining the maximum resistance.

Mr. H. M. Ridge asked the author whether he could give any reason for the fact that, according to his tables, lead containing a larger amount of bismuth generally suffered attack at higher temperatures than a lead which was comparatively free from bismuth. The same applied to the lead containing a considerable amount of silver. He had always looked on bismuth and silver as two elements which played an important part in the chemical attack of lead, and in obtaining his supplies he had always laid a certain amount of stress on reasonable freedom from bismuth and silver. Therefore, he would very much like to know whether the author could give any reason for the metal which happened to be lower in bismuth and silver being attacked at a lower temperature. He would also like to ask whether the author had done any work in connection with the varying atomic weights of lead, and whether he had found in his experience that that had any bearing on the question of chemical attack by sulphuric acid.

Mr. Rowell said it was usual to demand Pattersonised lead for best work in sulphuric acid plants, and the difference between that and the lead of which figures were given by the author was probably due to the zinc content. A small percentage of zinc would cause a much more rapid action of sulphuric acid on lead than any other metal. It did not appear that the silver content was deleterious, because Pattersonised lead usually contained more silver. The author's results were com-

parative to the case of concentrated sulphuric acid in a lead pan. Lead containing a large amount of copper in a sulphuric acid chamber where the acid was comparatively weak would not last so long as a chamber made of pure lead entirely. The purer the lead was, it was certain it would last longer, particularly in chamber work.

Mr. Lancaster pointed out that if more than 0.2 per cent. of copper was introduced into the lead it gave rise to commercial difficulties. He could not agree with Mr. Ridge's remarks with regard to the effect of silver, and he thought that if he were to refer to other authorities he would find that a small quantity of silver protected the lead. Another reason why Pattersonised lead was popular was because, *per se*, it invariably contained a very much larger percentage of copper than the lead produced by the Parke's process for the simple reason that, in trying to extract silver from lead bullion, zinc was added, which had an affinity for extracting copper more than any other metal, but it was entirely a mistake, as the author had said, to assume that because a lead was a Parke's lead it was a bad lead for chemical chambers, or, equally, to assume that because a lead had been made by the Patterson process it was a good lead or a suitable lead for chemical chambers. The science of the metal was now very much better understood than it had been in the past, and the manufacturers of sheet lead were producing lead to-day with only small traces of copper which would stand up to strong sulphuric acid, and there was no doubt in his mind that the purer the lead, the more it would resist the action of acid. There was little doubt, too, that copper acted as a dope against certain impurities. That was borne out very fully by some experiments which he had made recently in producing electrolytic lead, by which he meant pure lead and not a lead such as had been often spoken of in the past as electrolytic lead—one that would test 99.998 per cent.,—and that lead would stand up against sulphuric acid and without any addition of copper whatever.

The Author, replying to the discussion, said the analyses which he had given in the paper did not represent the whole of the work that had been done. He only gave the figures as typical analyses. Many others were done in which the analyses, with the exception of the copper, were very similar, but always with the same difference in the resisting power to the acid. With regard to the atomic weight of lead, he was afraid he had not done anything in that direction. With regard to Mr. Rowell's remarks concerning the Patterson *versus* the Parke's process, that had been so in the past, but lead in the Parke's process was now subject to a treatment which purified it and rendered it equal to Pattersonised lead, and from that point of view he thought that those who wanted Pattersonised lead were mistaken. Subsequent research had also shown that the Parke's process still further eliminated the zinc. He had not said anything in the paper with regard to copper in chamber lead for sulphuric acid because he had carried out practically no experiments with regard to weak or dilute sulphuric acid. In some cases it was necessary to have a lead which was harder for certain purposes—perhaps the lead had to be handled more drastically, and in that case it was not so much a question of temperature as the hardness of the lead. Then it was hardened with antimony, and, of course, the same temperatures did not apply; 0.2 per cent. of copper was not necessary if the lead was pure. The purer the lead, the smaller the amount of copper needed.

SWISS DYE INDUSTRY.

THERE was a decrease of 1,209,848lb., or 38.8 per cent., in the quantity of the total colour exports from Switzerland to the United States in 1918, compared with 1917, and a decrease in value of £265,000., or 36.4 per cent. There was, for the most part, sufficient raw material for the aniline colour and extract industries, and the delivery of raw materials was, under the prevailing conditions, generally satisfactory. There was sufficient coal for the factories to continue operating. Toward the end of the year, however, the situation became so critical that all factories closed for two weeks in order to save coal.

Foreign competition, particularly that of the United States, was especially noticeable during the year. However, the demand for dyestuffs was satisfactory until the signing of the armistice, when orders immediately were discontinued. This condition did not affect prices materially, for raw materials were just as dear and difficult to procure as before. The labour situation became more acute through the continual demands of the labourers for better wages and shorter hours.

There was a heavy demand for synthetic indigo throughout the year, though the English and American factories were active in competition. It is generally believed, however, says a *U.S. Commerce Report*, that with the overcoming of transport difficulties sufficient market will be found for the Swiss dyes and chemicals. Logwood was very scarce and dear throughout the year.

The growing desire among chemical manufacturers to work more unitedly in order to overcome the difficulties subsequent to the war was finally realised in 1918, when the three chemical companies—the Society of Chemical Industry, J. R. Geigy A.-G., and the Sandoz Chemical Works—consolidated for a period of 50 years. There was no consolidation of the stocks of the several companies. In order that there may be no appreciation or depreciation in the market values of the stock of any one of the former companies, the dividends in the future are to be distributed to the stockholders of the several companies in proportion to their respective earnings for the past nine years. They will buy crude products and sell the finished products both separately and jointly, but always under a joint direction. The Clayton Aniline Works, of Clayton, near Manchester, England, formerly the property of the Society of Chemical Industry, became the property of the new company. The colour formulæ of all three companies were pooled, and the Clayton plant is to be enlarged, and all dyes now made in Switzerland are to be manufactured also in England.

The technical branch of the chemical industry was marked by intensive work in all factories, and it was possible to work out formulæ for several new products which are to be manufactured in the near future.

The embargo placed on certain raw materials by the United States added to the difficulties of the pharmaceutical industry. In several cases, even after export licences had been granted, the necessary tonnage could not be obtained. Inasmuch as a separate import licence was necessary for each shipment of goods to the United States, there were often long delays and difficulties in the exportation of pharmaceuticals. Exportation to the northern neutrals was also very difficult, and for a time impossible. Eventually facilities were given by England and France for transportation. With few exceptions the foreign demand decreased throughout the year, owing especially to the increased production in other countries.

PRESERVATION OF TIMBER.

THE various methods of effecting the preservation of timber have been discussed by an American journal. The steeping process consists merely in soaking the timber in a water solution of a preservative. The wood must be thoroughly seasoned and left in the solution one day for each inch in thickness and one additional day. After treatment, the timber should be air-dried before using. Zinc chloride attacks lead paints, but is very desirable otherwise. Mercuric chloride is very effective, but is poisonous and has a decided corrosive action on steels. Sodium fluoride does not attack paint, is not corrosive, and in most other respects is very desirable. Timbers may be coated with coal-tar creosote by a brush treatment, by dipping in hot oil for five to fifteen minutes, or by the hot-and-cold bath method. This method consists in submerging the lumber in hot oil for several hours, and then either allowing the oil to cool down slowly with the wood in it or plunging the wood into cool oil and leaving it for several hours. Coal-tar creosote is objected to by some insurance companies, but whether or not it really does add greatly to the inflammability of wood is a debatable question. Creosoted wood cannot be painted over successfully, because the oil quickly comes through the paint and discolours it. Although pressure treatments are the most expensive, they are the most effective, because they result in the greatest absorption and penetration of preservative. Roof planking should receive 8lb. to 12lb. of creosote per cubic foot, or $\frac{1}{2}$ lb. of the salt if zinc chloride be used. Such treatment should add at least twenty years to the life of roof plank. Lumber should be cut to final dimensions before treatment. Whenever it becomes necessary to cut into treated timber the untreated wood exposed by cutting should be given two brush coats of creosote or some other preservative.

BORAX-POTASH FOR FERTILISER.

ACCORDING to the *Canadian Chemical Journal*, the Department of Agriculture of the United States has investigated the damage to crops attributed to the use of fertilisers containing borax-potash, and has traced in important instances this potash to the product of Searles Lake. In order to permit the safe use of this product in future, the department has, under authority of the Control Act of August 10, 1917, decided to place such restrictions on the use of potash salts containing borax as will guarantee the use of an application of not more than two pounds of anhydrous borax per acre. In order to effect this measure of safety, the department has issued instructions to the producers of potash salts at Searles Lake and to all brokers, fertiliser manufacturers, and mixers not to sell potash salts direct to farmers as straight goods when they contain more than five-tenths of 1 per cent. of borax, and not to sell mixed fertilisers containing more than two pounds of borax per ton unless the amount of borax contained is plainly shown upon the container.

This regulation is issued to insure that in no case shall a fertiliser application be made by farmers without their knowledge, which would add more than two pounds of borax to the acre. The department feels that such restrictions will make the use of potash salts from Searles Lake as safe under all conditions of agriculture as is the use of nitrate of soda, acid phosphate, and other fertiliser constituents.

A VISIT TO GERMAN CHEMICAL WORKS.

UNDER the auspices of the Glasgow Section of the Society of Chemical Industry an inaugural meeting of the new session on Friday (November 28) was addressed by Mr. D. A. Bost, who attracted a large audience to hear his description of a visit to the Rhine-land chemical works. The President of the Section, Mr. Quintin Moor, occupied the chair.

In opening his address, Mr. Bost said he was afraid that the audience might be expecting to hear more than they probably would hear. The results of the mission had been put into the volume which he had with him that night and which could be seen only from a distance. As a member of the mission, he had that volume sent to him, but had to sign a paper testifying that he would show it to nobody. Owing to the confidential nature of the report he could not go into details, but he might say that the main object which the mission set itself was to establish, if possible, the basic principle upon which the German chemical industry was founded, and to place before the British chemical industry a description of the plant and processes which would be compared by those interested with British plant and processes. It was to be expected that the Germans were not going to give away anything if they could help it, so that the members of the mission had, naturally, to be chary of accepting all they were told as gospel, but by keeping their eyes about them they were able to obtain much useful information. Another thing which was against them was that they were not allowed to take notes, and it was rather difficult to go through all sorts of plant and processes for two or three hours and then write up afterwards all they had seen.

THE BAYER COMPANY'S WORKS.

The speaker gave a very interesting description of the journey to Germany until their arrival at the Bayer Works at Leverkusen, and he pointed out that nearly the whole of the village belonged to Bayers and that it was laid out as a garden city. The directors received them in the main offices and the visitors were taken round the show places, and, while they did not really see any manufacturing process in detail, as these were mostly carried out in capsules, tubes, bottles, etc. They had expected to see a great deal of ferro-concrete work on the buildings, but they found that most of the buildings in which the products were manufactured were mostly brick, built with tiled or slated roofs. They were about forty feet high, and plant up to that height could be erected inside in any suitable place, storage tanks being supported from the floor on platforms placed where wanted. They also found a chemical library in the works, with most of the books published on chemistry since the year 1535, and they found that this firm were most assiduous in their endeavour to secure all books dealing with chemistry as soon as published. Indeed, they were interested to learn that one particular book of very great value (though not generally known) which was published in Great Britain in May, 1917, found its way to this library in June, 1917. As he had indicated, one thing which struck them very forcibly was the almost complete absence of the use of ferro-concrete in the construction of buildings devoted to the manufacture of chemicals, and the reason was that the Germans recognised the probability of changes in plant and processes and that such permanent construction might interfere with these changes. Ferro-concrete

was, therefore, only used where great strength was required or in the power-houses.

THE VALUE OF THE RHINE.

Continuing, Mr. Bost said that in Germany men talked about chemistry just as they on the Clyde talked about boats or engineering, and it was also an important fact to note that, as most engineers on the Clyde were also business men, so, too, were the German chemists business men. Undoubtedly many of their British chemists were also business men, but not to the same extent as in Germany. The foundation for the chemical industry being thus laid, it was only necessary for the Germans to find cheap raw materials, and the Rhine basin lent itself to this.

The Rhine was a swift-flowing river, with a big lime content, so that any effluent from the chemical works was quickly carried away and any acid in it was neutralised. It was navigable for many miles, and the chief centres of chemical manufacture were scattered over a length of 200 miles, from Ludwigshafen to Duisberg; while numerous small rivers and canals ran to it, these had been supplemented with railways. The Rhine was connected by the waterways mentioned above with districts producing salt, lime, coal, coke, tar, and pyrites, and it cost little to barge them down. Once these raw materials had been made into finished products, they could be sent cheaply abroad by means of the Rhine or inland by the railways. While the above circumstances were favourable to the foundation and development of the chemical industry, another factor was necessary if an electro-chemical industry was to be founded, and again in the Rhine Valley was found cheap matter for developing power—namely, brown coal, or lignite. This lignite was found in beds of immense depth, and it was only necessary to remove the soil above it and take it out with grabs or steam navvies. Before the war current was supplied to works within 30 miles of the generating station (built upon these fields) at a price which compared very favourably with the price of that produced by water-power; while, in addition to all the foregoing facts and factors, they had workmen in Germany accustomed to be ordered and to obey to the letter.

CAPITAL AVAILABLE FOR DEVELOPMENTS.

But, even with all the above advantages, the industry would not have advanced as it had done but for the capitalists, who were willing to spend money because they had faith in the ultimate result and who tackled the problem courageously even when it was evident it would take years to find a solution. The fact that until recently the services of chemists could be obtained in Germany at practically a labourer's wage was undoubtedly a factor in the large number of chemists employed, but, all the same, the German employers had recognised the necessity for employing chemists to a far greater extent than they had done in this country. Germany had also found her products protected by the fiscal laws of that country, and had conducted the business war against all opposition in as ruthless and underhand a manner as she had done in the field. Again, the Germans had a very much greater security of return for their money than they had in this country, and the owners of their chemical works were not only business men, but finished chemists, who knew the industry thoroughly. In Germany the chemist was looked up to just as an engineer was looked up to in this country, and he was encouraged and inspired in all his work.

In conclusion, Mr. Bost mentioned that the mission had visited 39 works altogether.

Dr. Heilbron, in the course of some remarks, said that they were now faced with the vexed question of whether the import of German chemicals should be allowed, and while the Government were meantime protecting the British dyestuffs industry, it was doubtful whether this would continue. He thought that if Mr. Bost could give them some information as to what was the actual state of the German dyestuffs industry at the moment it would prove very interesting—whether these works were now getting their full output and whether their research departments were as well organised as formerly. Whatever might be the position of affairs in Germany, however, the speaker personally thought that the great weakness of British manufacturers in pre-war times was that they had not given sufficient attention to research work. It was generally admitted that in heavy chemicals they in Britain still had the pull, but in the finer chemical trade they had largely allowed this to go to Germany through lack of enterprise on the part of the chemical manufacturers of this country. He did not think that the Rhine could altogether be quoted as the real reason why Germany had attained such supremacy in the dyestuffs trade; he thought that their system of technical training, and other reasons, might also be quoted. Personally, he felt that in this country they were still hampered too much by many things. There was no doubt that the German chemical manufacturers were far-seeing and thoroughly understood the value of research, and they were willing to pay for such research. His feeling was that they in this country, if they were going to maintain the position attained since the war in the chemical trade, should have strong Government support.

Dr. Cecil Desch expressed the opinion that they must all admit that the supremacy of Germany in the chemical trade in the past had been fairly earned, and their development had been largely because they were prepared to devote such an immense amount of attention to the scientific side of the industry. He, personally, did not think that the German chemists were any better than British chemists, but they received far greater encouragement as far as research work was concerned. If the British chemical industry was going to improve it would have to improve on its own merits, and we should have to be enterprising in other directions. He was afraid that so long as many British manufacturers found themselves making considerable profits they would not trouble themselves about science. He did not think that the chemical industry should look forward to protection from competition in future, but rather that the industry should be improved so that it could stand on its own merits; but they would require a great deal more scientific research than at present. The whole industry would require a great deal of reorganisation along scientific and progressive lines.

After a further expression of views by other speakers, the proceedings terminated with a hearty vote of thanks to the lecturer, and a similar compliment was also paid to Mr. Moore for presiding.

SYNTHETIC DRUGS.

THE first of three Cantor Lectures, arranged by the Royal Society of Arts, was delivered on Monday by Professor John Theodore Hewitt, Emeritus Professor of Chemistry, East London College, the subject being "Synthetic Drugs."

Professor Hewitt dealt briefly with the simple anaesthetics of the chloroform class and the synthetic alcohols, such as amylene hydrate, and chlorinated alcohols, like chlorbutol. Formaldehyde received some attention from the lecturer, who said its constitution was simple and its application very wide. Not merely was it a useful disinfectant itself, but it was the initial substance used in making a large series of drugs, such as urotropine and formamol; and, further, it had very considerable uses in the dyestuff industry.

After touching on other aldehydes, paraldehyde, chloral, etc., Professor Hewitt gave an account of some of the drugs made from ketones (sulphonal, etc.) and

from the fatty acids, and their bromine derivatives. Cyclic ureides were then considered and the veronal class of compounds. Veronal might be made by a variety of processes, he said, and the large number of patents taken out by rival firms testified to the stimulus given to organic research by the discovery of a profitable drug. The properties of the xanthine group (caffeine, theobromine) were dealt with, and the lecturer concluded with some account of the esters of the high boiling cyclic alcohols, such as borneol and menthol.

NEW TIN-EXTRACTION PROCESS.

TWO subjects affecting the future of Cornish tin-mining, says *The Times*, are at present engrossing the attention of those engaged in the industry. One is the visit being paid to Cornwall by the Government Committee inquiring into non-ferrous mines. The other subject is the discovery which is announced of a process for preventing almost the whole of the present waste of tin which occurs during extraction from the ore.

One of the great difficulties of tin-mining has been the very large percentage of loss of the metal owing to the want of efficient means of extracting it. Various improvements have been made in the plants now in use, but none of these has enabled the mines to recover more than about 70 per cent. of the tin from the ore which is stamped. The rest has flowed into the rivers, some to be intercepted by "streamers," who carry on small operations below the mines, and the remainder to go into the sea. So great has been the loss in the course of years that schemes have at times been formed for dredging the mouths of the rivers—in St. Ives Bay, for instance,—with a view to the recovery of the tin which is mingled with the sand. Though these plans have not come to fruition, there is no doubt that the tin—the waste of centuries of mining—is there.

The discovery which is now announced holds out the prospect of preventing practically the whole of this waste. The particles of tin, instead of being recovered by gravitation, are floated off from the residue of the pulped ore. Tests conducted over a long period by Mr. M. T. Taylor, the manager, and Mr. Partington, the chief metallurgist and chemist, of the East Pool and Agar mines, resulted in the discovery of an agent which floats tin oxide. A small plant has been constructed in which about 25 tons of concentrates a day are dealt with, and it is claimed that 90 per cent. of the metal is extracted.

It is hoped that the committee of inquiry will recommend some form of Government grant or subvention which will have the effect of rescuing the industry from its present state of depression. For many years difficulties have been caused by the violent fluctuations through which the price of tin has passed, and though of late the price has been high, the rise has not kept pace with the increased cost of working, and there is a real danger that an industry which has been carried on from time immemorial may be extinguished. One of the main directions in which Government assistance is looked for is in freeing the mines from water. Whether it will be possible to form a Drainage Board for the chief mining area in the neighbourhood of Camborne and Redruth, and if so whether means can be devised for rendering aid also to more isolated mines, are questions which the committee are expected to solve.

THE BRITISH DYE INDUSTRY.

LORD MOULTON'S ADDRESS TO CONSUMERS.

LORD MOULTON addressed an important meeting of dye consumers at Manchester on Friday of last week, organised by the Colour Users' Association, Mr. H. Allen, chairman of the Association, presiding.

Lord Moulton recalled that when he addressed the colour users in Manchester in December, 1914, he urged the formation of a great dye industry, which must be a national one in order that it should be able to stand up against the powerful dye industries of Germany. It should be an industry too big to crush and too national to be bribed. The danger against which he warned them had proved to be so great that the very existence of our country turned upon avoiding it. During the war he was astonished that England, so utterly unprepared with ready-made chemical industries, could respond to the colossal demands upon it, and could at once overtop the great chemical industries of Germany in a war that turned upon chemistry first of all. He had learned that, again and again, the Germans were on the verge of failure to meet the demand for ammunition, again and again they were driven from one expedient to another, and, again and again, their chemical industries came to the assistance of the nation with devices which reflected the greatest credit on their scientific power and originality.

CLAIM ON GERMAN STOCKS OF DYES.

The factories which we had to build to supply the demands of the war were now disappearing, because they were set up purely for war purposes, whereas the Germans, in their enlarged chemical factories, in the swollen establishments of all their dye firms, had a wealth remaining behind which, although created for war, was still serviceable in peace. The great German dye industry, supported by the Government very largely during the war, accumulated large stocks. England had been starved of them, except in so far as her own efforts had been able to create industries to make dyes under the difficult conditions of war time. Therefore, the first reason for the clause of the peace treaty, which gave the Allies the right to half of the existing German stocks of dyes, was to ensure that the world would not be at the mercy of Germany, because Germany possessed the only stocks of dyes. For that purpose it was provided that 50 per cent. of those stocks should be taken, by way of reparation, at a price to be settled by the Allies and to be credited to the reparation fund. The other part of the clause was intended to protect us in the future. Forty years of growth, assistance from the German Government, and our own negligence and that of other nations in regard to chemical industries, had left Germany in a position to produce special dyes to an extent far greater than any other nation could cope with. Consequently, we provided that Germany should no longer be able to corner the dye industry by ensuring that for five years 25 per cent. of their total production should be capable of being bought at the option of the Allies at a price which should be reasonable, at all events as low as the price at which they sold to any other nation.

He had been delighted to read in a German industrial publication an article protesting that it would make impossible the favourite German "full line system" of selling under which their manufacturers refused to sell a particular dye unless the customer bought all his other

dyes from them. It was exactly for that purpose that the clause was inserted. The operation of this provision was limited to five years because its purpose was to stir up England to help herself. To extend the provision over a long series of years would lead us to put off the time when we should apply ourselves to the formation of this industry. If the industry could not within five years become strong enough to bear its burden, and to hold its own against the chemistry of Germany, it did not deserve assistance. But he was satisfied that, after that period, we should find ourselves capable of doing all that Germany could do. The time had already come for the 50 per cent. provision of the treaty to be carried out. He had been invited by the Board of Trade to be the English representative at Paris on the committee which was dealing with the 50 per cent. and its division among the Allies. That committee had agreed, without prejudice to the ultimate proportion of the shares, that certain advances should be made out of these stocks. Italy, France, and Belgium together were allotted 2,200 tons, Great Britain had the right to 1,500 tons, and the United States also 1,500 tons. The first consignment of our 1,500 tons, he believed, was now on the eve of arriving in this country. He did not think there was any foundation for the idea that other nations were getting their share more quickly than ourselves.

DYE MANUFACTURE IN GREAT BRITAIN.

Regarding the amalgamation of British Dyes, Limited, with Messrs. Lévinstein, Limited, Lord Moulton said this great concern had, in his opinion, such a staff that there was no dye of any importance which they were not prepared to make when they had the plant. The idea that there were secrets unknown to them, the ignorance of which paralysed their efforts, was absurd. It was naturally true that the experience of the Germans had given them skill in getting the last bit of yield out of a combination. We had to learn, and we should learn. It must be remembered that the German combine was one not only of dyeworks, but of chemical works of all kinds, pooling their profits, and capable, therefore, of selling any particular class of things at a loss if necessary, in order to destroy a formidable growing industry in a foreign country. Such a combine as that was sure to give the British company trouble.

He was not surprised at the attacks made in some quarters upon the company. He never expected that England would take up the job of fighting the huge combine that existed in Germany without the persons who were doing it, catching it. One attack which made him very indignant was a suggestion of watered capital. It was utterly unjustifiable and absolutely untrue to suggest that there was anything like watered capital in the company. Dealing with complaints by users that they could not get the quantities they received before the war, he said it was impossible for a company so young at once to give a full range in such quantities as might be demanded. Increase in range was not the solution, because they could give a very large range indeed in quantities insufficient for the industry. They had to aim at satisfying the demand in quantity as well as in the nature of the dyes, and they were doing that as fast as they could. They produced more indigo now than England could consume, and he asked them to compare that with the position four years ago. When he spoke to them last, England produced only one-tenth of the dyes they wanted. He was informed that, by the end of this year, they would be able to turn out within

one-fifth of the amount that England used before the war. The tables were turned. The margin that they wanted importing was a small part; that which they made was the bigger. That, he said, was not a bad account of work done under the paralysing influence of war, and the almost equally paralysing influences of the last few months.

In acknowledging a hearty vote of thanks, Lord Moulton said there had been a good deal of complaint regarding the high prices now asked for dyes. If, however, they considered that two of the prime materials used in their manufacture, benzole and naphthaline, had increased five and four times respectively, they could not say that the high prices were unfair prices.

ANALYSIS OF RESIDUAL ACIDS FROM ETHER MANUFACTURE

AFTER determining the sp. gr. of the liquid, in accordance with a method described by E. C. Carron (*Ann. Chim. Anal.*, 1919, 1, 282-288), the free sulphuric acid is estimated by diluting 5cc. of the sample to 100cc. with water below 15° C., raising the temperature to 15° C., treating 5cc. of the dilute solution with 15cc. of 6 per cent. barium hydroxide solution, and centrifuging the mixture for thirty minutes. The clear liquid containing the barium sulphovinate in solution is decanted, and the precipitate washed with 10cc. of $\frac{N}{5}$ hydrochloric acid to dissolve the excess of barium and any barium carbonate, again centrifuged with water, washed, and finally centrifuged with water, ignited, and weighed. The amount of free sulphuric acid is calculated from the weight of barium sulphate.

Distillation.—150cc. of the sample are distilled between 85° and 90° C., and the distillate collected in a condenser chilled with a freezing mixture to -10° to -15° C. The distillate is brought to 15° C., the volume read, and water then added drop by drop with continual shaking until a permanent turbidity is produced, when the volume is again read. From these data the relative amounts of water, alcohol, and ether are found by reference to a graph constructed by Hascoet from empirical determinations.

Acidity in the Residue.—An aliquot portion of the residue in the flask is titrated with standard alkali, with methyl orange as indicator, and the results are expressed as sulphuric acid. The difference between this result and the free sulphuric acid previously estimated, multiplied by 1.285, gives the amount of sulphovinic acid.

Ether is estimated by distilling 25cc. of the sample from an ether bath, provided with a reflux condenser, at 35° C., with the aid of a slow current of air, and collecting the distillate in a U-tube with one very narrow limb. This contains 8cc. of a nitrochromic reagent, and is immersed in ice-water. The reagent consists of 1.2grms. of sodium and ammonium dichromate, 20cc. of water, and 180cc. of nitric acid (sp. gr., 1.33). The depth of the coloration produced through the formation of chromic nitrate is compared with that given by a range of colorations produced under the same conditions by mixtures of 15 per cent. alcohol with variable quantities of ether. The readings should be made within ten minutes after the ether has distilled, and at a temperature of about 0° C., and it is essential that the current of air should always be drawn through the reagent tubes at the same speed.—*The Analyst*.

INDIAN SESAMUM AND GROUNDNUT CROPS.

THE second sesamum forecast, 1919-20, issued by the Department of Statistics, India, is based upon reports received from provinces which contain on an average 76 per cent. of the total area under sesamum in British India. The returns in this forecast exclude the estimates for the "mixed" crop of the United Provinces, and for the late crop of Bengal and Madras. The final memorandum, which will be published in January, will include, as usual, returns for these crops.

The total area so far reported for the present season is 2,170,000 acres, as against 1,603,000 acres (revised figure) at this time last year, or an increase of 35 per cent. Details of the area by provinces are given below:—

SECOND FORECAST, OCTOBER.

Provinces.	1919-20.	1918-19.	Increase + or Decrease —
United Provinces (unmixed crop).	175,000	125,000	+50,000
Madras	616,000	400,000	+216,000
Central Provinces and Berar	463,000	491,000*	- 28,000
Bombay (including Indian States)	455,000	190,000	+265,000
Bengal (early crop)	167,000	169,000	- 2,000
Bihar and Orissa	168,000	138,000	+30,000
Punjab	82,000	67,000	+15,000
Sind (including the Khairpur State)	32,000	20,000	+12,000
Ajmer-Merwara	12,000	3,000	+9,000
Total	2,170,000	1,603,000*	+567,000

* Revised figure.

Weather conditions have not been quite favourable for the crop, which suffered from heavy and continuous rain in the important sesamum-growing tracts of the Central and the United Provinces; and the present condition of the crop, on the whole, is reported to be fair.

The first groundnut forecast, 1919-20, is based upon reports received from the three provinces of Madras, Burma, and Bombay, which comprise 99 per cent. of the entire groundnut area of British India. The total area sown in the present season in these provinces is estimated at 1,274,000 acres, as against 1,147,000 acres estimated at this date last year, or an increase of 11 per cent. Weather conditions have been favourable, and the condition of the crop is reported to be good. Details for the provinces are stated below:—

FIRST FORECAST, OCTOBER.

Provinces.	1919-20.	1918-19.	Increase + or Decrease —
	Acres.	Acres.	Acres.
Madras	919,000	821,000	+98,000
Burma	235,000	236,000	- 1,000
Bombay (including Indian States)	120,000	90,000	+30,000
Total	1,274,000	1,147,000	+127,000

FERTILISERS IN SOUTH AFRICA.—South Africa, prior to the war, imported large quantities of various kinds of fertilisers and, in fact, almost entirely depended on outside sources for its requirements in this direction. During the war these imports decreased to an alarming extent, the tonnage for 1914 being 59,651, and for 1917, 9,077. Experiments in regard to the production of basic slag and the exploitation of phosphate deposits are being conducted by private companies in various parts of the Union. It is understood that the general attitude of the Government is to leave such questions as the supply of fertilisers to the action of private enterprise.

INSTITUTE OF CHEMISTRY.

ANNUAL MEETING OF THE BIRMINGHAM SECTION.

THE annual meeting of the Birmingham Section of the Institute of Chemistry was held on Monday evening at the rooms of the Chamber of Commerce, Birmingham, Dr. E. W. Smith presiding.

The annual report, read by Mr. F. C. A. H. Lantsberry, M.Sc., hon. secretary, stated that since its inauguration in November last year the Birmingham section had done excellent work. From the outset the committee decided that in matters of technical and scientific interest it would co-operate with the Birmingham and Midland Section of the Society of Chemical Industry, and would largely devote the attention of the section to discussion of professional matters, and to the organisation of the local qualified chemists. With the committee's approval, the Council of the Institute appointed Professor Frankland, Mr. H. Silvester, Dr. Twiss, Dr. Smith, Mr. F. R. H. O'Shaughnessy, and Mr. Lantsberry to act as a committee to interview local applicants for admission to the Institute without examination and to advise the Council as to their suitability for election. The committee had interviewed a number of candidates. Professor Frankland had expressed his desire not to act on that committee, and the committee had requested the Council to add the names of Professor Morgan and Dr. Slater Price to the committee. The number of members of the Institute who had definitely joined the local section stood at 50. This was to be regarded as satisfactory for the first year of working, but the committee hoped there would be a good influx of members in the near future. The report was unanimously approved; Mr. N. P. Booth and Mr. S. R. Carter were appointed to the committee, two other vacancies to be filled later; and on the motion of Mr. H. T. Pinnock, seconded by Mr. H. Silvester, Mr. Lantsberry was unanimously re-elected hon. secretary.

SOCIETY OF CHEMICAL INDUSTRY.

BRISTOL AND SOUTH WALES SECTION.

AT the last meeting of the Bristol and South Wales Section of the Society of Chemical Industry two subjects were brought under discussion—"Sulphur Burners" and the question of "Chemical Engineering."

Mr. Hawkes described fair types of burners, two of the fixed variety, and two movable, and gave some results obtained in burning sulphur on the small scale, indicating how different forms of sulphur behave, the combustion in certain cases being very incomplete, as shown below by one example from figures given.

	Residue	Unburnt.	Ash.
Form A	3.5		0.02
Form B	50.0		0.60

Mr. Humphries gave further information as to the working of sulphur burners, with special reference to the rotary type, dealing more particularly with the question of sublimation.

Professor Hinchley, speaking on chemical engineering, deplored the lack of skilled chemical engineers, and stated that, in spite of the progress made in this country, there was a large amount of plant produced with ease on the Continent which we seemed unable to manufacture successfully. He suggested that what was wanted was a man, not a first-rate chemist or a first-rate engineer, but a man who combined both branches of knowledge in

himself sufficiently to enable him to interpret from one branch of science to the other, at the same time calling in the pure chemist or the pure engineer to consult on any specifically chemical or engineering problems. In the past the chemist and the engineer had been unintelligible to each other; the chemical engineer would provide the "missing link."

OIL-SEED CRUSHING INDUSTRY.

AT the Royal Society of Arts on Wednesday, Mr. John Westall Pearson, chairman and managing director of the British Oil and Cake Mills, read a paper on "The Oilseed Crushing Industry." The seed-crushing trade, he said, was probably one of the oldest industries in the world, and yet it was left for the war to bring about a recognition of its vital importance. The most important developments had been connected with the edible oil refineries. Refining plants made much more rapid progress in North Europe, where the use of oil for edible purposes was so much more general than in England. The consumption of margarine in England to-day, however, was more than three times what it was at the outbreak of war, and the margarine manufacturing plants were now capable of producing over 10,000 tons of margarine per week, whereas not more than 2,000 tons were produced before the war. The enormous increase in margarine and edible fats manufactured in England had created a demand for fine edible oils far in excess of that which previously existed, and, while in past years considerable quantities of the finer oils were manufactured in North Europe and shipped to England, it was hoped that the manufacture of these oils in England, being so largely the product of raw materials grown in our own Colonies, would be retained as a permanent trade for the United Kingdom. Up to the outbreak of war the seed-crushing industry was carried on in this country principally for the sake of cake production. The last five years had brought about a substantial change. Numbers of new plants had been erected whose major object was the production of oil.

The major portion of the oilseed crops of the world, said Mr. Pearson, was produced within the British Empire. The total consumption of oils for industrial and edible purposes in Great Britain was estimated at 600,000 tons per annum. No system had yet been discovered which would enable the whole process of oil manufacture to be conducted automatically from the cooking kettle to the point of oil expression, and this was the stage where there was much scope for economy in manufacture. But in a well-appointed mill, on a pre-war basis, the whole operation of receiving, crushing, cooking, pressing, oil-filtering, and delivery of the produce, inclusive of interest on capital employed, depreciation, power, labour, consumption of stores, and all general working charges, could be carried out for less than £1. per ton.

DUST IN FACTORIES.—The dust in various industrial establishments is found by Professor Winslow, of Yale Medical School, to range from about one-twentieth of a grain of solid particles per 100 cubic feet of air in a good metal polishing shop to twelve grains in a textile factory. But while a carpet or blanket mill yields more dust than such industries as pottery, asbestos, tobacco, and steel-grinding, little of it is inorganic matter, and it is the dust from abrasive materials that seems most harmful and to tend most to produce tuberculosis.

CORRESPONDENCE.

***We do not hold ourselves responsible for the opinions expressed by our correspondents.*

Pulverised Coal.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—May I be permitted to refer to Mr. Harald Nielsen's remarks on the subject of pulverised coal as recorded in the current number of your journal?

Mr. Nielsen is certainly correct when he states that probably American engineers originally got the idea of pulverising fuel from Europe, and he is also right in saying that many installations have existed in England for years where fuel has been burned in this manner. Everyone knows that pulverised coal has rendered the rotary kiln a successful means of burning cement clinker, and that this application affords a simple means of turning the "ash" contained in the fuel into a profit-bearing substance. Mr. Nielsen does not, however, appear to realise that whereas cement-burning in this manner has presented no difficulties whatever—apart from the costly experience gained in preparing and handling the fuel,—yet British, French, South African, German, and men of other nations have attempted over the past 100 years, and failed, to successfully apply pulverised fuel to metallurgical furnaces, stationary boilers, locomotives, and many other purposes. American engineers have definitely solved all the old troubles, and have done so during the past few years.

In America, quite apart from the cement industry, there have been erected, practically during the war period, some hundred installations, embracing open-hearth steel melting, reheating, annealing, puddling, Bushelling, malleable-iron melting, galvanising, and tinning furnaces. All the Anaconda copper-smelting furnaces are pulverised-coal fired, some 1,200 tons per day being used at these works alone. Locomotive equipments have been developed, and the fuel has been tried out on marine boilers. That England is considerably behind is evidenced by the fact that but three plants have been put up during the past twelve months, not one of which is giving complete satisfaction to the owners. Why? Because American experience has not been relied upon to the fullest extent.

That pulverised coal can be dangerous under certain conditions is irrefutable; but iron and steel plants in America, notably the one at Lebanon, have run for sixteen years without any serious accident. Powdered-coal plants can be made as fool-proof as oil or gas plants. Prevent the pulverised fuel from mixing with air until one wishes it to burn in the furnaces, and there can be no possible danger of explosion. Spontaneous combustion is only aggravated when the fine fuel is stored hot from the pulveriser. If stored cold, but a very few coals will give any trouble in this direction. The safe duration period for storage entirely depends upon atmospheric conditions, temperature, and nature of the fuel, for each of which factors "American" experience can apply the remedy. America has found a satisfactory method for delivering pulverised coal daily, weekly, or as required from central supply stations; so why should a system based upon similar practical lines fail in England? Pulverisation to a fineness that but 3 to 5 per cent. residue will remain on a 200-mesh sieve is a standard required for steel open-hearth furnace work only if ash trouble in chequers is to be minimised to the fullest extent.

Returning again to the question of powdered-coal storage, Mr. Nielsen considers that storage in bulk will present an "insurmountable difficulty at any rate for some years to come." Why should this difficulty not be solved within the next twelve months if it has not yet been removed? H.M.A.S. *Skylark* bunkered powdered coal in fair bulk during the war for considerable periods without spontaneous combustion taking place, and bins holding 30 tons of powdered coal have lain idle for several months at Sharron and other places in the U.S.A.—Yours, etc., L. C. HARVEY.

25, Victoria Street, Westminster, London, S.W. 1,
December 2, 1919.

Heat Economy in Chemical Plants.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—Mr. Nielsen has evidently only read your abstract of my paper on waste-heat boilers, etc., which was published in

full in the *Journal* of the Society of Chemical Industry of July 31, 1919, and I have therefore forwarded a reprint of it to him.

I have not recommended temperatures as low as those stated by Mr. Nielsen, and there are no nitrogen compounds in furnace gases. Even nitrogen compounds in gas-engine exhausts are safe at about 200° C., as Mr. Nielsen should know, and for lower temperatures my paper indicates how corrosion can be prevented. As regards pulverised coal, the object of my paper, as stated therein, was only to bring out salient points and useful facts and figures, and not to indulge in controversy. The best answer to Mr. Nielsen's objections to powdered fuel is that in America alone 11,000,000 tons are being burnt annually, and that the Fuel Research Board's first report is a long and valuable one on pulverised coal, which completely contradicts Mr. Nielsen's statements. It is a matter of common knowledge that powdered coal has been largely used for many years in cement kilns; but if Mr. Nielsen has any practical experience of results obtained by, or defects in, modern waste-heat boilers and powdered-fuel plant, let him contribute an article to the technical press on the subject. I can find little in the context to justify the title used for Mr. Nielsen's article, and his misstatements and misconceptions are of so glaring a nature that I feel that it would be waste of your valuable space to reply to them fully. The chief source of wonder to your readers must be not "why I wrote my paper," but why Mr. Nielsen has got no further than discussing an abstract of it four months after it appeared.—Yours, etc., C. J. GOODWIN.

60, Mark Lane, London, E.C. 3, November 29, 1919.

The Anti-Dumping Bill.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—The Anti-Dumping Bill is a profound disappointment to me, as I feel convinced that if it is passed in anything like its present form it will do infinite harm to all industries in this country for the following reasons: It sets up an enormous and expensive bureaucracy (the cost of which no one can foretell); it attempts to treat individual manufacturers in an industry instead of dealing with the industry itself (and this in practice is almost sure to mean partial administration); it will place a heavy burden on all firms affected—constant negotiations with the Board of Trade (involving such additional labour on those controlling the industry as well as on the staff), journeys to London, the filling-in of innumerable forms, etc.; lastly, but most important of all, it postpones the great need not only of all British industries, but of all classes in the country, of a settled industrial policy to which the nation can work and for which plans may be laid well in advance. Periodical changes in the tariff—which are called "fees" in the Bill—mean in practice that manufacturers will not know from one three months to another where they stand.

I am firmly convinced of the pressing need under present conditions for adequate protection against dumping in Britain and for promoting the maximum production in our industries, including agriculture. My opinion of the Bill as it stands is that it will place the maximum of obstacles in the way of British industry, that it will permanently place our industries in the grip of State bureaucrats, and that it will provide the minimum of advantage to British production.

I hope that the Bill may be withdrawn, and a simple, straightforward, and more permanent scheme for developing the productive capacity of this country substituted.—Yours, etc., RICHARD A. COOPER.

6, Carlton Gardens, London, S.W. 1,
November 29, 1919.

AUSTRALIAN IMPORT DUTIES.—The Board of Trade have received, through the Colonial Office, copy of a Bill to amend the Customs Act, 1901-16, which was read for the first time in the Commonwealth Parliament on August 7 last. The Bill proposes, *inter alia*, to repeal Sections 154-6 of the principal Act and to substitute new sections. These sections relate to the basis of valuation of goods for the purpose of levying *ad valorem* duties on their importation into Australia. In the proposed sections no new principle of valuation is introduced, but the order of the provisions has been re-arranged and some other amendments made with a view to making quite clear the basis on which duty is payable, and reducing the number of investigations in the country of export, and so avoiding the consequent delay in the adjustment of duty.

ITEMS OF INTEREST.

UNITED STATES PRODUCTION OF GYPSUM.—The American production of gypsum in 1918 was nearly 24 per cent. less than in 1917, the output having been 2,057,015 short tons, valued at £2,294,000., compared with 2,696,226 tons, valued at £2,223,000. in the preceding year.

ZINC AND ZINC DUST PRICES.—Australian high-grade zinc dust (88-92% metallic zinc) continues in demand at £75. per ton. The price of Australian electrolytic zinc (99-95% purity) remains at £44. per ton f.o.b. Australia for direct shipment to New Zealand, India, South Africa, and the Far East.

MANURE FROM SEWAGE SLUDGE.—An interesting commercial experiment in the production of manure from sewage sludge, is to be made at the works of the Birmingham Tame and Rea District Drainage Board, who have just entered into an arrangement with the British Organic Fertilisers Ltd., who intend to instal plant.

JAPANESE CELLULOSE SUBSTITUTE.—A company has been formed in Japan, with a capital of 100,000 yen, for the manufacture of celluloid substitute, based on the utilisation of albumen obtained from soya-beans, which are available in large quantities at a very low price. The product is stated to be adapted for the same uses as celluloid.

BRITISH ASSOCIATION OF CHEMISTS.—The Bradford and Leeds Section of the British Association of Chemists has held a meeting at the Hotel Metropole, Leeds, for the purpose of increasing the membership of the organisation. Mr. A. C. Wilkinson, of Bradford, presided, and he was supported by Dr. E. P. Hedley, of Derby, Dr. R. B. Forster, of Manchester, and Mr. H. Jennison (secretary), of Bradford.

OIL COMPANY'S DEVELOPMENT.—The Valor Company, of Aston, has bought from the Birmingham Tame and Rea Drainage Board 40 acres of land at Bromford, near Birmingham, for the erection of a factory and workmen's cottages. Alderman Sayer, chairman of the Board, stated that the Valor Company was associated with one of the largest oil-producing companies in the world, and big developments were in prospect. Facilities would be given for the construction of a railway siding on the Midland Railway line.

PATENT OFFICE LIBRARY.—At the conclusion of the meeting of the London section of the Society of Chemical Industry, on Monday, a petition in favour of the Patent Office Library being kept open until 10 p.m. as in pre-war days, was presented for the signature of the members, who appeared to be strongly in favour. The Presidents of the Society of Chemical Industry and the Chemical Society have formally signed the petition on behalf of their respective societies, and when complete it will be presented to the President of the Board of Trade.

RAILWAY INEFFICIENCY.—In a letter to *The Times* Mr. G. E. Howard, of Messrs. Howards and Sons (Limited), chemical manufacturers, Ilford, says: "The whole trading community is groaning under the utter inefficiency of the Government control of railways. Every day we receive letters from customers all over the country bitterly complaining of delays in delivery of our goods. To-day we think the record has been broken, since we hear from Wakefield that a small consignment of chemicals dispatched from here by us on June 12 reached its destination on November 24. What the result would be of nationalising the railways and placing the organisation completely into the hands of Government officials, one hardly dares to contemplate."

IMPERFECT PROTECTION OF WOOD.—Wood is not wholly protected from moisture by varnishing, which is shown by tests of the U.S. Forest Products Laboratory in Wisconsin to have only a retarding effect. The woods used were yellow birch, basswood, red gum, African mahogany, white ash, white pine, sitka spruce, southern yellow pine, bald cypress, incense cedar, white oak, western yellow pine, Port Orford cedar, and sugar pine; but there was no perceptible difference in the different species in the moisture absorbed through the coating. Three coats of high-grade spar varnish were applied to four panels of each species, two panels being brush-coated and two dipped with a special machine designed to give an even coat. The panels were dried 72 hours between coats and 10 days after the final coat; and were then exposed 17 days to an atmosphere practically saturated with moisture. The brush-coated panels all absorbed between 5 and 6.5 grammes of moisture per square foot of surface; the dipped, between 4 and 5 grammes.

BUSINESS NOTICE.—We are informed that as Mr. S. F. Waters is taking a less active part in the business of S. F. Waters and Co., 85, Gracechurch Street, London, E.C., he is admitting into partnership his two sons, Mr. Eric Noel Waters and Mr. Hardy Bedwell Waters, who for the past four years have been serving in France and Belgium with the forces, and Mr. Philip William Milner, who has been associated with Mr. Waters for fifteen years and with the army for the last two years.

CEITUARY.—We regret to announce the death of Dr. Jacob Grossmann, consulting chemist and chemical engineer, of Manchester. Dr. Grossmann was a practical authority on the question of sewage disposal, and during recent years was also closely interested in the problem of nitre-cake utilisation, a number of patents having been taken out by him on this subject. He was an original member of the Society of Chemical Industry, and was well known to the members of the Manchester Section of that society.

CATALYTIC REDUCTION OF HALOGEN ACETIC ESTERS.—In the course of a communication on this subject to the French Academie of Sciences, MM. P. Sabatier and A. Mailha said that at 300° C. ethyl chloroacetate can be reduced by hydrogen in presence of nickel to ethyl acetate, some aldehyde and ethylene being formed by secondary reactions. Under similar conditions ethyl dichloroacetate can be reduced to the monochloroacetate, and ultimately to ethyl acetate. The reaction can also be applied to ethyl trichloroacetate and ethyl bromoacetate.

TEACHING OF METALLURGY AT NEWCASTLE.—Professor Henry Louis, speaking at a meeting of the Newcastle branch of the Institution of British Ironfounders, said it was a matter of profound regret that, at Armstrong College, Newcastle, there was not the proper equipment for teaching the science of metallurgy as it ought to be taught. The metallurgists in the North-east district did not appear to have realised what they owed to themselves and their industry, no less than to the leading educational institution in the district. They had never made the slightest effort to equip a metallurgical department worthy of that important industry. A properly staffed and properly equipped metallurgical department would be the centre of research for the entire district. He urged, as a business proposition, that it would be worth while establishing such an institution where problems could be worked out which would benefit the industry as a whole.

OIL SHALE IN MONTANA.—One of the few places where a plant has already been installed for the distillation of oil from shale is near Dillon, Montana, states the United States Geological Survey. The shale at the site selected for the operations is a part of the phosphate formation, which contains the beds of rock phosphate that are mined at several places near Bear Lake, in south-eastern Idaho, for the manufacture of fertiliser. Phosphate beds are also associated with this shale in the vicinity of Dillon, and although they are neither so thick nor so rich as the beds in south-eastern Idaho, they have some prospective value. Soon after it became known that there was shale in the Dillon region from which oil could be distilled, certain promoters began to organise companies to drill for oil in that region, and the search has been carried on persistently in spite of the fact that the geological conditions there are almost wholly unfavourable to the occurrence of oil.

LEAD POSITION AND PROSPECTS.—A remarkable change, says *The Times*, has taken place in the position of lead during the past few months. In the early part of the year there was a superabundant stock of lead in the world, largely in the hands of various Governments. With consumption at a very low point these stocks, with the expectation of a reasonable maintenance of production, were a serious menace to the market, which showed signs of being overburdened, and prices fell heavily. Under the stimulus of low prices, consumption quickly revived throughout the world, particularly in the corroding and electrical industries, and it has assumed very large proportions. Simultaneously, owing chiefly to labour troubles, production has fallen rapidly; and with the drop assuming serious dimensions, instead of a market overburdened with supplies, there are now serious fears of a scarcity. The outlook suggests the necessity of replenishing supplies from America, as there are still no signs of a resumption of work at Broken Hill; and even if there were, the output will be very low for some time to come. It is understood that the Government policy is to do everything possible to restrict exports of lead until such time as the outlook becomes clearer.

PRICE OF POTASH SALTS INCREASED.—It has been found necessary to modify the terms on which the high-grade potash salts recently acquired by the Government from Germany in exchange for food, will be sold in Great Britain. On and after December 1 the prices announced by the Board of Agriculture and Fisheries in Leaflet No. F. P. 494/S. 1 will be raised by 5s. per ton. Manure mixers, merchants, dealers, and co-operative societies should in future send their orders to the Fertiliser Manufacturers' Association, Ltd., 155, Fenchurch Street, London, E.C. 3.

LUBRICATION INVESTIGATION.—In addition to routine work on lubricating oils, a great deal of effort has been given by the U.S. Bureau of Standards to the testing of lubricants used in the dynamometer laboratory. The results obtained appear to indicate that airplane engines consume oil faster than they deteriorate it. Apparently, this is the case with both paraffin and naphthene base lubricants. Progress has been made in the standardisation of the Waters oxidation test, and the indications are that it will be possible to carry out this test with very small and inexpensive apparatus.

SALE OF AMMONIA-SODA COMPANY'S WORKS.—Messrs. E. Rushton, Son, and Kenyon, at the Albion Hotel, Manchester, on Tuesday, offered for sale the freehold estate and works of the Ammonia-Soda Company, Limited., at Plumbley and Lostock Grlam, including the Manor of Holford. The land at Plumbley, on part of which the works are erected, comprises a total area of 159½ acres, and there are also two plots of land with wharf on the canal and a cottage at Lostock Grlam, containing 1½ acres. All the property is freehold and free from chief rent. Included in the sale was the plant and machinery, laboratory, mechanics', smiths', and joiners' shops, and the stock. The price obtained was £110,500.

FATALITY.—The Birmingham City Coroner (Mr. Isaac Bradley) on November 28 conducted an inquest respecting the death of Frank Ernest Sevier (33), machine oiler, who died at the Queen's Hospital on Tuesday from extensive burns received while following his employment at Hales Owen Steel Works. Sevier told his wife that he slipped and fell into the pickling tank, which contained a pickling solution of about 10 per cent. of sulphuric acid to a depth of 3ft. The works engineer stated that the pickling solution was kept hot by steam pipes, and was used for cleaning brass rods. When the machinery was being oiled it was stationary. The oiler stood on the edge of the tank. Following the accident, Sevier got into a pool at the rear of the acid tank, and said he did so because he was so hot. It was stated that to obviate a similar accident in the future a mechanical oiling apparatus had been installed. A verdict of "Accidental death" was recorded.

SURFACE TENSION OF OILS.—A new method of determining the surface tension of oils was recently described by K. Grunmachner and W. Bein in Vol. LX. of the Scientific Transactions of the Imperial Standardising Commission, Berlin. Two glass plates were vertically mounted on a base; by means of screws they can be moved so as to form a wedge of a small adjustable angle. The oil is fed into the space between the two plates and rises by capillary attraction, the liquid boundary taking the shape of an equilateral hyperbola. In order to facilitate measurements, a series of confocal hyperbolæ is photographed on one of the glass plates. To hasten the settling of the oil, which may take a long time, the plates are moved to and fro by means of a micrometer screw. The surface tension values thus obtained for various oils—turpentine, olive, resin, castor, hemp oil, etc., and also benzene—agree with the values determined by Wilhelm's meniscus method. —*Engineering*.

FIRES.—Owing to the overhear of a boiler, there was a serious and disastrous outbreak of fire in the premises of Messrs. T. and W. Farmiloe, Ltd., paint, glass, and white lead works, of 88, Nine Elm Lane, S.W., last week. The damage was very heavy, and would have been very much more serious except for the prompt arrival of the fire brigade, with a large force of men and motor appliances from all the surrounding stations. At Hull a fire occurred on the steamship *Queen Maud* while the vessel was discharging oil. There were large quantities of paraffin, lubricating oil, and colza oil on board, but the flames were confined to the store room, bunkers, and the engine-room. The damage was considerable.—On Monday night considerable alarm was caused in Alloa by an outbreak of fire in the Alloa Copper Works, situated in Bridge Street. The ventilating shafts on the roof of the main workshop were ablaze, and the roof soon caught fire. Strenuous efforts were being made to confine the flames to the copper works.

TUNGSTEN AND MOLYBDENITE (SUSPENSION) ORDER, 1919.—The Minister of Munitions has suspended the operation of the Tungsten and Molybdenite Order, 1917, which dealt with tungsten-bearing ores and tungsten metal alloys and salts, and molybdenite and molybdenite metal, alloys, and salts as from October 17, 1919.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

(SPECIALLY CONTRIBUTED.)

The demand for coke for export which renders the coking and by-product industry more independent of the pig-iron industry in Cumberland and North Lancashire than has ever been the case for many years has come at a time when the coal position is by no means a good one. The reduction of the price of household coal hits the Cumberland collieries very hard, for to the ten per cent. of the output which goes to local landsale there has to be added the 25 per cent. of output which is absorbed by Ireland. Part of the latter has been steam coal and part household coal, but Irish merchants now refuse to accept other than household coal. Cumberland coal owners are equally determined that the proportions which have been observed before shall obtain still. The result is that very little coal is now being shipped to Ireland, and there is being thrown on the local market far more coal than can be used. How long this state of affairs will continue it is impossible to say, but naturally there is much confusion and it seems certain that some weeks must elapse before things are straightened out again. Meantime the make of coke is gradually increasing, and directly trucks can be secured to enable shipments to be made on the East Coast it is believed that all the ovens will resume full activity. At present some of them are working at less than a third of their capacity. The local absorption of coke remains about normal, with a tendency to become smaller as the depression in the iron trade deepens. East Coast coke supplies to West Cumberland this week are 5,000 tons and to the Furness district, 15,000 tons. There is a brisk demand for benzole, and the make is insufficient to meet requirements. Sulphate of ammonia is a fair market.

THIRTY YEARS AGO.

From the "Chemical Trade Journal" of December 7, 1889.

Liquid Fuel.—Oil for locomotives in place of coal will be largely introduced on one of the southern railways soon. It is probable also that petroleum refuse will be used for fuel, in consequence of the high price of coal.

The Manufacture of Sugar by Diffusion.—The Washington Department of Agriculture has just issued a report on the work done at the Magnolia Plantation in Louisiana during the past year in the manufacture of sugar by the diffusion process, which is described and illustrated in great detail. In 1885 the attempt to introduce the process failed by reason of defective machinery. In 1886 Louisiana cane was sent to Kansas, and there treated by the new process. It yielded fully 30 per cent. more than by the usual milling process. In 1887 diffusion was successfully introduced into Louisiana, and it is to this that the report refers. During the current year it will be at work in four Louisiana plantations. The practical result is that while previously the average yield of sugar per ton of cane on the best plantation was scarcely 145lb., it is now over 200lb. Moreover, there is already growing up a more scientific agriculture, a better knowledge of the problems of sugar manufacture, a more scientific method in the sugar house, and the introduction of improved machinery.

Smokeless Powders.—They promise to be as numerous as explosives of the nitro-glycerine group. Every new moon brings into being a new smokeless powder; and, if we may believe the accounts of it, that now invented by Herr Swab, of the Stein powder factory in Austria, beats anything of the kind in point of efficiency. It burns slowly in the open air, giving off so light a smoke that it resembles the haze above an ordinary chamber lamp. It has scarcely any smell; but it ignites with extraordinary rapidity, giving to a projectile an initial velocity of 630 metres (693 yards), instead of 530 metres (583 yards). The invention of another smokeless powder by Herr Siersch is reported from Presburg, in Hungary. It is described as "slate-coloured triple azotate" (nitrate), and "most powerful."

FERTILISER NEWS.

(SPECIALLY CONTRIBUTED.)

Nitrate of Soda.—Although in normal times, before the war, the country dealers were in the habit of making "forward" purchases for spring delivery, they are showing no interest in the Chilean fertiliser at the present moment, the bulk of the small business passing being for export. The chief cause is, naturally, the extremely high price of the commodity compared with that of sulphate of ammonia, which latter has, moreover, for several years been extensively, and with satisfactory results, used as a substitute by the British farmer. In spite of the enhancement curiously enough decreed by the Board of Agriculture—and still, it may be added, accompanied by vexatious formalities,—sulphate is in nitrogenous contents far cheaper than nitrate, and the preference given to it is therefore not to be wondered at. Owing to the currency depreciation already referred to in these columns, nitrate of soda is very much dearer abroad than in this country, yet there is said to be an active demand on the part of Continental consumers, this, however, not applying to Germany and Austria, formerly the largest buyers, since it is officially admitted that they are altogether out of the market. Some mystery still attaches to the total of sales made in Chili by the Nitrate Producers' Association, the figure of 25 million quintals, or 1,140,000 tons, named at the recent meeting of the Santa Catalina Company being considerably below that hitherto reported. So satisfied, nevertheless, is the Association with the progress made that it has decided again to raise its limits—the third time since the institution of "fixed prices" three months ago,—and confidence is expressed in an early rehabilitation of the industry. The crux lies in the supply of tonnage, and the publication of the November shipments from Chili, together with the "loadings," is awaited with more than ordinary interest. The reinsurance rate on the *Cap Horn*, mentioned in our last issue, has risen to 50 quineas per cent.

German Potash and American Buyers.—The fuel question, which is so severely paralysing the German output of potash, it is sought to assuage by the use of heavy oil-engines, which might be installed with the aid of the Government for the particular purposes of helping the exchange situation. It is stated by United States representatives in Berlin that that country is ready to accept delivery of a milliard marks value in potash. The point made in connection with this is of peculiar interest when we remember the struggle that took place between the American potash people with the German Government for possession of certain potash properties in Germany—viz., there is no danger now of such a conflict, because the mere fact of the socialisation situation in Germany as it affects even the potash concerns rules out the possibility of any potash concern in the country acting independently.

Sulphate of Ammonia.—This material still moves off steadily, the higher prices which are to prevail in the near future certainly tending towards earlier trading. Amounts available for export are declared to be scarce, and manufacturers are reported to have as many orders in this department as they can conveniently handle at the time being. The export price is still declared to be round about £25 per ton.

Potassic Super.—This material, which has been mentioned more and more of late, has apparently an increasing sale, which is perhaps not surprising considering that potash for the last few years has been practically unobtainable. Moreover, it is declared to be a very economical way of supplying two important plant foods at the one dressing, neither of which is washed out of the soil by early application. The price is given as £9. 2s. 6d. per ton.

Potash.—The price of the high-grade potash salts recently acquired from Germany in exchange for food has now been raised 5s. per ton, and it is requested that all orders should be sent to the Fertiliser Manufacturers' Association. This increase raises the official maximum prices to the following figures: Potash salts, 30 per cent. potash, £12. 15s. per ton; muriate of potash, 80 per cent., £20. 17s. 6d.; and sulphate of potash, 90 per cent., £23. 7s. 6d. The 30 per cent. description appears to be the sort most available at the moment. The imports of Alsatian potash salts into the United Kingdom during the week ended November 29 were 1,541 tons sylvinitic 14 per cent., and 950 tons sylvinitic 20 per cent. Current quotations are as follows: Sylvinitic, 14 per cent. (French kainit), £7. per ton; sylvinitic, 20 per cent. (French potash salts), £8. 7s. 6d. per ton; muriate of potash, 80 per cent., £19. 7s. 6d. per ton.

Bone Meals.—So far as can be gathered from a limited market, the various descriptions of these appear to be dearer, although pure dissolved bones at about £15. 5s. are said to sell well. East Indian bone meal is still badly wanted, but not coming forward.

Slag and Super.—Whilst the output of basic slag seems to show some slight increase, deliveries are still delayed. At the same time, demand is continuous. The world-shortage of phosphates, of course, affects the superphosphate market, and very little help, apparently, can be expected yet from America. The demand is still good for 30 per cent. at £7. 15s., 33 per cent. at £8. 10s., and 35 per cent. at £9.

Other Fertilisers.—Fish guano is in good demand, and it is hoped that larger quantities are coming forward. The price of £15 to £18. per ton is quoted for material analysing from 8—9 per cent. ammonia and 2—14 per cent. phosphate. Cyanamide or nitrolim is apparently being preferred in France to nitrate of soda, although the price is said to be too high for any to ship to England. The recommendation has been published that cottonseed hulls might be useful for fertiliser material, for they could be put upon the market in an available character at from £6. to £8. per ton.

Nitrate of Lime.—This material is again on the market, but now in granular form. Sales are being affected at £19. to £20., c.i.f., British port.

SOUTH WALES NOTES.

(SPECIALLY CONTRIBUTED.)

There is no abatement in the extraordinary demand for tinplates, but manufacturers are experiencing difficulties in their endeavour to materially increase the output. Some sections of the employees have handed in seven days' notice to terminate contracts, but these are described as irregular and a violation of the last clause of the Industrial Council agreement. Several works in Briton Ferry were stopped on Monday owing to a few men not turning up. During the week 156,753 boxes were shipped, and the receipts from the works totalled 66,629 boxes, leaving stocks in dock warehouses at 170,857 boxes against 132,679 boxes at the corresponding date last year.

Mr. H. Dyer Lewis, H.M. Chief Inspector of Mines, has been elected president of the South Wales Institute of Engineers.

At a joint meeting of the South Wales and Bristol branch of the Society of Chemical Industry, and the South Wales Institute of Engineers, a paper was read by Professor Illingworth, of the School of Mines, Treforest, on "Chemistry and Coal." The paper emphasised the desirability of uniform methods of coal analyses to arrive at accurate conclusions and in order to determine the best uses of typical coals. He urged that the blending of coals for fuel purposes and for coking needed profound attention, because until such time as we discovered the salient points in the chemistry of coking coals, we should not be in a position to determine the best mixtures for particular cokes. The great friability of the South Wales coals and the consequent production of large amounts of small coal necessitated constant attention being paid to the problem of their efficient utilisation. If we were to progress every colliery must have its own chemist irrespective of whether or not that colliery was engaged in by-product work.

An important meeting was held on Monday at the Swansea Metal Exchange. The gathering included metal extractors, acid makers, patent fuel manufacturers, and representatives of practically all industries in that area. Some very strong remarks were made as to the serious delays that exist on the railways, and it was stated that if something was not speedily done many works would have to close down. The complaints were of a bitter kind, and the meeting resolved to send a deputation to the Government on the matter.

SUBSTITUTE FOR BARIUM PLATINOCYANIDE.—Barium platino-cyanide, so long used for fluorescent screens in viewing objects under the X-rays, has been made very expensive by the enormous increase in the cost of platinum. After long experimenting, P. Roubertie and A. Nemirowsky have found a substitute in certain tungstates, and with cadmium tungstate claim results even superior to those with the old screen. This new material is exempt from permanent phosphorescence, is unchanged by atmospheric or X-ray action, and gives an agreeable and easy photographed white luminescence with black shadows.

PARLIAMENTARY NEWS.

Gretna Explosives Factory.

In the House of Commons, Mr. R. Young asked the Parliamentary Secretary to the Ministry of Munitions to what use, if any, the Government intend putting the large plant at Gretna; whether the valuable machinery is being or is to be sold; what is to be done with the splendidly equipped power-stations; and whether inquiries will be made for the purpose of ascertaining how it can be utilised to develop industry in the district?

Mr. Kellaway: I am not yet in a position to make a definite statement as to the future of Gretna, but I hope that as a result of inquiries now proceeding a decision will soon be reached.

Cement Manufacture and Coal Prices.

Major Prescott asked the President of the Board of Trade whether the 8s. per ton increase in the price of cement due to the 6s. advance in the price of coal will now be taken off by the cement manufacturers; and whether a still further reduction will be made corresponding to the fall in the price of coal?

Mr. Bridgeman: As the reduction in the price of coal does not extend to industrial coal, I should not expect it to have any effect upon the price of cement.

British Dyestuffs Corporation.

Major Barnes asked the President of the Board of Trade if any legal instrument exists embodying the modified terms of the agreement between the President of the Board of Trade and the British Dyestuffs Corporation.

Mr. Bridgeman: No, sir. The earlier agreement is still operative so far as it is applicable in the changed circumstances.

Patent Office Library.

Mr. Bridgeman, replying to Sir M. Conway, said: The desirability of reopening the Patent Office Library in the evening has not been lost sight of, but there have been difficulties in making the necessary arrangements owing to depletion of staff. Arrangements will be made at the earliest possible date to keep the library open every evening for several additional hours.

Oil Borings.

Mr. Kellaway, in answer to Lieut.-Colonel Clay, said: Until the oil bore-holes now in progress have reached lower horizons, it would be premature to express an opinion on the success or otherwise of the operations. The Hardstoft well is the only one which has been completed to date, and this has given an average weekly production of 1,734 gals.—a figure which, it is anticipated, will be largely increased when pumping machinery has been installed. No estimate of the cost per gallon raised can be usefully formed at this stage, but the cost of drilling has necessarily been high on account of the heavy cost of materials and freight during the war and the necessity for protecting the coal seams encountered. The question of placing the industry upon a satisfactory financial basis is one which is largely dependent upon the early passage of legislation which is contemplated dealing with oil rights.

Patents.

Mr. Doyle asked the President of the Board of Trade if he will consider the advisability of bringing in a Bill to improve and cheapen the facilities for persons of limited means to take out patents and to prevent any patentee from selling more than 50 per cent. of his interest in his invention to his employer?

Mr. Bridgeman: In reply to the first part of the question, I would direct attention to the Bill to amend the Patents and Designs Act, 1907, at present under consideration in another place. If this Bill receives the Royal Assent, it is hoped that it will improve facilities for obtaining the grant of patents. Under the present practice of the Patent Office, all possible help and assistance is given by the staff to every inventor in preparing the specifications and other documents necessary for obtaining patent rights.

Export Duties on Palm Kernels.

Mr. Dudley Ward, in reply to Lieut.-Commander Kenworthy, said: The French Government have imposed export duties on oleaginous produce shipped from French West African Colonies to all destinations, including France. It is therefore evident that these duties have not been levied

as a retaliatory measure for the duty imposed on palm kernels exported from British West African Colonies to destinations other than the British Empire. I have no information as to other similar export duties imposed by any other country.

Sir Francis Blake asked the Parliamentary Secretary to the Board of Agriculture whether he intends to introduce legislation at an early date giving to fishery boards and other bodies responsible for the protection of rivers fuller powers than they now possess for dealing with questions of pollution by trade effluents and domestic sewerage?

Sir A. Boscawen: I hope it will be possible to introduce legislation next session upon this subject.

Ministry of Munitions and the Sale of Fertilisers.

Mr. Hohler, on Monday, asked the Parliamentary Secretary to the Ministry of Munitions if he will give the names of the articles comprised under the head, Fertilisers' Account, on which the profit of £237,000. was made; and explain how they make this profit, and state what profit per ton his Department makes and exactly what his Department does to earn this profit?

Mr. Hope: The articles comprised under the head "Fertilisers" are phosphate rock, pyrites, and sulphate of ammonia. The sum of £237,000. mentioned in the question does not represent profit, but is the excess of cash receipts over cash payments for the period under review—namely, April 1, 1919, to September 30, 1919. My hon. friend will see that this is a very different thing from a realised profit on the transaction as a whole.

Mr. Hohler: What does the Government do to earn this money? That is what we want to get at.

Mr. Hope: They sell the material to the best advantage.

Mr. Holmes: Does not the answer of the hon. gentleman mean that the stock in hand has not been taken into account, and, therefore, the profit is far more than the figure shown on the paper?

Mr. Hope: If my hon. friend means that the stock has not yet been disposed of, that is true. The transaction began before the beginning of this financial year, and I do not know whether it will be concluded within the financial year.

German Dyes.

Major M'Kenzie Wood asked the President of the Board of Trade the quantity of dyes which have been consigned from Germany to this country, and whether any have yet been received; whether the values to be credited to Germany have yet been fixed; and whether the price to be paid by consumers is to be fixed on the principle laid down in the Export and Import Regulation Bill?

Sir A. Geddes: Approximately 200 tons out of a quantity of about 650 tons so far requisitioned are now on the way, but have not yet been received. The Reparation Commission has not been formally established, and consequently no final decision has been taken as to the values to be credited to Germany. The prices to be charged to consumers will be announced shortly.

Messrs. Lever Brothers' Acquisitions.

Mr. Sugden asked the President of the Board of Trade whether his attention has been drawn to the recent absorption of Messrs. Loders and Nucoline, Ltd., by Messrs. Lever Brothers, Ltd.; whether he is aware that this is a continuation of a policy which has been followed for some time by the firm in question; whether trust-like operations of this nature are threatening with extinction a large number of smaller firms who are thus finding it more and more difficult to obtain suitable supplies of materials; and whether he proposes to take any action in the matter?

Sir A. Geddes: My attention has been drawn to the statements that negotiations in the direction indicated in the first part of the question have been taking place. Investigations into a number of combinations, including one into the position in the soap industry, are being made under Section 3 of the Profiteering Act by the Standing Committee on Trusts, and I propose to await their reports before considering what further action, if any, is desired and practicable.

Basic Slag.

The Parliamentary Secretary to the Board of Agriculture (Sir Arthur Boscawen) in reply to Mr. Forestier Walker on Tuesday, said: It is quite possible to obtain basic slag of a higher percentage of total phosphates than 24 per cent. During the five months ending October 31, 1919, the total deliveries of basic slag containing upwards of 24 per cent.

total phosphates amounted to 66,200 tons. The real cause of any shortage that may exist is the greatly increased demand. The production of high-grade slag is not directly dependent on the agricultural demand, but is primarily a question of steel works practice. Over this practice the Board have no control.

Government's Loss on Spelter.

Mr. Bridgeman replying to Mr. Bird said: Under an agreement made in September, 1918, between the Ministry of Munitions and the British zinc smelters, spelter produced from zinc ore purchased with the approval of the Ministry was taken by that Department at a standard price plus increased costs of fuel and labour. This agreement was in force until November 5 last, and under it the prices paid to the producers by the Government were considerably in excess of the prices realised on sale to consumers; but I am not at present in a position to state the actual loss resulting from the arrangement, which was entered into to avoid the closing down of the smelting works.

LEGAL INTELLIGENCE.

Picric Acid Pots Dispute.

Mr. Wm. Hassall, trading as C. W. Outram, fireclay manufacturers, of Woodville, Derby, was plaintiff in an action partly heard at Derby and concluded in London on Tuesday by Mr. Pollock, High Courts Official Referee, in which he claimed against Brooke's Chemical Company, Ltd., £1,330. 4s. for the supply of pots for the manufacture of picric acid.

The plaintiff's case was that the contract to supply the pots was partly verbal and partly in writing contained in certain letters which passed between the parties during September, 1915, and the claim was made up of one account of £465. 4s., another of £756., and a sum of £9. for discount on a previous account which defendants had agreed to pay. The verbal part of the contract, it was alleged, was made between plaintiff and defendants' managing director.

The defendants did not admit the contract so far as the alleged verbal portion was concerned, and said that it was wholly contained in the letters which passed between the parties in July, 1917. They admitted that a discount of £9. had been deducted in error, but said that it was duly credited in a subsequent account and paid. They denied indebtedness so far as £565. was concerned, and claimed that they were entitled to set off against the plaintiff's claim the price of goods which were not in accordance with the contract, and were defective and unfit for the purpose for which the defendants required them. They denied having ordered 108 80gal. pots, which, at the date of their refusal to accept them, were, they said, not in a deliverable state. Generally, they alleged that the pots were not equal to sample, and that some of them cracked and broke soon after they were put into use, in consequence of which they lost a good deal of material, about 55lb. per 80gal. pot and 27½lb. per 40gal. pot of the value of 2s. 2d. per lb. They had suffered loss in this way from 70 80gal. pots to the extent of at least £417., and about £9. from the 40gal. pots. They contended that they were justified in refusing to take delivery of 108 pots, and, while denying indebtedness, paid £183. 6s. into court. They counter-claimed £474. for pots which were defective and not in accordance with contract, and £426. in respect of pots which broke when used.

The Official Referee, in giving judgment, said he was of opinion that Mr. Hassall accepted the responsibility as to the thickness of the pots, but he would not guarantee them for three months. He only undertook to supply the 80gal. pots equal to those which had been previously supplied, and the question was whether they were equal. He criticised adversely the evidence of Mr. Hassall in regard to this matter, and particularly in relation to his communications to the Ministry of Munitions. There were two questions to be decided: Firstly, whether the defendants had shown that the claim of £565. was not justified; and, secondly, the defendants said that there were so many bad pots supplied that their counter claim for loss overtopped the claim. He was satisfied that the defendants had made out their case that the goods were not in accordance with contract. The plaintiff therefore failed in his claim for £565., and the defendants succeeded in their counter claim. In the result he found for the defendant on the claim and on the counter claim for £2. 11s. 5d., with an order for payment out to them of the £183. paid into court.

Phosphates for Munitions: Action in Prize Court Against Crown.

In the Prize Court, on Tuesday, the Skanska Superphosphate and Svafvelsyre Fabriks Aktiebolaget claimed damages from the Crown, or, alternatively, the fair value of a cargo of phosphate rock on the *Consul Olsson*, in respect of which the appraised value of £16,420. was paid into court by the Crown after the Government had requisitioned the cargo. The vessel went to Swansea to discharge.

The Crown, it was stated, seized the cargo because the well-known firm of Beer, Sondheimer and Co., of Frankfurt, were found associated with the transaction; but as it was found that they had sold to the claimants f.o.b. at Tampa, in Florida, and there was no enemy interest, the goods were released as innocent; and as they had been requisitioned, the appraised value was paid into court. This, claimants said, was not enough.

Mr. Wright, K.C., for claimants, said the rate of appraisal was 88s. per ton, and the amount of moisture had been deducted twice over. He suggested the minimum should be five guineas a ton, and that sum, in point of fact, was at the time offered on behalf of the Ministry of Munitions. The claimants were enormous buyers of phosphates, and as the goods had been used by the Crown, and it was admitted they were not contraband or destined to Germany, it followed that they were entitled to something. Of the £16,000. paid into court, part had gone to the claimants and part to the shipowners, and the shipowners were represented in court and entered a claim. The phosphate was seized at the end of October, 1915, and distributed to certain munition factories. The Ministry of Munitions was charged with the settlement of the claims, and it was then that the offer of five guineas was made—a direct offer to pay, fixing a minimum, which, counsel submitted, was equivalent to payment into court. As to market value, the Ministry of Munitions during the war wanted this stuff, and if it had not been for this and another cargo that demand would entirely have changed the position as to price and value. This fact had to be borne in mind in approaching the question of values here.

Mr. Robert A. Munro, of the firm of Robert A. Munro and Co., phosphate merchants, of Glasgow, said that phosphate came from two places, America and the Mediterranean, and the Mediterranean phosphate was not so well suited to the requirements of the munitions people. It was of a lower grade, with a lower unit of phosphate content. It was more expensive to handle. At the end of 1915 the price of the goods at shipping ports would be 3½ dollars per ton of 68 per cent. quality, and on top of that the freight would probably be 5 guineas a ton. The price could be put at £6. a ton.

The hearing was adjourned.

Caustic Soda Contract Dispute.

A claim for damages for the alleged breach of a contract to accept and pay for 300 tons of caustic soda was heard by Mr. Justice Roche in the Commercial Court of the King's Bench Division on Thursday (November 27). The action was brought by The Produce Brokers' Company, Ltd., of Exchange Chambers, St. Mary Axe, London, against Widenmann Broicher and Co., Ltd., of London House, Crutched Friars; P. D. Leake, of Abchurch Lane; and Cowan Bros., Ltd., of London House, all of London.

Plaintiffs' case, opened by Mr. G. Herbert Head, was that by a contract note dated May 2, 1918, made between them and the first-named defendants (Widenmann's), plaintiffs agreed to sell 300 tons, 5 per cent. more or less, caustic soda at £46. per ton, delivery to be taken by buyers *ex* warehouse or cars New York not later than September 30, 1918, payment net cash in New York against delivery order. The claim was for £8,647. damages for failing to accept and pay for the caustic soda. By an order of the Board of Trade of August 9, 1918, made under the Trading with the Enemy Acts, the second-named defendant (Leake) was appointed controller with power to sell the business carried on in the United Kingdom by Widenmann's, and the controller sold the business to the third-named defendants (Cowan's), one of the terms of the sale being that Cowan's should take over and satisfy the liabilities of Widenmann's. Plaintiffs wrote to Leake and Cowan's calling on them both to open credit in New York where delivery of the goods was to be taken. There was no credit opened, and the result was plaintiffs had to sell against defendants. There had been a previous contract with Widenmann, Broicher and Co. in September, 1917, and the

defence set up was a claim for rectification of the 1918 contract on the ground that defendants entered into it on the understanding that it was identical with the 1917 contract, except for an extension of time. The real difficulty in the case had arisen in this way:—When the 1917 contract was made there was an embargo in the United States against the export of caustic soda. There was a great deal of correspondence, but throughout the negotiations under that contract it was never suggested that it was the duty of the plaintiffs to obtain the export licence. After a time there was a suggestion of arbitration. Arbitration fell through. Then the 1918 contract was entered into. It was perfectly clear, said counsel, through the whole of the interval between the first and the second contracts, Widenmann, Broicher and Co. regarded it as their duty to get the export licence. Now they turned round and claimed rectification of the 1918 contract.

Mr. Raeburn, K.C., on behalf of Cowan Bros., Ltd., said he had advised his clients that rectification was out of the question. There was no defence to the claim under the second contract. Therefore that meant judgment for the plaintiffs against somebody.

Mr. Ricketts, for the defendants Widenmann, Broicher and Co., and P. D. Leake, submitted that he was entitled to an indemnity from his learned friend's clients.

After arguments by counsel, his lordship gave judgment against Widenmann, Broicher and Co. with costs; judgment for the defendant Leake, with costs; and judgment for Cowan Bros., Ltd., without costs.

Customs Seizure of Pyrogallol Acid.

In the King's Bench Division on Thursday (November 27), before Mr. Justice Sankey, the hearing was resumed of the action brought by the Crown, through the Attorney-General, against John Brown, trading as Brown and Forth, of Manchester and London. The case related to restrictions on imports by the prohibition of the import of pyrogallol acid, and was reported fully in our last issue.

Mr. Wright, K.C., on behalf of the respondent, said he could not contend that there would be any limitation under the Proclamation if the legislature had vested in the executive a universal power to prohibit goods of any kind whatever. If that was the case it must be expressed in clear terms. The Proclamation did not contain an absolute and general prohibition. It must be treated as a whole. If it was a general prohibition it was good, but if it merely amounted to this, that the Government could stop the importation of any goods they liked it was bad.

His Lordship: Bad in part makes the whole thing bad?

Mr. Wright said that was so, and submitted that they could not cut off the first part of the Proclamation from the proviso in the Act that the prohibition did not apply to goods imported under licence.

His lordship reserved judgment.

A Bankrupt's Discharge.

At the London Bankruptcy Court on Friday of last week an application was made for the discharge of Richard Maloney, of 11, Aberdeen Park, Highbury, and lately residing at 15, Lambolde Road, Hampstead.

The Official Receiver reported that the Receiving Order was made on July 2 last on the petition of a creditor. The liabilities expected to rank against the estate for dividend were estimated at £5,293., and the assets had realised £2. 10s. In March, 1917, the debtor became interested in a certain secret process for the manufacture of glaze and enamel, and in June, 1917, he agreed to purchase for £4,000. a two-fifths interest in the invention. The purchase consideration was satisfied as to £3,000. in cash and the balance in fully paid shares in a company which it was proposed to form, to acquire one of the processes with a nominal capital of £100,000., of which he was to have received £40,000. Of the £3,000. he actually paid £2,350., mainly with money advanced for that purpose, but no company was floated, and since July last he had been in employment.

The learned registrar granted the debtor an immediate discharge subject to his consenting to judgment for £5.

The Price of Benzole.

At the Complaints Tribunal of the Central Committee under the Profiteering Act, sitting at the Hotel Windsor, London, the Woodcock Motor Company, of Epsom, brought

a complaint against Messrs. S. Bowley and Son, Ltd., of Battersea, the allegation being that 2s. 6d. a gallon was charged for benzole, while other companies delivered at 2s. 4d. Counsel for the respondents stated that they bought the spirit at 2s. 1½d. per gallon, and consequently made a profit of 4½d. per gallon. In the case of an ordinary delivery, where benzole was only one of the commodities carried, a profit was made. In this actual case a special delivery was rendered necessary, involving the use of a five-ton lorry. The firm estimated that they had incurred a loss on the transaction of between 30s. and £2. It was stated by the manager of the firm that there was no actual "ring" in the trade, but there was an inclination on the part of big combines to hold a monopoly of the supply. One firm's contract compelled sale at 2s. 8d. a gallon.

The Chairman said there was, in the opinion of the tribunal, no case of profiteering. At the same time they were inclined to think, from the evidence given, that an attempt was being made to create a "corner" in the market, and they proposed to bring that fact before the Development Committee sitting for combines and trusts.

Co-partnership Dispute.

The disputes which the co-partnership scheme of Messrs. Lever Brothers has caused among trade unionists were mentioned to Mr. Justice Peterson in the Chancery Division on Friday of last week, when the plaintiffs in Braithwaite and Others v. the Amalgamated Society of Carpenters, Cabinet Makers, and Joiners moved to restrain the defendants from expelling or excluding them from the society on the ground that they were participating in the co-partnership scheme.

Mr. Cunliffe, K.C., for the plaintiffs, said the motion would have to stand over for further evidence, but he wanted an undertaking to protect his clients meanwhile. If the purported expulsions were acted upon it would be extremely serious for the plaintiffs. It would not only jeopardise their position in the society, but would also jeopardise their position with Messrs. Lever Brothers. Therefore he wanted the defendants to direct their branches to take no steps.

Mr. Wright, for the defendants, said all he could do was to undertake to preserve the *status quo*, and he understood that that undertaking had been accepted by the plaintiffs' solicitors.

Mr. Cunliffe said he feared that such an undertaking would be no protection for his clients.

In the end the motion stood over until after Christmas on the defendants' admission that none of the plaintiffs had been expelled and on their undertaking to preserve the *status quo*.

Seizure of Gas Mantles.

Judgment has been given at the Thames Police Court, London, in favour of Mr. Bendeker, a Dutch manufacturer, of Arnhem (Holland), in a case which has been pending since 1915.

The Customs authorities seized some 60,000 incandescent gas mantles, on the ground that they contained more than 25 per cent. of German material. The magistrates decided that Mr. Bendeker had proved the construction of the mantles from old mantles and United States cotton, and awarded 25 guineas costs against the Customs authorities.

Goonvean China Clay Company.

In the Chancery Division on Friday of last week Mr. Justice Astbury heard a motion in the case of Varcoe v. Varcoe for an injunction restraining five members of a partnership called the Goonvean China Clay and Stone Company from disposing of the property of the partnership to the Goonvean China Clay and Stone Company, Ltd.

Mr. Romer, K.C., who appeared for the plaintiffs, who were four other members of the partnership, said that the five defendants were a committee of management, and they had recently caused the purchasing company to be incorporated. A sixth defendant represented those members of the partnership who assented to a resolution under which the committee purported to sell or proposed to sell the assets of the partnership.

Mr. Micklem, K.C., for the defendants, said it was thought that it would be a great advantage to the co-adventurers in this company to turn their adventure into a limited company, and at the meeting that was held there was a large majority in favour of it. However, this action in court had defeated

the plan. He would give an undertaking in the terms of the notice of motion, and further, that they would not register any transfers in the books of the company.

The undertaking was accepted and the motion stood over until the trial.

Plytol Chemical Company, Ltd.

In the Chancery Division on Friday (November 28), Mr Justice Astbury made an order confirming a special resolution of the Plytol Chemical Company, Ltd., altering their memorandum of association so that they might carry out the business of manufacturing disinfectants, sheep dips, chemicals, and oils, in addition to selling and dealing in them.

Sulphide of Sodium Contract.

On Wednesday, Mr. Justice Bailhache had before him the question of an arbitration in the case of the British and French Chemical Manufacturing Company, Ltd., against Ofverborg and Company. The defendants were represented by Mr. W. Allen and the plaintiffs were not represented by counsel.

This was a special case stated by arbitrators, said counsel in opening, raising questions in regard to a contract for the sale of 20 tons of sulphide of sodium made in June, 1917. In May, 1918, the British and French Chemical Manufacturing Company had not delivered the goods under the contract, and the matter went to arbitration with the result that the delivery of the whole of the 20 tons was to be made in October, November and December, 1918. The company did not carry out the award and the goods were not delivered. The matter again went to arbitration, and the arbitrators in their award found that there had been a breach of contract on the part of the sellers by reason of their failure to make any of the deliveries under the first award. The sellers asked for a special case to be stated for the opinion of the Court as to whether upon the true construction the first award constituted a valid and binding contract for the sale of goods. The buyers' contention was that any such question should have been raised when the first award was made. The arbitrators in the second arbitration said if the Court held that the first award was a valid and binding contract then the sellers should pay the buyers £450 damages. Counsel now argued that the first award was a valid and binding contract by which the sellers were bound, and that as they had not chosen to attack it at the time it was enforceable and the buyers were entitled to the goods delivered and the dates fixed in the award.

His Lordship remarked that if the award was bad on the face of it the sellers were not bound to take any notice of it. If the sellers were completely in default in not delivering any goods now, could they be ordered to deliver the goods at a subsequent date? It was really a case of a claim for damages for breach of contract. The contract was ended and there had been a complete breach. What power had the arbitrators to fix dates of deliveries when there were no such dates in the contract? He was asked whether on the true construction of the first award it was a valid and binding contract for the sale of goods by the chemical manufacturing company, and the answer to that was obviously "No." It was not a contract at all.

Mr. Allan argued that after all it was an award that finally determined the rights of the parties.

His Lordship: It may be a good or a bad award, but it certainly is not part of the contract.

Mr. Allan asked that the case might go back to the arbitrators.

His Lordship: No. If people will go to arbitration they must put up with the disadvantages of it. I answer the questions put by the arbitrators in the negative. The award is not a valid and binding contract.

SWEDEN AND RAMSAY MEMORIAL FUND.—*Reuter's* Stockholm correspondent states that with reference to the British Ramsay Memorial Committee's application to Sweden to pay £60,000, on condition that a Swedish chemist should every year be granted a Fellowship with the object of studying and making researches at the institution in England, the famous chemist, Professor Arrhenius, strongly advocates that the Government should ask the Riksdag to grant the necessary funds, on the ground that the Swedish holder of the Fellowship would undoubtedly get the most ample opportunity of learning the best and latest scientific results obtained in England and her large dominions and colonies.

REPORTS OF COMPANIES.

Castner-Kellner Alkali Company, Ltd.

The twenty-fourth ordinary general meeting was held in London on Wednesday, the Right Hon. G. W. Balfour presiding. The chairman, in moving the adoption of the report and accounts, said that the net profit for the year amounted to £190,655., and the balance available to be dealt with that day was £17,876. The board recommended the appropriation of £50,000. to depreciation reserve, increasing that to £637,500., the sum of £70,000. to the payment of a final dividend of 7 per cent., making 13 per cent. for the year, and that the balance of £51,876. should be carried forward. The figures were disappointing. For a series of years, both during the war and before it, they had been accustomed to a dividend of 20 per cent.; no dividend as low as 13 per cent. for the year had been declared since 1908. Whilst sharing the regret the shareholders must naturally feel at this setback, he hastened to add that, in his opinion, it was not likely to be of more than a temporary nature. The falling off was first of all due to the general uncertainty in business, which had led to a diminished demand for their products, with an equivalent reduction in output, which had the double effect of diminishing sales and greatly increasing the cost of production. They had also been faced since the beginning of the year by further demands for increased wages, and the cost of raw materials had risen enormously—the cost of fuel in particular. The sale price of their products had also risen, but, during the year under review, not in proportion to the rise in the cost of production. A return of trade to normal conditions would remedy many, if not all, of the disadvantages from which the company had been suffering, and he was glad to say that signs of such a return were already visible on the horizon.

Mr. John S. Parkin seconded the motion and it was carried unanimously.

Liverpool Nitrate Company, Ltd.

The report for the year to June 30 last states that, pursuant to the resolution for amalgamation with the Colorado Nitrate Company, Ltd., passed at an extraordinary general meeting held on November 28, 1918, the called-up capital of this company now stands at £64,800., divided into 259,200 shares of 5s. each fully paid. The assets and liabilities of the Colorado Nitrate Company, Ltd., are incorporated in the present balance-sheet. The premium paid upon the shares issued in exchange has been carried to a special account. The profit for the year was £84,355., and £12,432. was brought in, making £96,787. The directors recommend a further dividend of 5s. per share, free of tax, payable on December 5, making, with the interim dividend paid last May, a total of 7s. per share, free of tax, for the year. As a member of the Association of Nitrate Producers, which came into force at the end of November, 1918, the company is limited in ratio to the sales effected by the Association. By the addition of the allotment of the quota which the Colorado Nitrate Company would have received, it has been possible to concentrate manufacture and keep oficinas Ramirez and Mapocho running. Consequently, oficinas San Donato and Carmen Bajo were closed down in January and March last, and advantage was taken of the stoppage to overhaul the machinery.

Bryant and May, Ltd.

An extraordinary general meeting will be held on December 10 for the purpose of considering a resolution to the effect that the capital of the company be increased from £1,480,000. to £2,000,000. by the creation of 520,000 new shares of £1. each, of which 320,000 shares shall be ordinary shares and the remaining 200,000 shares shall be partnership shares. It is also proposed to make various alterations in the articles of association, so that the scheme of co-operative profit sharing with the workers, referred to in the last annual report, may be carried into effect.

Huelva Copper and Sulphur Mines, Ltd.

After providing £1,173. against repairs to buildings, and writing £8,413. off development, the accounts for the year to June 30, 1919, show a loss of £4,227., from which must be deducted the credit balance of £1,746. brought in, leaving a debit balance of £2,481. to be carried forward. Last year, after providing £2,112. against repairs to buildings, £5,000. against depreciation of plant and machinery, £9,016. expended on mines and development, writing £6,500. off

minerals in cementation and £5,322. off development, and including the £8,978. brought in, a credit balance of £1,746. was carried forward.

Cassel Cyanide Company, Ltd.

The accounts for the year to September 30 show a net profit of £69,866. and £18,881. was brought in, making £88,747. Further dividend of 1s. 6d. per share, making 2s. per share for the year; carrying forward, £18,247.

Loders and Nucoline, Ltd.

The directors report for year ended August 31 last that after providing for bad and doubtful debts, depreciation and sinking fund instalments, there remains £70,376., which with £11,984. brought in makes £82,360. The board recommend final dividend of 12½ per cent. on ordinary, making 20 per cent. for year.

Lagunas Syndicate, Ltd.

Accounts for the 12 months to June 30 show gross profit of £41,480., from which has been deducted London expenses, income tax, interest, and discount, £8,126.; debenture interest, £15,702., leaving £17,652., which has been transferred to the sinking fund in accordance with the resolution of debenture-holders of December 14, 1914. It has been decided to install oil fuel, and a plant for South Lagunas has been ordered.

Alby United Carbide Factories and Nitrogen Products and Carbide Company.

The extraordinary general meetings of shareholders of the Alby United Carbide Factories, Ltd., and the Nitrogen Products and Carbide Company, Ltd., were held in London on November 27, when the necessary resolutions regarding the amalgamation were confirmed.

Courtaulds, Ltd.

The directors have decided to recommend to the shareholders the issue of one bonus share for each share held, based upon the capitalisation of the company's general reserves. The board are of opinion that the company's capital reserve investment in shares in the Viscose Company continues to appreciate in value; but they do not recommend that any action be taken at present in the way of the capitalisation of this reserve.

Anglo-Persian Oil Company, Ltd.

The profit for the year to March 31, after allowing for depreciation, etc., amounts to £2,010,805., and £154,722. was brought in, making £2,465,527. Deduct £1,200,000. reserved for excess profits duty and the following appropriations: Debenture stock redemption reserve, £80,000.; preference share reserve, £50,000.; general reserve, £300,000.; and amortisation reserve, £100,000.; leaving £735,527. The directors recommend a dividend at the rate of 10 per cent., free of tax, on the ordinary shares, leaving £275,527. to be carried forward. In view of the largely extended operations of the company, it has been decided to increase the capital of the company to £20,000,000.

Bleachers' Association, Ltd.

The directors declare a dividend at the rate of 8 per cent. for the half-year, or 4 per cent. actual, against 2½ per cent. actual a year ago. The gross profits were £782,457. and the net profits £549,940., and £546,831. is carried forward to next half-year.

Malayan Tin Dredging Company, Ltd.

The report for the year ended June 30 states that the profit for the year, after allowing for depreciation, was £40,497. After payment of dividends as declared, there is an available balance of £47,868. A final dividend of 1s. per share is declared, making 5s. per share, or 25 per cent., for the year; and the balance, out of which has to be provided the liability for excess profits duty, is carried forward. The total quantity of tin ore produced was 702½ tons, which realised £109,957., or an average price of £156. 10s. per ton, as compared with £161. 6s. 2d. for the previous year.

DIVIDENDS.

BROXBURN OIL COMPANY, LTD. A dividend of 7½ per cent. actual, free of tax, on the ordinary shares.

BRITISH CYANIDES COMPANY, LTD.—Interim dividend at 10 per cent. per annum (1s. per share), free of tax, on ordinary for half-year.

UNITED PREMIER OIL AND CAKE COMPANY, LTD.—Directors have decided to pay on account of profits for first financial period ending December 31, 1919, interim dividend of 5 per cent., free of tax, on ordinary.

SULPHIDE CORPORATION, LTD.—Final dividend of 7½ per cent. on the ordinary shares, making 15 per cent. on both classes of shares for the year ended June 30.

NEWS FROM THE ANTIPODES.

(FROM OUR OWN CORRESPONDENT.)

SYDNEY, October 6.

Alsation Potash for Australia.—The Commonwealth Government steamer *Australpeak* left Amsterdam on August 23 for Adelaide, Melbourne, and Sydney, via Genoa and Messina. At Rotterdam the *Australpeak* loaded the following quantities of Alsation potash: For Adelaide, 441 tons; for Melbourne, 500 tons; for Sydney, 2,022 tons. Prior to the war Australia imported about 10,000 tons of potash annually from Germany.

Kauri Oil Works in New Zealand.—The kauri oil works, erected for the Parenga Gumfields, Ltd., at a cost of £10,000., have been completed and the machinery has been given a satisfactory trial. The capacity of the plant is 4,500 gals. weekly, and it is anticipated that a ton of peat will yield 75 gals. of oil. Subsequent to the engineer's inspection, the works will officially be opened.

New Zealand Sulphur.—It has never yet been satisfactorily settled whether or not there exist in New Zealand workable sulphur deposits of sufficient magnitude to warrant their exploitation, says the report of the Parliamentary Industries Committee. As pointed out by more than one witness, it is incumbent upon the Government to put the matter to the test, and the committee recommends accordingly.

Australian Chemical Institute.—The annual election of the committee of the Victorian branch resulted in the return of Professor Masson as president, Mr. B. T. Paton as hon. treasurer, Dr. F. H. Campbell as hon. secretary, and Messrs. V. G. Anderson, C. S. Dawes, W. F. Cuming, and R. J. Lewis as members of committee. The annual report shows that the membership of the Victorian branch is 212, and that that of the institute as a whole approaches 600.

Calcium Carbide Manufacture in New Zealand.—One of the recommendations of the Parliamentary Industries Committee is that an effort should be made as early as possible to give practical effect to a proposal made for the manufacture of calcium carbide. On a comparatively small capital outlay, the whole of the needs of the Dominion of New Zealand could be met and a considerable quantity be available for export.

Chemical Market.—Chemicals have been generally firm, but business has been only of moderate dimensions. Average distributing quotations were as follows:—Alum: Japanese £30., English £32. per ton. Arsenic: White £65., grey £60. per ton. Bluestone: Macclesfield's £55., Japanese £40., U.S.A. £50. per ton. Boracic acid, £96. per ton. Borax: Powdered or lump, £55. per ton. Carbide: Tasmanian £36. per ton, Alby 75s. per drum of about 2 cwt., Japanese 32s. per 100 lb. drum, Canadian 45s. per cwt. Carbolic acid: English, 98 per cent., 9s.; colonial, 8s. 6d. per gallon. Citric acid: 4s. 3d. per lb. Tartaric acid: 8s. 11d. net per lb. Cream of tartar: 95 per cent., 3s. 1½d.; 99 per cent., 3s. 1½d. per lb. Cyanide: 98 per cent., 1s. 4d. per lb. Quicksilver, 7s. 3d. per lb. Resin: G grade, £52. 10s.; N grade, £55. per ton. Soda: Silicate, liquid, £22.; bicarbonate, in kegs, English, £16.; soda ash, £15.; soda crystals, £9. 10s.; caustic soda, English, 76 per cent., £26.; American, 76 per cent., £23.; 98 per cent., £50. per ton. Phosphorus, 5s. 6d. per lb. Sulphur: American flowers, £36.; Japanese common, £18. per ton. Oxalic acid, 2s. 6d. per lb. Chloride of calcium, £20. per ton. Whiting, English £16., Danish £14. per ton.

BOOKS RECEIVED.

The Institute of Chemistry: Register of Fellows, Associates, and Students. August, 1919.

Alcohol: Its Production, Properties, and Application. By Charles Simmonds. Pp. 574. London: Macmillan and Co.; 21s. net.

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

November 24th to 29th (inclusive).

Treatment and Reduction of Sulphide Refractory, etc., Ores. Angel, H. R. 29,213.
 Ferro-chrome Alloys. Ballantine, W. B. 29,216.
 Carbonisation of Coal. Beilby, G. T. 29,817.
 Neutralisation of Fatty Acids in Fats and Oils. Bolton, E. R.; and Lush, E. J. 29,705.
 Vulcanisation of Rubber, etc. Brierley, J. T.; Leyland and Birmingham Rubber Company; and Lunn, R. W. 29,381.
 Blending Oils and Fats. Calvert, G. 29,533.
 Coke Ovens, etc. Coke and Gas Ovens, Ltd.; and Cooke, A. H. J. 29,767.
 Mixing and Agitating Machines and Appliances. Coleman, G. F. 29,238.
 Obtaining Hard Springy Copper by Electro-deposition. Coles, S. O. Cowper-. 29,847.
 Gas Calorimeters. Davidson, W. B. 29,631.
 Dyes. Davies, L. J. 29,358.
 Treatment of Fine Ores. Dorr Co. 29,302.
 Recovering and Utilising Solvent from the Air which Passes Away from Apparatus for Extracting Oil, Fat, etc. Downs, C.; and Melton, J. W. 29,781.
 Recovery of Zinc by Electrolysis. Electrolytic Zinc Co. 29,504.
 Conversion of Hydrocarbons. Fleming, R. 29,490.
 Condensing and Treating Distillates. Fleming, R. 29,491.
 Producing Oxygen and Ammonium Carbonate. Foster, J. 29,775.
 Deacidification of Raw Wood-pulp Liquor. Grätz, B. 29,474.
 Flux for Welding. Groves, W. E. 29,844.
 Condensing Apparatus. Hick, Hargreaves, and Co., H. 29,460.
 Sulphuretted Hydrogen, etc., Generating Apparatus. Keenan, H. W.; and Richardson, S. 29,399.
 Zinc Oxide. New Jersey Zinc Co. 29,293.
 Metal Oxides and Other Compounds of Metals. New Jersey Zinc Co. 29,297, 29,303, and 29,539.
 Sulphide Composition for Painting which Resists Action of Light and Heat. Nishizawa, Y. 29,417.
 Distillation of Coal, Shale, Peat, Wood, etc. Oddy, T. 29,347.
 Purifying or Refining Hydrocarbons. Oddy, T. 29,348.
 Light Hydrocarbons, etc., for Motor and Lighting Purposes. Oddy, T. 29,349.
 Obtaining Vulcanised Rubber Goods and Materials. Peachey, S. J.; and Skipsey, A. 29,172.
 Concentration of Sea-water. Reid, T. A. 29,754.
 Combined Disinfectants and Perfumes in Solidified Form. Sandy, M. E. 29,450.
 Granulating Calcareous Cyanamide to Enable it to be Employed as Ammonia-potassic Fertiliser. Savès, P. 29,378.
 Nitrocellulose or Celluloid Compounds. Stevenson, W. J. 29,295.
 Pure Potash Salts. Wilderman, M. 29,625.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 6d. in stamps to the Comptroller, Patent Office Sales Branch, 25 Southampton Buildings, Chancery Lane, W.C.

The numbers in heavy type are those under which the Specifications will be printed and abridged and all subsequent proceedings will be taken.

1917.
 Oxidation of Ammonia. Adams, H. E. F. Gould; Partington, J. R.; and Rideal, E. K. 9,653. **135,224**
 1918.
 Continuous Fractional Distillation of Petrols, Petroleum, Benzole, and the Like. Barbet et Fils et Cie, E. 10,341. **117,615**
 Edible Product Obtained from Beet. Kestner, P. 14,969. **135,235**
 Removing the Tar from Tar-containing Liquids. Barbet et Fils et Cie, E. 16,457. **120,558**
 Current-regulating Devices for Electrically Heated Crucibles, Retorts, Muffles, Melting Furnaces, and the Like. Morgan Crucible Co.; and Speirs, C. W. 16,673. **135,237**
 Treatment of Vegetable Fibrous Materials and the Production of Detergents. Amber Size and Chemical Co.; and Weygang, G. 16,825. **135,240**
 Potassium Chloride. Dutt, E. E.; and Dutt, P. C. 17,083. **135,246**
 Crucible Furnaces for Melting Aluminium and the Like for Casting Purposes. Price, C. F. 17,151. **135,247**
 Barium Oxide. Pierce, J. B. 18,993. **135,285**
 Deodorising and Purifying Oils and Fats. Calvert, G. 19,126. **135,295**
 Treating Pyrolusite. Jorgensen, C. V. 19,266. **135,305**
 Grinding, Crushing, and Pulverising Mills. Wake, J. F. 19,770. **135,322**
 1919.
 Sulphuric Acid. Dawson, H. Royal-. 265. **135,359**
 Paints. Goldthorpe, E. T. 1,462. **135,368**
 Distant Liquid Level Indicators. Badin, R. E. 3,682. **123,729**

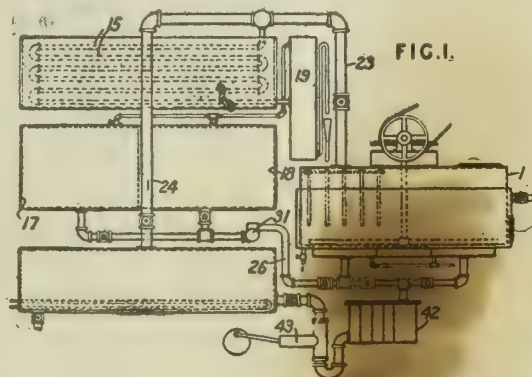
COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

1919.
 Manufacture of Catalysts. Brochet, A. 29,002. **135,510**
 Porous Charges for Containers for the Storage of Explosive Gases Dissolved in Liquids. Pintsch Akt.-Ges., J. 29,003. **135,511**

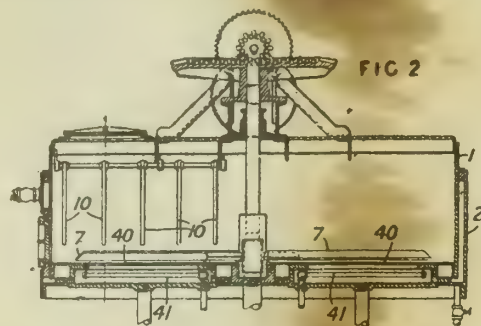
ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Extraction of Fats and Fatty Oils. F. B. Dehn, Westminster. (A communication from the Cobwell Corporation, Cleveland, Ohio, U.S.A.) British Patent, 133,075, of 1917.

In the extraction of fats and oils from moist materials such as garbage, offals, fish, meat, and vegetable substances, including seeds and beans, the material is treated with a solvent insoluble in water at such a temperature that the water and solvent are boiled off together, the quantity of solvent in the extraction chamber being kept constant by suitable additions. After the evaporation of the water is complete, the solution of fat is drawn off and the material is treated with a further quantity of solvent. The solvent used at this stage has a boiling-point below 100° C. The apparatus, Fig. 1, consists of a shallow extraction chamber 1 fitted with a heating-jacket 2 and communicating by a vapour pipe 23 with a condenser 15. From the condenser,



the condensate flows through a water separator 19 to one or other of two storage tanks 17, 18, according to the type of solvent used. The quantity of solvent in the extraction chamber 1 is kept constant by returning solvent to the chamber by means of a pump 31 in the pipe-line 26. At the close of each stage, the solution of fat is drawn off through a mud-separator 42 and is forced by a pump 13 into a still, which communicates by a vapour pipe 24 with the condenser 15. The extraction chamber, Fig. 2, contains a thin layer of material submerged in solvent, and an undulatory movement is imparted to the material by rotating, curved, and inclined blades 7 which move over the bottom of the chamber. Co-operating with the stirrer 7 are a number of freely-swinging arms 10 which stir the upper surface of the material. To



prevent the formation of deposits on the bottom of the chamber 1, a scouring material, such as broken bones, is placed in the chamber. To recover residual solvent, the material in the chamber 1 is raised to above 100° C. by the heating-jacket 2, and steam, admitted by open steam-pipes 41 arranged below the foraminous bottom 40 of the chamber 1, is passed through the material.

Explosives. W. Rintoul, T. J. Nolan, and Nobel's Explosives Company, Ardeer Factory, Stevenston, Ayrshire. British Patent, 131,389, of 1918.

This invention consists in the use in nitrocellulose explosives of urethanes containing, attached to the nitrogen atom, two aromatic groups, one of which is a benzyl or substituted benzyl group, such as phenylbenzylurethane, or benzyltolylurethane.

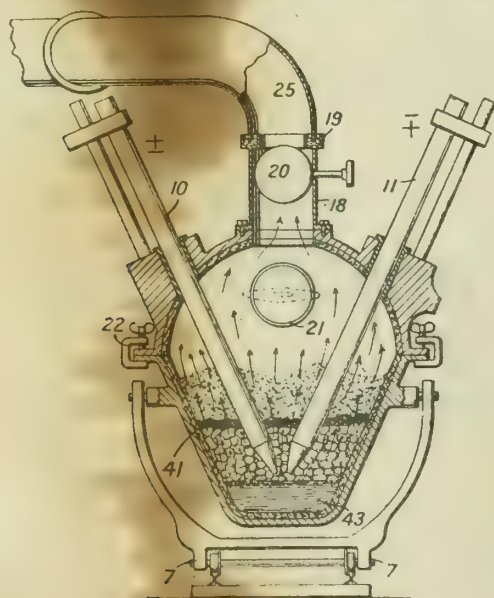
These urethanes have a gelatinising action on nitrocellulose. Other gelatinising agents and stabilising agents may be added. One example contains nitrocellulose 50 per cent., nitroglycerine 41 per cent., benzylparatolylurethane 8.5 per cent. or phenylbenzylurethane 8 per cent., and ethylbetanaphthyl ether 0.5 per cent. or diphenylurethane 1 per cent. These urethanes are prepared by adding ethylchloroformate to secondary amines suspended or dissolved in an aqueous or alcoholic solution of sodium carbonate. They may also be prepared like other urethanes; for example, phenylbenzylurethane may be prepared by the action of sodium ethylate on phenylbenzylureachloride, or of benzylchloride on the sodium derivative of phenylurethane.

Hydrocarbon Oils. G. F. Forwood, and J. G. Taplay, London. British Patent, 133,059, of 1916.

Hydrocarbon oils are hydrogenated, cracked, or treated for the removal of sulphur by bringing their vapours mixed with steam at temperatures between 450° and 600° C. into contact with a form of carbon that is capable of decomposing steam with the production of nascent hydrogen at those temperatures. The forms of carbon used include lamp-black, soot, charcoals derived from wood, cellulose, and lignite, and carbons obtained by carbonising oil residues and other organic bodies at temperatures below 600° C. The process is applied to the treatment of coal oil, shale oil, petroleum, and lignite oil. In examples, kerosene is cracked at 570° C., cracked spirit is hydrogenated at 500° C., and shale spirit is desulphurised at 530° C. The products are led to a condenser and thence to a scrubber, where they are washed with creosote oil. After desulphurisation, the products are washed with dilute caustic soda to remove sulphuretted hydrogen.

Carbides. J. H. Reid, Pittsburgh, Pennsylvania, U.S.A. British Patent, 133,098, of 1918.

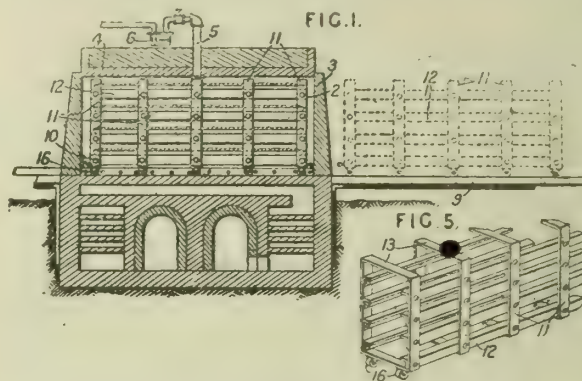
Hot gases from the reaction zone of an electric carbide furnace, in which the charge is heated by its resistance, are passed through a raw mixture of carbonaceous material and metal oxide, to prepare the mixture for conversion. This preheating may take place in the furnace itself. Bituminous coal mixed with lime or barium oxide may be fed into the upper part of the electric furnace through a charging-door 21. Intimate mixing of the materials takes place in an intermediate layer 41 in which the evolved gases agitate the



plastic charge. The electrodes 10, 11 are maintained out of contact with the fused product 43. In starting the furnace, about 5 per cent. of powdered coke may be added to the mixture to increase its conductivity. The furnace is pivoted to a carriage 7 running on rails. A domed cover is held by external clamps 22. In the cover is a gas-outlet pipe 18 with damper 20. A sweating section 25 of the outlet pipe may dip into a fusible seal 19. The gases may be led to a condenser and reservoir.

Cyanogen Compounds. F. L. Slocum, Pittsburgh, Pennsylvania, U.S.A. British Patent, 133,105, of 1918.

The production of cyanogen compounds from nitrogen and a carbide, which as calcium carbide, with or without a catalyst, and the production of ammonia from the product, is effected in one apparatus by a continuous series of operations. The apparatus described comprises a series of furnace chambers 2, each having end doors 3 and a top 4, with an outlet 5 for the gases passing through a trap 6. Extending from one end of the heating-chamber is a platform 9 for the charging-rack. The rack consists of a frame 10 comprising uprights 11, side pieces 12, and cross-pieces 13. The rack is provided with rollers 16 and carries perforated trays,



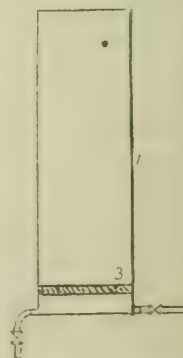
which may be provided with a lining of wire mesh. The rack is moved into and out of the heating-chamber by means such as a ram. To carry out the process, the heating-chamber containing the carbide is filled with nitrogen under slight pressure and heated to 1000° C. When the reaction is effected, the product is allowed to cool in the chamber to about 450° C., and steam is passed in to produce ammonia, which is collected. The rack is then removed and the trays re-charged or the temperature of the furnace chamber is raised to 850° C. to expel water and carbonic acid from the residue.

Acetaldehyde. H. W. Matheson, Shawinigan Falls, Quebec, Canada. British Patent, 132,557, of 1918.

Acetaldehyde is prepared by passing acetylene in large excess through a sulphuric acid solution of approximately 6 per cent. strength containing mercuric oxide at a temperature of 40-65° C. and a pressure ranging from atmospheric to 4 lb. per sq. in. above atmospheric. The requisite amounts of water, acid, and mercuric oxide to keep the reaction liquid uniform are added periodically. The process is carried out in iron-silicon vessels as described in Specification 115,899. The mercury sludge formed in the process may be regenerated by the processes described in Specifications 132,559 and 132,560.

Forming Nitrates by Bacterial Oxidation. C. I. Thorssell and H. L. R. Lunden, Gothenburg, Sweden. British Patent, 132,882, of 1918.

The bacterial oxidation of ammonia, ammonium compounds, or organic nitrogen compounds to form nitrates is effected in a vessel 1 in which is supported, on a perforated grating or on a disc of charcoal or firebrick 3, a substance which will act as a base, such as calcium carbonate or hydrate or magnesia. A solution of nitrate from a preceding operation, and therefore containing bacteria, is poured into the vessel, the solution to be oxidised is added, and air is blown in below the support 3 and rises in a divided form through the liquid. When the oxidation is complete, part of the liquid is drawn off, and a further quantity of solution to be oxidised is added. A filtering-layer of coke, gravel, sand, charcoal powder, or powdered firebrick may be placed below the support 3 or may take the place of the support.



Fuming Sulphuric Acid. British Dyes, Ltd., J. Turner, and W. B. Davidson, Huddersfield. British Patent, 132,923, of 1918.

Fuming sulphuric acid of high strength (40–80 per cent. SO_3) is produced by a continuous process in which fuming sulphuric acid of low strength (20–40 per cent. SO_3) resulting from the contact process is heated to dissociation point by the hot gases from the contact plant, the sulphur trioxide evolved being absorbed in more fuming sulphuric acid of low strength, and the stripped acid returned to the absorbers of the contact plant.

Recovering Mercury in Acetaldehyde Manufacture. H. W. Matheson, Shawinigan Falls, Quebec, Canada. British Patent, 132,559, of 1918.

The mercury sludge resulting in the manufacture of acetaldehyde is allowed to stand, the separated liquid is drawn off, and the solid portion is neutralised with alkali and then heated to 100–125° C.; this partly decomposes mercury compounds, and the liquid mercury is run off. The residue is dry-ground in a ball-mill to remove more mercury, and the material is then heated to 100–500° C. to carbonise it; the liberated mercury is then separated by flotation from the carbon particles.

Dyes. G. B. Ellis, London. (A communication from Chemical Works, formerly Sandoz, Basle, Switzerland.) British Patent, 132,995, of 1919.

Disazo dyes are obtained by coupling tetrazotised 4 : 4'-diaminodiphenyl-2 : 2'-dicarboxylic acid with *o*-oxycarboxylic acids of the benzene series; salicylic acid, 4-oxisophthalic acid, *o*-cresotinic acid, and *m*-cresotinic acid, are specified as components. The products give yellow shades when printed on cotton with chromium or chromium-aluminium mordants.

Detanning Chrome Leather. M. C. Lamb, London. British Patent, 132,864, of 1918.

Chrome leather is detanned and the material used for making glue or gelatine. The chrome leather is immersed in a solution of an organic acid containing two or more hydroxyl groups. Suitable acids are phthalic, lactic, tartaric, succinic, malonic, and oxalic, preferably the last-named. The chromium is recovered from the solution, and the detanned material treated in the usual way for making glue, etc.

Purifying Coal-gas, Etc. E. Bury, O. Ollander, and A. F. Bury, Salthurn-by-Sea, Yorkshire. British Patent, 133,159, of 1918.

Peat-coke, prepared by distilling air-dried peat at a temperature of from 700° to 900° C., is used for the absorption of gases and vapours, such as methylene, benzene, propylene, toluene, xylene, sulphuretted hydrogen, carbon bisulphide, and organic sulphur compounds from the products of distillation of organic material. The absorbed products may be separated by fractional distillation or otherwise. The peat-coke is placed in vessels, preferably combined with scrubbers, and the gases passed over it at approximately normal pressure and temperature. When the peat-coke has been used for some time, it is removed through air-tight mains into a heating-vessel for the removal of the gases and vapours. The residual peat-coke is cooled out of contact with the atmosphere and returned to the absorption chamber for further use.

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

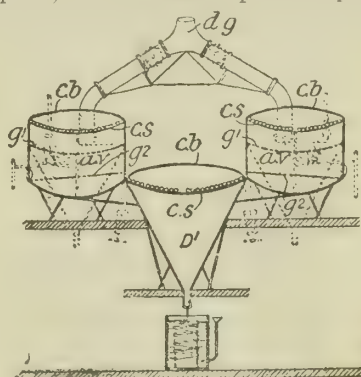
Ethyl Acetate. Soc des Acieries and Forges de Firminy, Loire, France. British Patent, 131,600. Convention date, March 13, 1918.

Ethyl acetate is made by esterifying acetic acid which has been obtained by the electrolytic oxidation of paraldehyde. The paraldehyde is poured on to the electrolyte, which may be a 10 per cent. solution of sulphuric acid. Oxidation may be aided by the addition of oxides or salts of metals capable of more than one degree of oxidation; for instance, manganese, cerium, molybdenum, or vanadium, to the amount of 0.5–1 per cent. of the quantity of paraldehyde. The temperature may be allowed to rise slightly. When the percentage of acetic acid rises to about 40, an equivalent

quantity of alcohol is added and the mixture distilled in a rectifier. The residual liquid may be used again for electrolysis.

Destructive Distillation. F. P. A. Rousseau, Vendorne, Loir et Cher, France. British Patent, 132,490. Convention date, September 9, 1918.

Liquid hydrocarbons such as petroleum and spirit are distilled from coal, shale, lignites, and distillation residues, resin, pitch, etc., in a series of vessels heated at their upper parts, and the volatile products pass from the bottom of each



vessel into a central condensation chamber also heated at the top. If the material is poor in hydrogen, a current of the gas is circulated through the vessels during the process. The coal, etc., is supplied through a series of valves pipes *d, g* to a perforated hearth *g'*, *g''* within each vessel, and the charge is spread by rotary agitators mounted on vertical shafts *a, v*.

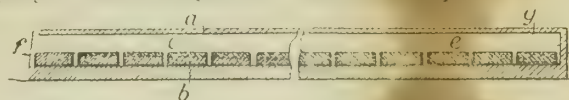
The heating is effected by spiral steam or vapour pipes *c, s* located at the top of each vessel beneath an insulated cover *c, b*. The condensation chamber *D'* may be dispensed with if the lower parts of the distillation vessels be of conical form. In a plant for distilling liquids such as heavy oils and solids of low melting-point, the stills are heated from below, and connect at their upper parts with a condenser heated at the top.

Manures. Norsk Hydro-Elektrisk Kjølstofaktieselskab, Christiania. British Patent, 132,496. Convention date, September 13, 1918.

Fertilisers are obtained by mixing insoluble phosphates with urea salts and kindred substances, the phosphates being rendered soluble. Urea nitrate obtained by treating cyanamide or cyanamide of lime with nitric acid is suitable.

Calcium cyanamide. F. Gros and Bouchardy, Paris. British Patent, 132,622. Convention date, November 3.

Calcium cyanamide is produced by rapidly heating in nitrogen calcium carbide arranged so as to expose a large surface, and moving it through a zone of high temperature without disturbing the lower layers. The product is cooled rapidly. The arrangement described comprises a tunnel



furnace *a* provided with an air lock at each end and with automatic means for conveying trays *b* from the inlet end *f* to the outlet end *g*, while nitrogen passes in the opposite direction. The part *c* is heated, for instance, by electric resistances, so that the charge is heated by radiation from the roof, while the part *e* is not heated, and may be cooled.

Cyanogen Compounds. Nitrogen Corporation, Providence, Rhode Island, U.S.A. British Patent, 133,095. Convention date, June 12, 1917.

The reaction product in the fixation of free nitrogen by the processes described in Specification 27713/12 and 13332/14 is extracted with liquid ammonia to separate the cyanogen compound from the catalytic metal and excess of alkali compound and carbon. The residue is used again. It is stated that sulphur or like impurities should be excluded in the cyanide-forming reaction mixture. The extraction and evaporation to recover the ammonia are effected with exclusion of air unless the product to be obtained is cyanate. The extraction apparatus may be of non-porous iron, or of a porous iron of which the pores have been allowed to choke up with cyanide.

Fatty Acids. Pardubitzer Fabrik der Akt.-Ges. für Mineralöl-Industrie vorm. D. Farnö and Co., Pardubitz, Austria. British Patent, 133,027. Convention date, September 25, 1918.

In the production of fatty acids by oxidising paraffin wax, as described in the parent Specification (No. 131,301), the temperature is regulated, after the reaction has started, by cooling the reaction mass, instead of regulating the air supply. This may be effected by circulating a cooling medium through the heating-coil of the apparatus. Light-coloured products are obtained by effecting the reaction in aluminium, glass, or enamel vessels instead of iron vessels; the heating coil, etc., are also made of such material. Catalysts which do not discolour the product, such as the acids referred to in Specification 131,302, may be employed.

Catalytic Processes. L. Duparc and C. Urfer, Geneva. British Patent, 133,041. Convention date, September 24, 1918.

Ammonia is burnt quantitatively to nitrogen peroxide by passing rapidly an undried mixture of four volumes of ammonia and seven volumes of oxygen, but not air, over a catalyst heated to between 500° and 650° C. As a catalyst, a metal of the platinum group, such as platinum, or preferably rhodium, may be employed and the catalyst may be distributed on asbestos. The ammonia may be obtained by heating its concentrated solution; but it is not satisfactory to pass oxygen through such solution in order to obtain the desired mixture. The nitrogen peroxide is passed into water at 30° C. in order to obtain nitric acid.

NEW COMPANIES.

Majunga Oilfields of Madagascar, Ltd.—Capital £200,000., £1. shares. Office: Colford Chambers, 10, New Bond Street, W.

Nigerian Hydraulic Tin Mines, Ltd.—Capital £10,000., £1. shares. Solicitors: H. Jones, Son and Pott, Capel House, E.C.

Palestine Oil Industry "Shemen," Ltd.—Capital £250,000., £1. shares. Office: 24, Holborn, E.C.

Platinum and Mineral Estates (Colombia), Ltd.—Capital £25,000., in 20,000 preferred ordinary shares of £1. and 100,000 deferred ordinary shares of 1s. each. Office: 17, Victoria Street, S.W.

Rubber and Tin Estates, Ltd.—Capital £10,000., £1. shares. Office: West Africa House, Water Street, Liverpool.

Union Mining and Smelting Company, Ltd.—Capital £500,000., £1. shares. Solicitors: Grundy, Kershaw and Co., 6, Austin Friars, E.C.

United Chemical Corporation, Ltd.—Capital £100,000., 10s. shares. Manufacturing, analytical, wholesale and retail chemists, druggists, dyers, etc. Solicitors: Ashurst, Morris, Crisp and Co., 17, Throgmorton Avenue, E.C.

Winnebuh Tinfields, Ltd.—Capital £100., 10s. shares. Registered office: 17, Farringdon Avenue, E.C.

A. H. Herbert and Co., Ltd.—Private company. Capital £20,000., £1. shares (10,000 preference). Manufacturers and merchants of lead, glass, oil, colours, etc. Registered office: 61-2, Chancery Lane, W.C.

Arthur White and Sons, Ltd.—Private company. Capital £10,000., £1. shares. Lead, zinc, glass, oil, colour, and varnish merchant. Registered office: 61, Atlantic Road, Brixton, S.W.

Charles H. Marchent and Co., Ltd.—Private company. Capital £10,000., £1. shares. Makers of spelters, dealers in copper, gunmetal, brass, zinc, lead, pewter and phosphor bronze, manganese and brass ingots, etc. Registered office: Premier Metal Works, 17, Stott Hill, Bradford.

Erp and Co., Ltd.—Private company. Capital £5,000., £1. shares. Object: To take over patents, rights, contracts, and plant relating to the distillation of wood and other substances, etc. Solicitors: C. C. Tarelli, 62, London Wall, E.C.

Ezypol Syndicate, Ltd.—Private company. Capital £2,000., £1. shares. Manufacturers, importers, and exporters of and dealers in furniture and other polishes, etc. Registered office: 19, Lisle Street, W.C.

Beding (Malaya) Rubber, Ltd.—Private company. Capital £70,000., 2s. shares. Solicitors: Herbert Smith, Goss, King and Gregory, 62, London Wall, E.C.

Hasland Coking Company, Ltd.—Private company. Capital £100,000., £1. shares. Object: To acquire the business of a company of the same name, incorporated in 1905, to carry on the business of coke-oven proprietors, manufacturers of coke, gas tar, pitch, benzole, ammonia, and other by-products, etc. Solicitors: Broomhead, Wightman and Moore, 14, George Street, Sheffield.

Matches, Ltd.—Private company. Capital £100., £1. shares. Manufacturers, producers, importers and exporters of matches, etc. Registered office: Ridgway House, 40-42, King William Street, E.C.

Mossley Colour and Chemical Company, Ltd.—Private company. Capital £5,000., £1. shares. Object: To take over the business of manufacturers and merchants of colours, chemicals, paints, oils, varnishes, etc., carried on at Quickwood Works, Haddens, Mossley, near Manchester, by W. Marvel and J. Marvel, as the "Mossley Colour and Chemical Company." Registered office: Quickwood Works, Haddens, Mossley, near Manchester.

Plumbex, Ltd.—Private company. Capital £15,000., in 12,000 preference shares of £1. each and 60,000 deferred shares of 1s. each. Object: To acquire and develop patent processes for treating or retreating refuse and waste materials of all kinds, or any chemical or other processes or formula, etc. Registered office: 3, Laurence Pountney Hill, E.C.

Stourbridge Hardware, Chemical, and Drysaltery Company, Ltd.—Private company. Capital £5,000., £1. shares. Office: Green Street, Stourbridge.

Zalbide, Alvarez and Co., Ltd.—Private company. Capital £4,000., £1. shares. Foreign and general merchants, manufacturers of and dealers in iron and steel tinplates, chemicals, dyes, asbestos, etc. Registered office: 6, Broad Street House, E.C. 2.

Fairy Dyes, Ltd.—Private company. Capital £10,000., £1. shares. Manufacturers of and dealers in dyes, chemicals, etc. Office: 20, Renfrew Street, Glasgow.

Allchies Copper Mines, Ltd.—Private company. Capital £80,000., £1. shares. Object: To acquire certain mines and mining rights in the County Cork known as the Allchies Mines. Solicitor: I. I. L. Overend, Ely Place, Dublin.

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 4, Queen Anne's Gate Buildings, London, S.W. 1, whence further information may be obtained:—

Ceylon.

A commission agency at Colombo desires to represent United Kingdom manufacturers and shippers of perfumery, paints, and oils. (Reference No. 1096.)

Belgium.

An agent at Liège desires to represent, on commission, British firms manufacturing aniline and other dyes. (Reference No. 1101.)

A Belgian inquirer at Liège desires to purchase from, and represent on commission, United Kingdom firms manufacturing cement, plaster, and refractory products. (Reference No. 1103.)

A firm of many years' standing at Huy desire to obtain the agency, with dépôt, for British exporters of margarine and soap, etc. (Reference No. 1106.)

Germany.

A commission agent in Wiesbaden desires to obtain a commission agency for the sale of steel cylinders (for oxygen, hydrogen, and carbonic acid gas); spiegeleisen, high-speed tool steel, steel alloys, such as nickel steel, chrome steel, chrome-nickel steel, etc.; oil (engine and lubricating) and tar oil. (Reference No. 1113.)

Italy.

An Italian firm resident in Turin desires to represent British houses dealing in soap and perfumes. (Reference No. 1115.)

Netherlands.

H.M. Consul-General at Rotterdam reports that a firm of manufacturers of chemical and tar solutions for the making of dustless roads are anxious to receive offers of oils, calcium chloride, etc., for road spraying and dust-laying preparations for floors and roads. (Reference No. 1118.)

United States.

An American firm, established at New Orleans, Louisiana, would like to get into touch with United Kingdom manufacturers of chemicals with a view to acting as their representatives in that district. (Reference No. 1135.)

GAZETTE NEWS.**MORTGAGES AND CHARGES.**

Artificial Silk Syndicate, Ltd., London, E.C.—Registered November 12, £5,000. deb., to R. W. Williams, 68, Lombard Street, E.C., and another; general charge. (May 21, 1919.)

London Scientific Instrument Company, Ltd., Manor Park, E.—Registered November 15, £1,700. deb., to Albert Lee and Co., Ltd., 8 and 9, New Zealand Avenue, E.C.; general charge.

Torbay and Dart Paint Company, Ltd., London, E.C.—Registered November 11, £4,000. deb.; general charge.

Vulcan Salvage and De-Tinning Works, Ltd., London, E.C.—Registered November 14, £500. deb., to R. T. Marsh, 57, Bishopsgate, E.C., and another; general charge.

LIMITED COMPANIES.—Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions. Orders, and Official and Other Notices.

West Hartlepool Chemical Manure Company, Ltd.—Resolved October 31, confirmed November 17: That the company be wound up. E. Heslop, 200, York Road, West Hartlepool, accountant, liquidator. Meeting of creditors, Turnbull and Tilly's, 13, Church Street, West Hartlepool, solicitors, December 5. Claims to liquidator by December 31.

Irwell and Eastern Rubber Company, Ltd., Salford.—Resolved October 25, confirmed November 10: That it is desirable to effect an amalgamation of this company with I.

Frankenburg and Sons, Ltd., by transferring the undertaking hereof to a new company, and that, with a view thereto, this company be wound up. W. Bolton, 46, Pall Mall, Manchester, chartered accountant, liquidator, who is authorised to consent to the registration of a new company to be named the Greengate and Irwell Rubber Company, Ltd.

Melyn Tin Plate Company, Ltd., Neath.—Resolved October 22, confirmed November 19: That it is desirable to reconstruct the company, and, accordingly, that the company be wound up. W. H. S. Rees, Charlesville Place, Neath, liquidator, who is authorised to enter into an agreement with a new company about to be formed for the sale to such new company as on September 30, 1919, of the whole of the undertaking and assets of the old company upon terms submitted to said meeting.

Silverton Oil Company, Ltd.—Resolved November 12: That the company be wound up. H. E. Sweeting, 4, Charles Street, Cardiff, chartered accountant, liquidator. Meeting of creditors at liquidator's, December 1.

COMING EVENTS.

Society of Chemical Industry: Manchester Section.—The annual dinner of the Section will be held at the Grand Hotel, Manchester, on Thursday, January 22, 1920, at 7 p.m.

The Ceramic Society.—Meeting, Central School of Science and Technology, Stoke-on-Trent, at 7.30 p.m., Monday, December 8. Paper: "Fine Grinding of Potters' Materials: Part II." by Mr. L. G. Hill.

Oil and Colour Chemists' Association.—Meeting, Food Reform Club, 2, Furnival Street, E.C., Thursday, December 11, at 7 p.m. Paper: "The Principle of Application of Paint and Varnish, and How It Affects the Works Chemist of the Paint and Varnish Industry."

Chemical Engineering Group (Society of Chemical Industry).—Conference, Monday, December 15, from 3 to 5.30 and 7.30 to 10 p.m., at Armstrong College, Newcastle-on-Tyne, on "The Transport and Distribution of Liquids in Chemical Works."

Society of Chemical Industry: Edinburgh and East of Scotland Section.—Meeting, Tuesday, December 9. Paper: "The Oxidation of Ammonia," by Dr. J. Kuen.

MARKET REPORTS.**TAR AND AMMONIA PRODUCTS.****WEDNESDAY.**

Benzole: London, 90%, 2s. to 2s. 1d.; North, 1s. 11d. to 2s.; 50%, 1s. 10d. to 1s. 11d.; North, 1s. 9d. to 1s. 10d., naked; pure, 3s., naked at works. Carbolic acid, crude, 60%, East and West Coast, nominally 2s. 3d. to 2s. 4d.; crystals, 39-40%, 8½d. to 9d., f.o.b. Crude tar, London, 50s. to 55s.; Midlands, 50s., North, 50s. per ton, ex works. Refined tar 35s. per barrel. Pitch, 85s.; East Coast, 72s. to 77s. 6d., f.o.b.; West Coast, 72s. 6d. to 75s. f.a.s. Solvent naphtha, naked, London, 90-100%, 2s. 5d.; North, 2s. 3d. to 2s. 4d.; 95-100%, naked, London, 2s. 9d. to 2s. 10d.; North, 2s. 8d. to 2s. 9d. Crude naphtha, naked, 30%, 9d.; North, 8d. to 8½d. Refined naphthaline, £18. to £22.; salts, £6. to £7. Toluol, naked, London, 2s. 6d.; North, 2s. 5d. Creosote, naked, London, 6½d.; North, 5½d. to 6d.; heavy oil, 6½d. Anthracene, 40-45%, 7d. per unit. Cresylic acid, 95%, 2s. 5d. to 2s. 6d.; 97-99%, 2s. 7d. to 2s. 8d., ex works, London, and f.o.b. other ports. Sulphate of ammonia: home trade, December, £21., basis 24½%. Nitrate of soda, £22. 10s. to £22. 15s.

MANCHESTER CHEMICAL MARKET.**THURSDAY.**

Business all round continues satisfactory, with good demand both for home and export account. Values generally are firmer and with an upward tendency. There is keen competition for resale lots of caustic soda, and price of 70% is well held at £26. 10s. per ton. Refined bicarbonate of soda at £11. 10s. and 58% alkali at £11. per ton. Spot price for bleaching powder is unchanged at £17. on rails, but contract price for 1920 has now been fixed at £15. 15s. per ton, carriage paid. Roasted saltcake firm at 70s. in bulk. Chlorates are again dull. Soda at 6d. per lb., and potash 1s. per lb. Bichromates are scarce, but makers' quotations unaltered at 1s. 6d. and 11d. per lb. for potash and soda respectively. Recovered rock sulphur £17., on rails,

Sulphate of copper continues very quiet, and f.o.b. price nominal at £40. per ton. Nitrate of soda scarce and dear at £61. per ton. Commercial hyposulphite of soda £19. per ton. Phosphate of soda £29. to £30. per ton. Concentrated sodium sulphide, in casks, higher at £25. per ton. White powdered arsenic firm at £65., and supplies scarce. Yellow prussiate of soda steady at 1s. per lb. Potash 2s. 1d. per lb. Carbonate of potash quiet at £102. per ton, basis 85%. Lead salts are higher in sympathy with the advance in metal. White acetate £83. 10s.; brown £67. Nitrate £56 per ton. Acetic acid and acetate of soda are firmer. English brown acetate of lime is well maintained at £14. 10s. to £15. per ton; grey £20. per ton. Miscible naphtha 10s. 6d. per gallon. Ammonia salts are steady. Lump carbonate has been advanced to 7½d. per lb., and oxalic acid to 1s. 5d. per lb.

LONDON METAL MARKET.**THURSDAY.**

Copper: Standard brands, £98. 5s. to £98. 10s. cash; £99. 10s. to £99. 15s., three months; electrolytic, £107. to £108. **Tin:** Standard, £294. to £294. 15s. cash; £296. 5s. to £296. 10s. three months; Straits, £294. 10s.; English, £296. 5s. to £296. 10s. **Lead:** Soft foreign, £39. 7s. 6d.; English, £40. 5s. **Spelter,** £50. 10s., hard, £35. **Antimony,** English regulus, 90%, £47. 10s. **Aluminium,** £150. **Nickel,** £215., ex warehouse. **Quicksilver,** £23. to £23. 10s. **Bismuth,** 12s. 6d. **Platinum,** 442s. per oz. **Wolfram,** 32s. 6d. per unit.

TURPENTINE MARKET REPORT.

Messrs. James Watt and Son, Ltd., of 101, Leadenhall Street, London, E.C. 3, report that the stocks of turpentine on November 29 were: American, 29,050 barrels, compared with 2,587 barrels at the corresponding date of 1918; French, 825 barrels (1,101 barrels); and Spanish, 297 barrels (1,050 barrels). Deliveries during the week ended November 29 were 1,685 barrels, against 1,055 barrels last year; and since

January 1, 69,501 barrels, compared with 24,089 barrels in 1918. The price on Saturday last was 127s. per cwt., compared with 105s. at the corresponding date of last year. January-April (1920) was quoted at 129s. 6d., and May-August 117s.

SWANSEA MARKET REPORT.

THURSDAY.

Tinplate prices are very firm and steady on the basis of 45/6 to 46/- per standard box f.o.b. Copper slightly firmer at £97. prompt and £98. 10s. three months. Tin easier at £295. prompt and £296. 10s. three months. Lead remains active with good sales at £38. prompt and £38. 5s. forward for Spanish, and £39. for English. Spelter sold freely and was very active at £48. 17s. 6d. prompt and £49. over next quarter. Zinc sheets have become firm at £67. for English, and £68. for American f.o.b. at New York. Antimony regulus £47. 10s. f.o.b. prompt; Chinese £44. 10s. Aluminium £150. Quicksilver very firm and dearer at £21. Silver irregular at 73½d. per ounce. Nickel slightly dearer at £215. delivered London or equal. Pitch rather scarce at 62/6 per ton ex ship. Nitrate of soda very firm: ordinary and refined 21/6 to 22/6 per cwt. in bags. Sulphate of copper remains quiet and steady at £41. 10s. per ton f.o.b. Sulphate of ammonia in good movement at £21. per ton. Arsenic in better request, with white powdered at £61. 15s. 6d. per ton f.o.b. Oxalic acid in better request and dearer at 1/2½d. per lb.

LIVERPOOL CHEMICAL MARKET.

THURSDAY.

An active demand for the heavier chemicals has again been experienced, the inquiry on export account being fairly brisk. It is evident that the labour will only allow manufacturing in the consuming industries to proceed at its feasible maximum a large increase in the consumption of chemicals must take place, and the trade experience a very active and prosperous time. The uncertainties as to labour's action constitute the main element of doubt and retardation in the chemical industry, and in the commercial branch of the industry—the "trade," as the term is commonly understood. Bleaching powder has been in good request, and is scarce for prompt or early delivery. Prices are £17. per ton, free on rail or conveyance, in buyers' packages; and £15. to £18. per ton for export. Chloride of calcium has been in moderate request, and is £8. to £11. per ton, in casks, f.o.r. Caustic soda has been much inquired for, and prices continue very firm. They may be given as £21. per ton for 76%, £22. per ton for 70–72%, and £21. per ton for 60%. Nitrate of soda has been in rather active demand, and the price has hardened; it is £21. 10s. to £22. 10s. per ton. Saltcake has been in very fair request, and is £6. 10s. per ton, in casks, f.o.b. Soda crystals have been steadily called for, and are £5. 10s. per ton, in 2cwt. bags, f.o.r. at works. Bicarbonate of soda has again been in active demand, and is £8. 5s. to £10. per ton, according to terms of delivery. Borax has been well inquired for, and is £39. per ton for ordinary and £40. per ton for powdered, in bags, less 3%, for lots of not less than 50 tons. Ammonia alkali has had a well-sustained inquiry; it is still scarce, and is £6. 10s. to £6. 15s. per ton, f.o.r. at works. Hyposulphite has been quiet, and is £18. 10s. per ton for ordinary and £22. per ton for pea crystals, in 1cwt. bags. Sulphite of sodium has been in fair request, and is £11. per ton for ordinary and £16. to £18. per ton for pea crystals, in 1cwt. kegs. Sulphide of sodium has been in quietly steady demand, and is £22. per ton in casks and £23. per ton in drums. Prussiate of soda has been quiet, and is 1s. per lb. Bichromate of soda has been steadily called for, and is 9½d. per lb. Phosphate of soda has been in somewhat freer demand, and is £27. per ton. Chlorate of potash has been but little inquired for, and is 1s. to 1s. 1d. per lb. Permanganate has been in moderate demand, and is 3s. 6d. per lb. Sulphate of potash has been but little in request, and is £22. 10s. per ton. Carbonate of potash has been in quietly steady demand, and is £95. to £100. per ton for 80–85%. Caustic potash has been in good request, and is £120. per ton. Nitrate of potash has been in very fair demand, and is £60. to £62. per ton for refined and £40. per ton for ordinary. Canadian potashes have been but little in request: first quality Montreal are £200. to £220. per ton, and second quality £190. to £210. per ton. Bichromate of potash has been in quietly steady demand, and is 1s. 6d. per lb. Yellow prussiate of potash has been rather more in request, and is dearer; the price may be given as 1s. 10d. to 2s. per lb. Salammmoniac has been in fair request and is £90. per ton for first quality, £85.

per ton for second quality, and £5. per ton extra for crushed. Sulphate of ammonia has been but little called for, and supplies are still very light; prices are £21. per ton for December, £21. 7s. 6d. for January (1920), £21. 15s. for February, and £22. per ton for March to May (1920). Carbonate of ammonia has been steadily called for, and is 6½d. per lb. Muriate has been quiet, and is £45. to £50. per ton, according to grade. Magnesia has been in somewhat better request. Carbonate is £2. 5s. per cwt., and sulphate £11. to £16. per ton. Alum has met with a fairly brisk inquiry, and supplies for early deliveries are still light; prices are: For the home trade, £18. 10s. per ton, and for export £18. 10s. to £19. 10s. per ton. Aluminoferric has been very quiet, and is £8. 10s. to £12. per ton. Sulphate of alumina has been but little called for, and is £12. to £17. per ton, according to grade. Sulphur has been in good request. English flowers are £32. per ton; roll is £28. per ton; and rock, £22. per ton, in bags, f.o.r. Sicilian grades are: Flowers, £28. per ton; roll, £22. 10s. per ton; and rock, £17. 15s. per ton. Cream of tartar has been in moderately active demand, and is £12. 10s. to £13. per cwt., according to test. Tartaric acid has sold more freely, and is 3s. 2d. per lb. Boracic acid has been in very fair request, and is £72. per ton for crystals and £74. per ton for powdered; £2. to £3. extra being charged per ton for casks. Oxalic acid has been quieter, and is 1s. 3d. per lb. citric acid has been rather more in demand, and is 4s. 3d. per lb. White acetate of lead has moved but slowly, and is £83. to £85. per ton. Arsenic has been in moderate demand, and the supply over and above current contract requirements continues very light. White powdered is £63. to £65. per ton. Sulphate of copper has been quiet, and prices have eased; for the home trade £41. per ton is being asked, and for export £41. per ton, less 5%, in casks, f.o.b. at Liverpool.

TYNE CHEMICAL REPORT.

TUESDAY.

Business is still very active, and both for home and export there is a strong demand, bleaching powder and caustic soda being in particularly good request. Soda crystals locally very scarce and in demand at £5. 10s. per ton 2cwt. bags. Sulphur (best quality) also very firm at £24. to £25. per ton.

Prices per ton net are nominally: Bleaching powder, softs and hard, £17.; caustic soda 76/77%, £26., 74/76%, £25.; do., 70%, £24., do., 60%, £23.; recovered sulphur, 2cwt. bags, £24.; hyposulphate of soda, 5/7cwt. casks, £19., 1cwt. kegs, £20.; sulphite of soda, 5/7cwt. casks, £12., do. 1cwt. kegs, £20.; silicate of soda, 75Tw., £9. 12s. 6d., do., 100Tw., £10. do., 140Tw., £10. 10s.; soda crystals, 2cwt. bags, £5. 10s.; sulphate of soda (salt cake) in bulk, £4.; pure white sulphate of alumina, £19. 10s.; blanc fixe, £22.; sulphide of sodium, crystals, £18., do., refined concentrated solid, 60/62%, £25.; hydrate of barium, crystals, £56.

COALS.—Market very brisk, with a strong demand, and the principal collieries have now sufficient orders on hand for the remainder of this year. Nominally prices are as follows: Best Northumbrian steam, 95/- to 100/- per ton, seconds, 90/- to 84/-; Northumberland small coal, 75/- to 80/-, seconds, 70/- to 72/6; best Durham gas coals, 80/- to 85/-, seconds, 65/- to 75/-; Durham bunker coals, 70/- to 80/-, seconds 66/- to 65/-; foundry coke, 100/-; gas coke, 95/-.

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Wednesday.

During the past week there has continued a good demand at firm prices and the inquiry for the home market has been very steady. Several articles are again dearer and scarcer, and the most noticeable price variations are in the case of arsenic (which has jumped from £64. to £65. per ton); caustic soda (from £25. to £27.) and salammmoniac (which is now quoted at £90. as against £85. for second lump). Current quotations are: Arsenic, £65. per ton, net, Glasgow; bicarbonate of soda, £10. 10s. and £12. 10s. per ton for 6-8 cwt. casks and 1cwt. kegs, net, Liverpool; boracic acid crystals, English refined, £72. for 2cwt. bags; and borax crystals, £39. for 2cwt. bags, carriage paid; caustic soda, white, 70-72%, £27. per ton, net, Glasgow; chlorate of potash, 1s. 2d. per lb., net, Glasgow; chlorate of soda, 8d. per lb., net, Glasgow; citric acid, 4s. 4d. per lb., 5%, Glasgow; cream of tartar, 98%, £12. per cwt., net, Glasgow; paraffin wax, U.K. deliveries, 125° to 6½d. to 121-3° 5½d. to 5½d.; 118-20°, 5d.; 110-120°, 4d. to 4½d.; and 98-102°, 4d. to 4½d.; salammmoniac, £95. and £90. per ton, net, any port, for first and second lump respectively; salammmoniac crystals, £70.

per ton, net, Glasgow; saltpetre, £3. 4s. per cwt., net, Glasgow; tartaric acid, 3s. 3d. per lb., 5%, Glasgow.

There are no noticeable changes in the market conditions as far as the different sea oils are concerned, and quotations are all unchanged except in the case of Newfoundland cod—where there is an advance recorded from 80s. to 82s. Among the whale oils pale continues to find buyers at 94s.; brown continues to attract attention at 76s.; and black continues to

be absorbed at 75s.; while yellow is still unobtainable. There are no changes either as regards pale seal or Menhaden and these are still selling at 96s. and 80s. respectively.

There is little new to be said regarding the position in the coal trade, and it is still a case of the inquiry being usually bigger than the demand. Everything which goes to the pit-head is very quickly ear-marked and there is never any surplus of fuel either for household or industrial purposes.

IMPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LIST OF CONTRACTIONS USED IN THE IMPORT AND EXPORT LIST.

Blns.	Balloons.	Cbys.	Carboys.	Gals., Gls.	Qnty.	Quantity (otherwise undeclared).	qr.	Quarters.
Bls.	Bales.	Css. or Cs.	Cases.	or Glns.	Gallons.		lb.	Pounds.
Brls.	Barrels.	Cks.	Casks.	Hf. pps.	Half pipes.			
Bgs.	Bags.	Chts.	Chests.	Hhds.	Hogsheads.	Rnlt.	Runlets.	
Btls.	Bottles.	Cylds.	Cylinders.	Kgs.	Kegs.	Sks.	Sacks.	
Bdls.	Bundles.	Dms. Drs.	Drums.	Ozs.	Ounces.	Slbs.	Slabs.	
Bskts.	Baskets.	Djns.	Demijohns.	Pks.	Packages.	Tcs.	Tierces.	
Bxs.	Boxes.	Frkns.	Firkins.	Pns. Puns.	Puncheons.	t. c.	Tons. Cwts.	

Note.—There is no information available as to the net weights of the various items, nor do we recognise in them any standard.

BRISTOL.

Publication of Official Returns Suspended.

GLASGOW.

Week ending November 29.

DYESTUFFS—
Dyewood Extract
Philadelphia, 170 brls.

GLYCERINE—
Genoa, 202 drms.

IRON PYRITES—
Almeria, 2,629 t.

LITHOPONE—
Rotterdam, 20 cks.

MAGNESITE—
Montreal, 800 bgs.

METHYL ALCOHOL—
Philadelphia, 48 drms.

PARAFFIN SCALE—
New York, 605 brls.

POTASH SALTS—
Rotterdam, 49 bgs.

SCALE WAX—
New York, 200 brls.

WAX—
New York, 206 bgs.; Philadelphia, 1,433 brls.

WHITE LEAD—
Philadelphia, 70 brls.

ZINC OXIDE—
Rotterdam, 25 cks.

GOOLE.

Week ending November 29.

NIL.

GRANGEMOUTH

Week ending November 29.

NIL.

GRIMSBY.

Week ending November 29.

CHEMICALS (otherwise undescribed)
Antwerp, 2 cks.

DYESTUFFS (otherwise undescribed)
Antwerp, 244 cks., 348 pkgs.

DYESTUFFS—
Aniline Dyes
Antwerp, 254 pkgs.

HULL.

Week ending November 29.

BARTYES—
Antwerp, 6 cks.; Rotterdam, 260 cks.

DYESTUFFS—
Aniline Colour
Antwerp, 96 cks., 4 cs.

PHOSPHATE—
Ghent, 510 bgs.

TAR

Stockholm, 1 brl.

WHITE LEAD—
Montreal, 17 brls.

LEITH.

Week ending November 29.

NIL.

LIVERPOOL.

Week ending November 29.

ANTIMONY—
Yokohama, 59 cs.

BORATE OF LIME—
Punta Arenas, 4,232 bgs.

BORAX—
Mollendo, 1,788 sks.; Mejillones, 15,587 sks.; New York, 1,352 bgs., 836 sks.

CAUSTIC SODA—
New York, 155 drms.

CHLORAL HYDRATE—
New York, 24 cs.

COAL PRODUCTS—
Chlorophyll
Amsterdam, 1 ck., 1 cs.

CREAM OF TARTAR—
Bordeaux, 27 cks.

DEXTRINE—
New York, 500 bgs.

DYESTUFFS—
Aniline Dye
New York, 4 brls.

Argols
Bordeaux, 241 bgs.

Cutch
Rangoon, 750 bxs.

Myrobalans
Bombay, 10,405 bgs.

Tanning Extract
Baltimore, 211 brls., 540 bdls.

Tartar
Bordeaux, 384 bgs.

FATTY ACID—
Amsterdam, 610 brls.

GLUE—
Bordeaux, 10 ble.; Marseilles, 80 cs

GLYCERINE—
Marseilles, 98 drms., 13 cks.

HEMATINE CRYSTALS—
New York, 10 brls.

HYDROQUINONE—
New York, 2 kgs.

MINERAL WAX—
New York, 276 bgs.

NITRATE—
Talcahuano, 36,715 sks.

OCHRE—
Bordeauo, 102 cks.

OXALIC ACID—
Baltimore, 84 brls.

PARAFFIN SCALE—
Philadelphia, 300 brls.

PARAFFIN WAX

New York, 1,563 bgs.; Philadelphia, 312 cs.

PITCH—
Pensacola, 3,752 cs.

POTASSIUM BROMIDE—
New York, 100 cs.

POTASSIUM HYDRATE—
Gothenburg, 5 cs.

ROSIN—
Bordeaux, 100 cks., 400 brls.

SILICO MANGANESE—
Bordeaux, 12 cks.

SOAP—
Marseilles, 10 cs.; New York, 700 bxs.

SODIUM BROMIDE—
New York, 10 cs.

SODIUM NITRATE—
Mejillones, 15,697 sks.; Punta Arenas, 26,586 sks.

SODIUM PRUSSATE—
Marseilles, 13 cks.

TALLOW—
Fray Bentos, 300 tes.

TAR—
Gothenburg, 150 brls.

TARTRATE OF LIME—
Bordeaux, 160 bgs.

WAX—
New York, 160 brls.; Valparaiso, 44 sks.; Zanzibar, 225 bgs.

WOOD TAR—
Gothenburg, 24 brls.

LONDON.

Week ending November 29.

AMMONIUM BROMIDE—
Switzerland, £84.

ARSENIC—
France, 10 c.; Holland, 4 t.

BARYTES—
Holland, 25 cks.

BEESEWAX—
Brit. India, 200 cs.

BORIC ACID—
Italy, £7,282.

CARBON BLACK—
Italy, 200 cs.

CITRIC ACID—
Italy, 20 kpgs.

COPPER OXIDE—
Denmark, 13 cks.

CREAM OF TARTAR—
Holland, 20 pkgs.

DISINFECTANTS (otherwise undes.)
France, £27.

DYESTUFFS (otherwise undescribed)
Switzerland, 1 ck.

DYESTUFFS—
Aniline Dye
Switzerland, 1 ck., 127 pkgs.
Annatto
Victoria, 2 pkgs.

DYESTUFFS

Argols
Greece, 781 bgs.

Cochineal
France, 2 cs.

Indigo
Brit. India, 71 bgs.; France, 18 cks.

Logwood Extract
U.S.A., 13 cks.

Myrobalans
Brit. India, 2,000 pkts., 957 bgs.

Tanner's Bark
Natal, 377 t.; W. Australia, 66 t.

Turneric
Brit. India, 615 bgs.

Valonia
A. Turkey, 103 t. 4 c.

GELATINE—
France, £1,116.; Germany, £726.; Holland, £1,377.; U.S.A., £373.

GLUE—
Belgium, 10 t.; France, £858.; Holland, 100 t.; U.S.A., £292.

HEMATINE CRYSTALS—
Turkey, 10 bds.

HYDROQUINONE—
Switzerland, £727.; U.S.A., £170.

LEAD CARBONATE—
U.S.A., £350.

LITHOPONE—
U.S.A., 200 cks.

MAGNESIUM CHLORIDE—
Holland, £118.

OXALIC ACID—
Sweden, £154.

PARAFFIN SCALE—
U.S.A., 286 t.

PARAFFIN WAX—
U.S.A., 165 t. 11 c.

PLUMBAGO—
France, 101 bgs.

POTASSIUM BROMIDE—
Holland, £982.; U.S.A., £300.

PRUSSIAN BLUE—
Germany, 8 cks.

ROSIN—
France, 25 cks.; Portugal, 66 cks.

SOAP—
Canada, £1,710.; France, £1,513.; U.S.A., £812.

SODA—
Holland, 13 c.

SODA (RESUBLIMED)—
Japan, 475.

STEARINE—
Victoria, 24 cks.

SULPHUR—
Italy, 29 t. 6 c.

TALLOW—
Argentine Republic, 136 t. 8 c.; Belgium, 132 t.; N.S.W., 75 t. 13 c.; N.Z., 680 t. 4 c.; Queensland, 6 t. 2 c.; U.S.A., 71 t. 10 c.

TALLOW—
Victoria, 49 t. 15 c.

TAR—
Sweden, 90 brls., 46 cks.

TARTARIC ACID—
France, 58 pkgs.; Italy, 50 kgs.

ULTRAMARINE—
Belgium, 4 brls.

WAX—
Brit. India, 10 cs.

WHITE LEAD—
U.S.A., 224 kgs.

WOOD OIL—
Sweden, 869 brls., 1 ck.

ZINC OXIDE—
Belgium, 400 cks.; U.S.A., 200 brls.

MANCHESTER.*Week ending November 29.*

ACETIC ACID—
Philadelphia, 30 brls.

ANTIMONY SALTS—
Rouen, 14 cks.

CALCIUM CARBIDE—
Montreal, 500 drms.

DYE STUFFS—
Aniline Colour
Antwerp, 141 cks., 72 brls.
Wood Extract
Antwerp, 9 brls.

GLUE—
Antwerp, 7 cks.

OXALIC ACID—
Gothenburg, 9 brls.

PARAFFIN WAX—
Philadelphia, 212 bgs.

PHOSPHORUS—
Montreal, 500 cs.

ROSIN—
Jackson, 1,287 brls.

SILICO MANGANESE—
Rouen, 27 cks.

SOAP—
Philadelphia, 1,000 bxs.

SODIUM ACETATE—
Antwerp, 100 cks.

SODIUM CHLORATE—
Gothenburg, 300 cs.

STEARINE—
Antwerp, 63 bgs.

MIDDLESBROUGH.*Week ending November 29.*

NIL.

NEWCASTLE-ON-TYNE*Week ending November 29.*

NIL.

N. & S. SHIELDS.*Week ending November 29.*

NIL.

SWANSEA.*Week ending November 29.*

NIL.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

BRISTOL.*Publication of Official Returns Suspended.***GLASGOW.***Week ending November 29.*

AMMONIUM PHOSPHATE—
Rouen, £272.

ANTIMONY—
Busreh, 6 t.

CAUSTIC SODA—
Busreh, 2 drms.; Genoa, 606 drms.; Leghorn, 28 drms.

CHEMICALS (otherwise undescribed)—
Busreh, 26 pkgs.; Buenos Ayres, 10 pkgs.; Genoa, 100 pkgs.; Pt. Swettenham, 1 pkgs.; Rouen, 72 pkgs.; Trinidad, 83 pkgs.

CITRIC ACID—
Busreh, 2 c.

COAL PRODUCTS (otherwise undes.)—
Busreh, £45.; Rouen, £130.; Pt. Swettenham, £107.

COAL PRODUCTS—
Carbolic Acid
Busreh, 2 c.

DYE STUFFS (otherwise undescribed)—
Genoa, £336.

DYE STUFFS—
Quebracho Extract
Bordeaux, £81.

LEAD NITRATE—
Rouen, 5 t.

PARAFFIN WAX—
Leghorn, 9 t. 16 c.

PITCH—
Leghorn, 300 t.

POTASSIUM BICHROMATE—
Valencia, £53.

SALAMMONIAC—
Busreh, 23 cks.

SHEEP DIP—
Buenos Ayres, £15,030.

SOAP—
Abadan, 1 bx.; Barbados, 60 bxs.; Busreh, 11 bxs.; Demerara, 10 bxs.; Pt. Swettenham, 3 bxs.; Trinidad, 52 bxs.

SODA ASH—
Genoa, 7 t. 4 c.

SODIUM BICARBONATE—
Busreh, 232 lbs.

SPERMACEETI WAX—
Rouen, 1 t. 8 c.

SULPHUR—
Demerara, 1 t. 12 c.

SULPHURIC ACID—
Busreh, 1 t.

TARTARIC ACID—
Busreh, 2 c.

GRANGEMOUTH.*Week ending November 29.*

NIL.

GRIMSBY.*Week ending November 29.*

NIL.

HULL.*Week ending November 25.*

BASIC SLAG—
Oporto, 132 t.

BEE SWAX—
Wiborg, 2 bgs.

BORAX—
Newfairwater, 200 bgs.

CARBON (RETORT)—
Christiania, 15 cs.

CHEMICALS (otherwise undescribed)—
Antwerp, 1 ck., 1 brl., 13 drms.; Bombay, 380 drms., 126 cks., 1,167 brls.; Copenhagen, 1 cs.; Christiania, 17 cs., 2 drms., 25 cks., 5 brls., 277 kgs.; Dunkirk, 8 cks., 50 bgs., 8 cbys.; Gothenburg, 30 cks.; Helsingfors, 17 cks., 14 pkgs.; Karachi, 789 brls., 80 drms.; New York, 19 cks., 20 pkgs.; Newfairwater, 25 cs., 30 kgs., 273 cks., 133 brls., 1,396 bgs., 10 drms.; Rotterdam, 2 cs., 1 ck.

COAL PRODUCTS—
Creosote
New York, 60 brls., 102 drms.; Rouen, 2,465 cks.

DISINFECTANTS (otherwise undes.)—
Bombay, 1,400 drms.; Karachi, 2,000 drms., 10 cs.

DYE STUFFS (otherwise undescribed)—
Bombay, 13 kgs., 116 cks., 3 drms.

FATTY ACIDS—
Dunkirk, 30 brls.

GLUE—
Antwerp, 1 ck.; Christiania, 150 bgs.

MAGNESIUM CARBONATE—
Valencia, 200 bgs.

PARAFFIN WAX—
Newfairwater, 14 cs.; Wiborg, 650 bgs.

PITCH—
Antwerp, 490 t.; Caen, 500 t.; Rotterdam, 540 t.

RED LEAD—
Barcelona, 10 cks.

SALT—
Barcelona, 100 cs.

SODA—
Helsingfors, 200 kgs.

TARTARIC ACID—
New York, 5 cks.

TURPENTINE—
Antwerp, 2 brls.

WAX—
Antwerp, 126 bgs.

WOOD PRESERVATIVE—
Dunkirk, 5 brls., 5 drms.

LEITH.*Week ending November 29.*

AMMONIUM SULPHATE—
Kobe, 850 t., £2,350.

BORAX—
Amsterdam, 2 t. 6 c., £92.; Antwerp, 4 t. 18 c., £192.; Lisbon, 10 t., £390.

BORIC ACID—
Amsterdam, 2 t. 19 c., £220.; Lisbon, 7 t., £457..

CREAM OF TARTAR—
Iceland, 1 c., £11.

MAGNESIUM CARBONATE—
Rouen, 6 t. 18 c., £246.

POTASSIUM BICHROMATE—
Amsterdam, 3 t. 6 c., £525.; Dunkirk, 5 t. 3 c., £817.

SODA ASH—
Rotterdam, 17 t. 4 c., £135.

SODA CRYSTALS—
Iceland, 2 t. 10 c., £18.

SODIUM BICARBONATE—
Iceland, 2 c., £1.

LIVERPOOL.*Week ending November 27.*

ACETIC ACID—
Bombay, 48 lbs., £5.; Constantinople, 4 c., £45.; Galatz, 2 t. 1 c., £180.; Iquitos, 1 c., £6.; Restoff, 4 c., £28.; Wellington, 5 c., £34.

ACETO SALICYLIC ACID—
Gothenburg, 5 c., £100.

ALUM—
Galatz, 14 t. 11 c., £255.; Lagos, 3 t., £74.

ALUM (CHROME)—
Bilbao, 10 c., £50.

ALUMINA SULPHATE—
Bilbao, 12 t. 10 c., £200.; Bombay, 10 t., £189.; Bergen, 4 t. 18 c., £60.; Christiania, 10 t. 2 c., £120.; Gothenburg, 1 t. £15.; Passages, 12 t. 10 c., £200.; Trondhjem, 20 t., £170.

ALUMINA SULPHIDE—
Rio de Janeiro, 2 t. 6 c., £184.

ALUMINOFERRIC—
Rosario, 15 t. 5 c., £136.

AMMONIA—
Buenos Ayres, 12 c., £72.; Monrovia, 2 c., £25.; Wellington, 1 c., £2.

AMMONIA (ANHYDROUS)—
Lagos, 5 c., £99.

AMMONIUM CARBONATE—
Barcelona, 2 t., £135.; Maranham, 1 c., £4.; Marseilles, 1 t., £65.; Piraeus, 1 t., £66.; Pt. Alegre, 10 c., £49.; St. John's, 4 c., £19.; Santos, 14 t. 6 c., £938.; Seville, 1 t., £67.; Santander, 1 t., £61.; Stamboul, 2 t. 3 c., £129.; Smyrna, 1 t. 12 c., £92.; Trondhjem, 1 t. 9 c., £132.; Valencia, 10 c., £28.

AMMONIUM MURIATE—
Barcelona, 19 c., £50.; Constantinople, 4 t. 19 c., £322.

AMMONIUM MURIATE—
Genoa, 7 t., £384.; Leghorn, 20 t. 2 c., £1,010.; Rio de Janeiro, 1 t., £60.; St. John's, 8 t. 19 c., £451.; St. Lucia, 1 c., £3.; Santander, 2 t. 4 c., £117.; Stamboul, 7 t. 9 c., £485.; Smyrna, 2 t. 19 c., £193.

ANTIMONY—
Buenos Ayres, 6 c.; Rosario, 1 t. 4 c.; Para, 3 t. 7 c.; Santos, 9 t.

ANTIMONY (CRUDE)—
Santos, 8 t. 19 c., £369.

ARSENIC—
Buenos Ayres, 4 t. 14 c., £286.; Melbourne, 2 t. 18 c., £350.; Oporto, 6 c., £19.

BARIUM PERBORATE—
Kobe, 2 c., £28.

BARIUM SULPHIDE—
Rio de Janeiro, 17 c., £66.

BISMUTH CARBONATE—
Constantinople, 1 c., £86.

BLEACHING POWDER—
Bombay, 10 t., £180.; Malta, 9 c., £8.; Pt. Alegre, 19 c., £17.; Rio de Janeiro, 20 t. 2 c., £307.; Rotterdam, 7 t. 8 c., £90.; Santos, 13 t. 3 c., £200.

BORAX—
Antwerp, 15 t., £730.; Galatz, 10 t., £610.; Iddo, 1 c., £3.; Montreal, 3 t., £120.; Santos, 2 c., £5.

BORIC ACID—
Constantinople, 6 c., £26.; Durban, 4 c., £15.; Rio de Janeiro, 70 lbs., £3.; Santos, 2 c., £8.

CALCIUM CARBONATE—
Lagos, 1 c., £3.; Oporto, 10 c., £15.

CALCIUM CHLORIDE—
Bombay, 34 t. 8 c., £224.; Madras, 5 t. 2 c., £38.; Palermo, 2 t. 2 c., £21.; Sydney, 17 t. 12 c., £156.

CAUSTIC SODA—
Adelaide, 65 pkgs.; Bahia, 924 drms.; Balik Pappan, 166 pkgs.; Bombay, 65 drms.; Buenos Ayres, 75 drms.; Christchurch, 20 pkgs.; Galatz, 375 drms.; Genoa, 525 drms.; Kobe, 540 drms.; Las Palmas, 40 drms.; Lytleton, 125 pkgs.; Messina, 54 pkgs.; Monte Video, 65 drms.; Oporto, 64 drms.; Palermo, 15 drms.; Rouen, 220 drms.; Sao Paulo, 75 drms.; Sydney, 93 drms.; Valencia, 77 drms.; Valparaiso, 400 drms.; Vladivostock, 337 drms.; Wellington, 25 drms.; Yokohama, 636 drms.

CHEMICALS (otherwise undescribed)—
Marseilles, 5 t., £100.; Odessa, 8 c., £56.; Oporto, 5 t., £350.; Paris, 9 t. 12 c., £280.; Sao Paulo, 6 c., £13.

CHLORIDE OF LIME—
Cape Town, 2 t., £35.; Patras, 2 t. 2 c., £36.

CHROME ACETATE—
Rio de Janeiro, 1 t. 13 c., £285.

GOOLE.*Week ending November 29.*

NIL.

COAL PRODUCTS—

Carbolic Acid
Antwerp, 10 t., \$790.; Hong Kong, 50 t., \$4,500.; Kobe, 43 t. 15 c., \$3,827.; Revel, 6 c., \$12.; Rio de Janeiro, 330 gals., 2 t. 19 c., \$266.; St. John's, 17 c., \$21.; Yokohama, 15 t. 9 c., \$11.13.

Creolina

Rio de Janeiro, 2 t. 10 c., \$218.; Revel, 5 c., \$13.

Creosote

Buenos Ayres, 23 t. 3 c., \$412.; Revel, 11 lbs., \$4.

Naphthalene

Iddo, 2 qrs., \$2.; Lisbon, 8 c., \$16.; Pernambuco, 2 c., \$10.

Tar

Sierra Leone, 1 t. 10 c., \$14.; Saltpond, 2 t. 10 c., \$13.; Winnebago, 4 c., \$35.; Warri, 10 c., \$7.

COPPER SULPHATE—

Alexandria, 10 t., \$75.; Algiers, 9 t. 15 c., \$350.; Bordeaux, 239 t., \$9,240.; Bombay, 5 t., \$204.; Montreal, 15 t., \$570.

CREAM OF TARTAR—

Auckland, 5 c., \$80.; Constantinople, 4 c., \$50.; Melbourne, 3 t., \$650.; Monrovia, 12 c., \$6.

DISINFECTANTS (otherwise undes.)

Antwerp, 1 t. 5 c., \$42.; Alga Bay, 6 t. 14 c., \$281.; Ancoats, 2 c., \$3.; Alexandria, 1 t. 4 c., \$133.; Bilbao, 3 c., \$25.; Bluff Hbr., 4 t. 1 c., \$227.; Burutu, 3 c., \$16.; Cape Town, 6 t. 14 c., \$219.; Calabar, 5 c., \$9.; Demerara, 2 qrs., \$5.; Durban, 16 c., \$19.; East London, 14 t. 10 c., \$600.; Guimarara, 4 t. 12 c., \$2,360.; Iloilo, 2 qrs., \$1.; Lagos, 15 c., \$18.; Lisbon, 2 c., \$12.; Lome, 2 c., \$10.; Melbourne, 1 t. 16 c., \$30.; Maceio, 6 c., \$28.; Oporto, 2 qrs., \$3.; Opo, 9 c., \$23.; Oruro, 10 c., \$24.; Piraeus, 1 c., \$2.; Pt. Harcourt, 1 c., \$2.; Rangoon, 9 c., \$13.; Reval, 5 c., \$19.; Singapore, 9 c., \$26.; Sydney, 19 t. 8 c., \$482.; Valparaiso, 3 c., \$24.

DYESTUFFS (otherwise undescribed)

Antwerp, 2 t. 1 c., \$274.; Buenos Ayres, 2 c., \$80.; Callao, 14 c., \$637.; Cadedello, 1 c., \$209.; Galatz, 7 c., \$148.; Genoa, 14 c., \$368.; Kobe, 101 t. 19 c., \$18,879.; Piraeus, 1 t. 19 c., \$285.; Pernambuco, 14 c., \$777.; Rio de Janeiro, 4 c., \$23.; Rangoon, 15 c., \$472.; Saigon, 1 t. 15 c., \$281.; Yokohama, 6 t. 6 c., \$1,615.

DYESTUFFS—

Aniline Dye
Aalberg, 17 c., \$493.; Bahia, 44 lbs., \$60.; Barcelona, 27 t. 8 c., \$9,837.; Beyrout, 10 c., \$324.; Bilbao, 2 t., \$260.; Bombay, 4 t. 2 c., \$234.; Boston, 27 t., \$13,094.; Calcutta, 7 c., \$493.; Copenhagen, 1 c., \$47.; Hong Kong, 6 c., \$116.; Karachi, 10 c., \$560.; Lagos, 1 c., \$40.; Mollendo, 36 lbs., \$43.; Montreal, 12 t. 8 c., \$3,743.; New York, 4 t. 19 c., \$2,049.; Santos, 4 t., \$1,254.; Samarang, 2 t. 18 c., \$1,360.; Syria, 2 t. 4 c., \$201.; Talcahuano, 2 c., \$92.; Valencia, 3 c., \$63.
Logwood Extract
Pernambuco, 10 kgs.

FERRO MANGANESE—

Leghorn, 5 t.; New Orleans, 109 t.; San Francisco, 30 t.

FERRO TUNGSTEN—

New York, 34 t. 1 c.

GLUE—

Auckland, 135 bgs.

GLUE, SIZE, AND GELATINE—

Accra, 50 pkgs.; Barcelona, 30 pkgs.; Bergen, 4 pkgs.; Bilbao, 2 pkgs.; Christiania, 20 pkgs.; Galatz, 120 pkgs.; Patras, 3 pkgs.; Punta Arenas, 3 pkgs.; Quebec, 193 pkgs.; Rangoon, 50 pkgs.; Santos, 8 pkgs.; Talcahuano, 1 pkg.; Tuticorin, 2 pkgs.

HYDROCYANIC ACID—

Calcutta, 3 c., \$12.

LEAD ACETATE—

Genoa, 2 t. 10 c., \$255.; Odessa, 4 c., \$42.; Santos, 1 c., \$5.; Smyrna, 5 c., \$81.

MAGNESIUM SULPHATE—

Alexandria, 1 c., \$2.; Bombay, 10 t., \$108.; Honolulu, 1 t. 10 c., \$73.; Kingston, 1 c., \$2.; Lome, 2 c., \$5.; Parahyba, 5 c., \$7.; Rio de Janeiro, 15 t., \$195.; Santos, 1 t. 9 c., \$22.

MANGANESE ORE—

Paris, 1 t.

NITRIC ACID—

Calcutta, 3 c., \$18.

OLEIC ACID—

Gothenburg, 2 t., \$215.

PHOSPHORUS AMORPHOUS—

Melbourne, 1 c., \$16.; Rio de Janeiro, 15 c., \$133.; Santos, 1 t. 6 c., \$246.

PITCH—

Alexandria, 45 t., \$326.; Accra, 3 c., \$4.; Bathurst, 3 c., \$2.

PARAFFIN WAX—

Antwerp, 104 brls.; Catania, 68 bgs.; Galatz, 20 t.

POTASH—

Maceio, 2 c., \$8.

POTASSIUM BICHRONATE—

Constantinople, 1 t. 14 c., \$266.; Galatz, 6 t. 2 c., \$978.; Piraeus, 18 c., \$64.; Rosario, 6 c., \$45.; Smyrna, 16 c., \$131.

POTASSIUM CARBONATE—

Melbourne, 3 t. 18 c., \$420.; Patras, 3 lbs., \$1.

POTASSIUM CHLORIDE—

Cape Town, 1 t., \$65.; Constantinople, 10 c., \$88.; Odessa, 4 c., \$44.; Santos, 1 c., \$11.

POTASSIUM CYANIDE—

Calcutta, 2 c., \$19.

POTASSIUM SULPHATE—

Rio de Janeiro, 22 lbs., \$3.; Teneriffe, 5 t., \$125.

POTASSIUM SULPHIDE—

Napier, 108 kgs.

SALAMMONIAC—

Calcutta, 4 c., \$15.; Constantinople, 5 t. 3 c., \$363.; Fama-gusta, 2 c., \$8.; Galatz, 2 t., \$170.; Limassol, 4 c., \$18.; Smyrna, 1 t. 8 c., \$100.

SALICYLIC ACID—

Rio de Janeiro, 2 c., \$31.

SALT—

Onitsha, 20 t.; Oporto, 1 t.; Para, 43 t.; Puerto Barrios, 50 t.; Rouen, 20 t.; Secondee, 1 t.

SALTCAKE—

Bilbao, 2,000 pkgs.

SALT PETRE—

Lagos, 10 c., \$38.; Madeira, 5 c., \$19.; Maranham, 3 c., \$10.; Para, 12 c., \$38.; Sierra Leone, 3 c., \$11.

SHEEP DIP—

Alga Bay, 6 t. 2 c., \$403.; Buenos Ayres, 52 t. 19 c., \$2,722.; Cape Town, 2 t. 5 c., \$135.; Christchurch, 5 t., \$164.; East London, 16 t. 4 c., \$949.; Durban, 15 t. 13 c., \$1,074.; Invercargill, 2 t. 6 c., \$85.; Napier, 3 t. 12 c., \$134.; Nelson, 1 t. 3 c., \$44.; Pt. Elizabeth, 18 t. 11 c., \$700.; Rio Gallegos, 7 t. 10 c., \$415.; Talcahuano, 5 t., \$200.; Trondhjem, 1 t. 4 c., \$52.; Wellington, 2 t. 7 c., \$88.; Valparaiso, 5 c., \$29.

SOAP—

Accra, 5 cs., 425 bxs.; Antofagasta, 785 bxs.; Attuabee, 225 bxs.; Auckland, 45 bxs.; Banda, 175 bxs.; Bandjer massin, 500 bxs.; Batavia, 100 bxs.; Bathurst, 5 cs.; Belawan, Deli, 1,000 bxs., 500 cs.; Benoa, 100 bxs.; Boeleling, 135 bxs.; Buenaventura, 50 cs.; Buenos Ayres, 3 cs.; Cheribon, 220 cs.; Christiania, 1 bx.; Constantinople, 135 bxs.; Corinto, 500 bxs.; Coomassie, 200 bxs.; Dakar, 1,446 bxs.; Dunkirk, 4,770 bxs.; Focani, 220 cs.;

SOAP—

Genoa, 3,000 bxs.; Gorontalo, 200 bxs.; Grenda, 500 bxs.; Guadeloupe, 10 cs.; Half Assinee, 100 bxs.; Hong Kong, 11 brls.; Koko, 1 cs.; Las Palmas, 707 bxs.; Larache, 381 bxs.; Leghorn, 600 bxs.; Macassar, 1,025 cs.; 500 bxs.; Mauritius, 3,200 bxs.; Monte Video, 3 cs.; Nantes, 1,050 cs.; Naples, 30 bxs.; Nassau, 10 cs., 4 bxs.; Opo, 224 bxs., 550 cs.; Oporto, 1 cs.; Oran, 1,910 bxs.; Padang, 550 pkgs.; Palermo, 3 bxs., 2 cs.; Paramaribo, 270 pkgs.; Piraeus, 48 bxs.; Pt. Harcourt, 998 bxs.; Pt. of Spain, 29 bxs.; Puerto Barrios, 50 pkgs.; Puerto Colombia, 1 bx.; Quittah, 5 bxs.; Rabat, 1,260 bxs.; Rangoon, 450 bxs.; Rosario, 100 pkgs.; Rubisque, 1,200 pkgs.; Rotterdam, 11 bxs.; St. Kitts, 100 bxs.; Salonika, 121 bxs.; San Juan, 5 pkgs.; Samarang, 895 bxs.; Secondee, 310 bxs.; Savanilla, 4 bxs.; Singapore, 2,776 bxs.; Sierra Leone, 50 bxs.; Shanghai, 506 bxs.; Smyrna, 56 bxs.; Stockholm, 10 bxs.; Talcahuano, 10 bxs.; Tagoelandang, 75 bxs.; Taroena, 100 bxs.; Teneriffe, 185 bxs.; 842 cs.; Ternate, 250 bxs.; Tilatjap, 503 cs.; Trelew, 130 cs.; Tumaco, 400 bxs.; Trinidad, 500 bxs.; Tsingtau, 25 bds.; Vera Cruz, 52 cs.; Vlaardingen, 2 cs.; Warri, 300 bxs.; Wellington, 57 bxs., 5 cs.; Wiborg, 3,617 bxs.

SODA ASH—

Antofagasta, 200 pkgs.; Bombay, 1,400 pkgs.; Buenos Ayres, 4,309 pkgs.; Concepcion, 82 pkgs.; Hong Kong, 1,792 pkgs.; Helsingfors, 382 pkgs.; Leghorn, 160 pkgs.; Lyttleton, 8 pkgs.; Melbourne, 450 pkgs.; Messina, 70 pkgs.; Moji, 2,867 pkgs.; Penang, 30 pkgs.; Valparaiso, 331 pkgs.; Vera Cruz, 400 pkgs.; Yokohama, 5,237 pkgs.

SODA CRYSTALS—

Bombay, 250 pkgs.; Casablanca, 95 pkgs.; Singapore, 8 pkgs.

SODIUM BICARBONATE—

Aarhus, 105 pkgs.; Amsterdam, 905 pkgs.; Bombay, 2,400 pkgs.; Buenos Ayres, 2,588 pkgs.; Christiania, 60 pkgs.; Constantinople, 230 pkgs.; Dantzic, 600 pkgs.; Genoa, 525 drms.; Halifax, 100 pkgs.; Kobe, 100 pkgs.; Las Palmas, 10 pkgs.; Lyttleton, 1,416 pkgs.; Moji, 323 pkgs.; Napier, 20 pkgs.; Pernambuco, 60 pkgs.; Penang, 30 pkgs.; Sao Paulo, 200 pkgs.; Valparaiso, 1,000 pkgs.; Varna, 16 pkgs.; Velo, 20 pkgs.; Venice, 100 pkgs.; Wanganui, 14 pkgs.; Wellington, 100 pkgs.

SODIUM SALICYLATE—

Odessa, 1 c., \$33.

SODIUM SILICATE—

Alexandria, 194 pkgs.; Boston, 40 pkgs.; Buenos Ayres, 181 pkgs.; Hamburg, 279 pkgs.; Hankow, 50 pkgs.; Maceio, 6 pkgs.; Melbourne, 52 pkgs.; Montreal, 100 pkgs.; Oporto, 426 pkgs.; Pernambuco, 48 cs.; Piraeus, 200 pkgs.; Salonika, 32 pkgs.; Santos, 80 pkgs.; Vancouver, 10 pkgs.

SODIUM SULPHIDE—

Bordeaux, 159 pkgs.; Buenos Ayres, 100 pkgs.; New York, 484 pkgs.; Oporto, 54 pkgs.

SULPHUR—

Kingston, 1 c., \$8.; Montreal, 5 c., \$16.

SULPHURIC ACID—

Alleppey, 19 c., \$37.; Calcutta, 2 c., \$8.; Rio de Janeiro, 1 t. 13 c., \$83.; Sierra Leone, 1 c., \$5.; Valparaiso, 9 c., \$23.

TALLOW—

Galatz, 10 t.

TANNIC ACID—

Odessa, 1 c., \$65.

TAR—

Bathurst, 1 c., \$4.

TARTARIC ACID—

Bombay, 50 lbs., \$5.; Melbourne, 2 t., \$638.; Montreal, 1 t. 10 c., \$495.; Parahyba, 1 c., \$23.; Sydney, 4 t., \$1,276.; Toronto, 1 t. 10 c., \$495.

TIN OXALATE—

Rio de Janeiro, 17 c., \$66.

ZINC CHLORIDE—

Sydney, 1 t. 6 c., \$70.

LONDON.

Week ending November 26.

ACETANILID—

Rangoon, 1 cs., \$10.

ACETIC ACID—

Auckland, 2 cs., \$5.; Antwerp (F.), 5 brls., \$75.; Buenos Ayres, 1 cs., \$5.; Constantinople (F.), 15 cs., \$190.; Montreal, 2 cs., \$7.; Otago, 3 cs., \$8.; Pt. Sudan, 21 cs., \$50.; Salonika, 11 cs., \$138.; Wellington, 6 cs., \$16.

ACETO SALICYLIC ACID—

Batoum, 2 cs., \$25.; Christiania, 20 kgs., \$1,010.; Copenhagen, 3 cs., \$116.; Gothenburg, 33 cs., \$540.; Neppel, 2 brls., \$138.; Piraeus, 6 cs. (pt.), \$18.; Stockholm, 10cs., \$237.

ACETONE—

Antwerp (F.), 61 drms., \$1,795.; Copenhagen, 3 drms., \$88.; Rotterdam (F.), 7 drms., \$32.; Rotterdam, 1 drms., \$31.

ALUM

Colombo, 2 cs., \$6.; East London, 19 cs., \$31.

ALUM (CHROME)—

Cologne, 1 t., \$125.

ALUMINA SULPHATE—

Rotterdam, 2 t. 3 c., \$57.

AMMONIA—

Accra, 18 cs., \$35.; Beira, 3 cs., \$6.; Bombay, 14 cs., \$28.; Bonaire, 42 drms., \$405.; Buenos Ayres, 8 cs., \$16.; Calais, 28 drms., \$295.; Calcutta, 2 cs., \$5.; Durban, 11 cs., \$26.; Hong Kong, 3 cs., \$5.; Karachi, 8 cs., \$15.; Monte Video, 5 cs., \$17.; Rangoon, 3 cs., \$7.; Rio de Janeiro, 10 cs., \$97.

AMMONIA (ANHYDROUS)—

Cape Town, 20 cylds., \$183.; Calcutta, 32 cylds., \$4,024.; Durban, 30 cylds., \$275.; East London, 10 cylds., \$42.; Pt. Elizabeth, 10 cylds., \$42.; Tarquah, 7 cylds., \$129.

AMMONIUM BICARBONATE—

Bombay, 2 c., \$7.

AMMONIUM BICHRONATE—

Calcutta, 1 ck. (pt.), \$5.

AMMONIUM BROMIDE—

Bombay, 1 cs. (pt.), 1 cs., \$29.; Durban (F.), 1 cs., \$10.; Melbourne (F.), 1 cs., \$11.; Piraeus, 1 ck. (pt.), \$6.

AMMONIUM CARBONATE—

Bombay, 2 t., \$166.; Calcutta, 15 c., \$7.; Callao, 1 t., \$66.; Deslorro, 9 c., \$45.; Durban, 1 c., \$5.; Mossel Bay, 2 c., \$10.; Penang, 2 t. 5 c., \$178.; Piraeus, 10 c., \$19.; Rangoon, 1 t., \$74.; Singapore, 3 t., \$314.; Zanzibar, 1 c., \$7.

AMMONIUM FLUORIDE—

Demerara, 6 brls., \$121.

AMMONIUM HYDRATE—

Bombay, 1 cs. (pt.), \$10.

AMMONIUM MOLYBDATE—

Adelphi, 1 cs. (pt.), \$10.

AMMONIUM MURIATE—

Perth, 2 c., \$5.; Rabat, 2 c., \$17.

AMMONIUM PHOSPHATE—

Durban, 7 cs., \$116.

AMMONIUM SULPHATE—

Tripoli, 100 t., \$2,650.

AMMONIUM SULPHOCYANIDE—

Sydney, 2 cs., \$11.

AMYL ACETATE—

Brussels, 1 drms., \$10.; Paris, 6 drms., \$653.

ANTIMONY

Rotterdam, 2 t.

ANTIMONY REGULUS

Rotterdam, 25 t.

ANTIMONY SULPHIDE

Paramagua, 10 c., £21.

ANTIMONY SULPHIDE

Boulogne, 16 cks., 6 kgs., £385.; Kobe, 13 cks., £209.; Italy, 20 cks., £448.; Paris, 13 cks., £240.; Rotterdam, 10 cks., £184.; Santos, 30 cks., £59.; Yokohama, 13 cks., £437.

ANTIMONY TARTRATE

Brussels, 2 cks., £33.; Bombay, 1 cs. (pt.), £8.; Gothenburg, 8 kgs., £150.; Odense, 3 kgs., £54.

BARIUM NITRATE

Antwerp, 100 cs., 13 cks., £550.

BENZALDEHYDE

Stockholm, 1 cs., £20.

BEESWAX

Antwerp, 1 t. 3 c.; Copenhagen, 1 t.; Norrköping, 1 c.

BLEACHING POWDER

Pernambuco, 9 t. 18 c., £157.

BISMUTH

Bombay, 1 cs. (pt.), £10.; Naples, 1 cs., £250.; Shanghai, 2 cs., 2 cs. (pt.), £166.

BISMUTH CARBONATE

Cape Town, 30 lbs., (pt.), £22.; Durban, 1 cs., £87.; Piraeus, 1 cs. (pt.), £10.

BISMUTH SALTS

Cape Town, 30 lbs., (pt.), £5.; Piraeus, 2 cs. (pt.), £8.

BISMUTH SALTS

Adelaide, 1 cs. (pt.), £44.

BISMUTH SUBGALLATE

Cape Town, 30 lbs., (pt.), £5.; Piraeus, 1 cs. (pt.), £8.

BISMUTH SUBNITRATE

Cape Town, 30 lbs., (pt.), £10.; Copenhagen, 1 cs., £17.; Odense, 1 cs., £22.; Piraeus, 1 cs. (pt.), £9.

BORAX

Antwerp, 15 t. 2 c., £24.; Antwerp, 20 t. (F.), £780.; Beira, 7 c., £15.; Cadix, 10 t. 11 c., £1,933.; Calcutta, 5 c., £12.; Cape Town, 3 c., £15.; Christiania, 1 t. 10 c., £8.; Durban, 5 c., £19.; East London, 2 c., £5.; Hamburg, 1 t., £250.; Gothenburg, 2 t. 2 c., £84.; Gothenburg, 5 t. 10 c., £230.; Geraldton, 1 c., £11.; Jibau, 16 c., £11.; Lihle, 10 c., £11.; (Finland), 1 t. £15.; Nantes, 17 c., £12.; Rangoon, 2 t. 3 c., £82.; Shanghai, 7 c., £15.; Stockholm, 1 t., £40.; Warsaw, 1 t., £45.

BORIC ACID

Asuncion, 2 c., £19.; Constantinople, 4 c., £32.; Gothenburg, 3 t. 19 c. (F.), £294.; Medan, Deli, 4 c., £15.; Switzerland, via Ostend, 5 c., £18.; Rotterdam, 1 t. (F.), £74.; Shanghai, 1 t. 5 c., £95.; Stockholm, 2 t. (F.), £114.

BUTYRIC ACID

Rotterdam, 1 cys., £27.

CACODYLIC ACID

Boston, 1 cs., £93.

CALCIUM CARBIDE

Calcutta, 5 c., £6.; Channel Is. (F.), 1 t., £27.; Sase, 1 cs., £6.

CALCIUM CARBONATE

Adelaide, 5 bgs., £6.; Marseilles, 13 bgs., £28.; Shanghai, 15 cks., £34.

CALCIUM HYPOPHOSPHITE

Calcutta, 2 cs., £10.; New York, 40 cs., £870.

CARBON BISULPHIDE

Copenhagen, 20 drms., £30.; Durban, 1 drms., £8.

CARBONATE OF LIME

Buenos Ayres, 11 cks., £14.

CARNAUBA WAX

Amsterdam, 10 c.

CAUSTIC POTASH

Calcutta, 1 cs. (pt.), £9.

CAUSTIC SODA

Barbados, 5 c., £19.; Havre, 4 t. 2 c., £137.; Malacca, 2 c., £39.; Naples, 20 t. 9 c., £409.; Shanghai, 7 c., £29.

CELLULOSE ACETATE

Calais, 1 sk., £20.

CERESINE WAX

Adelaide, 2 t.; Antwerp, 3 t.; Christiania, 10 c.; Wellington, 2 t. 1 c.

CHEMICALS (otherwise undescribed)

Adelaide, 7 cs., £50.; Alexandria, 1 cs., £21.; Auckland, 5 cs., £61.; Beira, 1 cs., £10.; Bilbao, 1 cs., £7.; Bombay, 2 pkgs., £20.; Brisbane, 1 cs., £33.; Buenos Ayres, 13 cs. (pt.), £65.; Christchurch, 2 cs., £9.; Constantinople, 3 cs., £46.; Durban, 1 cs. (pt.), £5.; Kobe, 2 cs., £98.; Melbourne, 17 pkgs., £143.; Piraeus, 15 pkgs., £652.; Rangoon, 14 cs., £278.; Rio de Janeiro, 13 pkgs., £490.; Singapore, 3 cs., £64.; Shanghai, 4 pkgs. (pt.), £64.; Sydney, 5 pkgs., £32.; Tokio, 2 cs., £148.; Wellington, 3 cs., £20.

CITRIC ACID

Barcelona, 1 t., £469.; Bilbao, 10 c. (F.), £235.; Bombay, 5 c. (F.), £110.; Bombay, 1 t. 5 c., £630.; Cape Town, 1 cs. (F.), £31.; East London, 1 cs. (pt.), £6.; Kobe, 3 t., £1,290.; Malmo, 15 c. (F.), £378.; Montreal, 3 t., £1,321.; New York, 10 c., £227.; Piraeus, 1 cs. (pt.), £6.; Pt. Elizabeth, 1 c. (F.), £15.; Trinidad, 1 c. (F.), £15.

COAL PRODUCTSAniline Chlorohydrate
Smyna, 3 cks., £123.**Aniline Colour**

Jaffa, 1 cs. (pt.), £7.; Jamaica, 1 cs. (pt.), £9.; Melbourne, 2 cs. (pt.), £91.

Aniline Dye

Genoa, 10 pkgs., £377.; Santos, 3 cs., £30.

Aniline Salt

Alexandria, 5 cks., £84.

Auramine

Bombay, 4 cks., £530.

Bitumen

Bombay, 117 cks., £842.

Carbolic Acid

Brisbane, 4 cs., £24.; Cape Town, 1 drms., £9.; Channel Islands, 10 cks., £79.; Fiji Islands, 3 cs., £11.; Hamstad, 125 cks., £1,100.; Helsingfors, 54 cks., £437.; Piraeus, 4 cs. (pt.), £15.; Sekondi, 10 drms., £20.

Creosote

Boulogne, 507 cks., £1,020.; Dunkirk, 250 brls., £625.; Durban, 50 drms., £38.; Hong Kong, 1 cs., £23.; New Orleans, 3,430 t., £18,835.

Creosote Oil

Calais, 1,570 brls., £3,064.; San Francisco, 140 cks., £383.

Cresylic Acid

St. John, N.B., 10 cks., £93.

Mirbane Oil

Melbourne, 4 pkgs., £54.; Sydney, 43 pkgs., £256.

Naphthalene

Alexandria, 1 cs., £5.; Helsingfors, 8 cks., £23.

Pitch

Antwerp, 438 t., £1,740.; Auckland, 20 brls., £38.; Boulogne, 1,139 t., £4,504.; Calais, 1,438 t., £5,313.; Dunkirk, 145 t., £592.; St. Servan, 1,423 t., £5,692.

Tar

Acera, 20 cks., £36.; Beira, 100 drms., £38.; Durban, 280 drms., £32.

Tar Oil

Brussels, 1 drms., £5.; Calais, 552 drms., £950.; Hong Kong, 5 drms., £7.

COPPER CARBONATE

Copenhagen, 2 cks., £41.

COPPER SULPHATE

Salonika, 1 t., £15.

COPPERAS

Barcelona, 1 t. 7 c., £18.

CREAM OF TARTAR

Athens, 1 cs. (pt.), (F.), £7.; Bombay, 4 c., £43.; Canary Islands, 1 kg., (F.), £7.; Cape Town, 6 c. (F.), £100.; Cape Town, 1 t., £245.; Calcutta, 5 c., £68.; Calcutta, 5 c. (F.), £74.; Durban, 4 c. (F.), £67.; East London, 2 c. (F.), £30.; East London, 1 c., £13.; Geraldton, 6 c., £74.; Hango, 10 c., £133.; Karachi, 1 c., £13.; Limon, 1 c., £13.; Mossel Bay, 4 c. (F.), £72.; Pt. Elizabeth, 6 c. (F.), £104.; Rangoon, 1 c. (F.), £13.; Singapore, 1 cs. (F.), £6.; Shanghai, 2 cs. (F.), £7.; Trinidad, 1 cs. (F.), £7.; Brisbane (transit), 2 t. (F.), £360.; St. John, N.B. (transit), 1 t. (F.), £180.; Rockhampton (transit), 1 t. (F.), £180.; Mackay (transit), 2 t. (F.), £360.; Sydney (transit), 34 t. (F.), £6,120.; Townsville (transit), 2 t. (F.), £360.

DISINFECTANTS (otherwise undescribed)

Amoy, 1 t. 11 c., £83.; Antigua, 2 c., £5.; Auckland, 4 c., £25.; Beira, 12 c., £27.; Belawan, 9 c., £23.; Bombay, 1 t. 3 c., £53.; Buenos Ayres, 2 c., £5.; Calcutta, 18 c., £26.; Canton, 3 t. 16 c., £99.; Cape Town, 2 t. 14 c., £128.; Cyprus, 5 c., £11.; Delagoa Bay, 4 c., £49.; Dieppe, 5 t. 19 c., £715.; Dundee, 2 c., £20.; Durban, 12 t. 9 c., £1,096.; Haifa, 1 c., £11.; Hankow, 6 c., £9.; Invercargill, 2 c., £16.; Hong Kong, 3 t. 13 c., £120.; Jamaica, 12 c., £241.; Kuala Lumpur, 12 c., £19.; Karachi, 1 t. 7 c., £67.; Kobe, 2 t. 3 c., £104.; Malta, 4 c., £11.; Montreal, 3 c., £11.; Lisbon, 4 c., £36.; Lytleton, 1 c., £5.; Ottago, 4 c., £11.; Osaka, 2 t. 3 c., £142.; Pt. Moresby, 4 c., £13.; Perth, 2 c., £9.; Pt. Swettenham, 1 t. 2 c., £32.; Rangoon, 2 t. 15 c., £152.; Rio de Janeiro, 3 c., £8.; Rotterdam, 2 t., £114.; St. John, N.B., 1 c., £7.; Sandakan, 1 t. 17 c., £53.; San Sebastian, 11 c., £60.; Shanghai, 2 t. 5 c., £82.; Swatow, 14 c., £24.; Sydney, 1 t. 1 c., £69.; Toronto, 4 c., £34.; Trinidad, 15 c., £26.; Wellington, 2 t. 17 c., £99.

ETHER

Penang, 1 cs., £11.

ETHER (ACETIC)

Odessa, 4 cs., £170.

ETHER (SULPHURIC)

Odessa, 30 drms., £250.

FORMALDEHYDE

Buenos Ayres (F.), 5 brls., £132.; Dieppe, 25 brls., £720.; Pt. Swettenham, 1 cs., £6.; St. Kitts, 2 brls., £60.

FULLER'S EARTH

Baltimore, 233 t.; Barcelona, 98 t.; Malaga, £321.; Nanking, 20 t.

GLUE

Boston, 1 t. 6 c.; Delft, 1 t. 13 c.

GLUE, SIZE, AND GELATINE

Adelaide, 1 c.; Antwerp, 59 t. 16 c.; Alexandria, 4 c.; Auckland, 11 c.; Amsterdam, 11 t. 6 c.; Bangkok, 2 c.; Bombay, 1 c.; Calais, 2 c.; Calcutta, 10 c.; Cologne, 14 t.; Copenhagen, 6 t. 19 c.; Durban, 14 c.; East London, 2 t.; Fremantle, 1 c.; Ghent, 9 t. 11 c.; Gibraltar, 3 c.; Helsingfors, 2 t.; Karachi, 4 c.; Kobe, 6 t. 5 c.; Melbourne, 6 c.; Mombasa, 1 c.; New York, 3 t. 5 c.; Perth, 1 c.; Pt. Said, 1 c.; Rotterdam, 16 t. 17 c.; Sydney, 1 t. 11 c.; Wellington, 1 t. 5 c.; Yokohama, 2 t. 12 c.

GLYCERINE

Alexandria, 1 c., £12.; Bombay, 3 c., £42.; Buenos Ayres, 3 c., £26.; Calcutta, 1 t. 2 c., £152.; Durban, 12 c., £69.; Piraeus, 2 c., £14.; Pt. Elizabeth, 1 c., £7.; Rotterdam, 1 t., £134.; Swatow, 1 c., £7.; Tientsin, 2 c., £15.

GOLD CHLORIDE

Durban, 1 cs. (pt.), £66.

HYDROCHLORIC ACID

Durban, 8 c., £44.; Sekondi, 6 c., £9.; Shanghai, 1 c., £5.

HYDROXYANIC ACID

Melbourne, 1 cs., £15.

HYDROGEN PEROXIDE

Alexandria, 14 cs., £21.; Boulogne, 38 cbs., £63.; Durban, 8 cs., £43.

HYPOPHOSPHORIC ACID

Adelaide, 1 cs., £12.; Sydney, 1 cs., £30.

IODINE

Batoum, 1 cs., £95.; Constantinople, 1 cs., £35.

IODINE (RESUBLIMED)

Brussels, 2 cs., £202.; Galatz, 1 cs. (pt.), £51.; Hobart, 1 cs. (pt.), £7.

IRON AND AMMONIUM CITRATE

Antwerp, 1 cs., £29.; Hobart, 1 cs. (pt.), £6.; Melbourne, 1 cs. (pt.), £6.; Shanghai, 1 cs., £34.; Rotterdam, 1 cs., £62.; Shanghai 5 cs., £78.

LACTIC ACID

Athens (F.), 2 cs. (pt.), £17.; Melbourne, 5 cks., £90.; Piraeus, 1 cs. (pt.), £6.; Piraeus (F.), 4 pkgs. (pt.), £16.

LEAD ACETATE

Alexandria, 1 cs. (pt.), £6.; Rouen, 20 cs., £440.; Swatow, 1 cs., £40.

LITHIUM CARBONATE

Adelaide, 1 cs. (pt.), £7.

MAGNESIA

Adelaide, 10 cs., £30.; Durban, 3 cs., £20.

MAGNESIUM CARBONATE

Bordeaux, 4 cs., £22.; St. John, N.B., 1 ck., £5.

MAGNESIUM CHLORIDE

Bombay, 9 cks., £52.; Copenhagen, 2 drms., £6.; Montreal, 3 drms., £22.

MAGNESIUM CITRATE

Barcelona, 35 cs., £500.; Bombay, 15 cs. (pt.), £132.

MAGNESIUM HYPOPHOSPHITE

Melbourne, 1 cs., £5.

MAGNESIUM SULPHATE

Accra, 10 c., £19.; Barbados, 5 c., £12.; Beira, 8 c., £18.; Bombay, 4 c., £6.; Brussels, 10 c., £10.; Cape Town, 1 t. 12 c., £68.; East London, 1 t. 6 c., £57.; Montreal, 2 c., £64.; Melbourne, 2 t. 9 c., £105.; Mossel Bay, 14 c., £30.; Pt. Elizabeth, 1 t. 12 c., £55.; Pt. Sudan, 5 c., £16.; Pto. Novo, 10 c., £20.; Sekondi, 10 c., £21.; Shanghai, 2 t., £43.; Townsville, 1 t. 2 c., £43.

MANGANESE BORATE

Copenhagen, 1 c., £10.

MERCURIALS

Bombay, 3 cs. (pt.), £49.; Calcutta, 1 cs., £37.; Shanghai, 4 cs. (pt.), £49.; Trinidad, 1 cs., £26.

MERCURIAL SALTS

Adelaide, 1 cs. (pt.), £11.

MERCURY BICHLORATE

Switzerland, 2 cs., £120.

MERCURY SUBCHLORIDE

East London, 1 cs. (pt.), £7.

METHYL ACETONE

Durban, 7 drms., £77.

METHYL SALICYLATE

Batoum, 1 cs., £11.; Santos, 1 cs. (pt.), £12.; Stockholm, 2 drms., £39.

MINERAL WAX

Antwerp, 1 t. 10 c.

MURIATIC ACID

Santos, 2 t. 9 c., £143.

NITRATE OF LIME

Mauritius (F.), 173 t., £3,760.

NITRIC ACID

Durban, 17 c., £36.; Piraeus, 2 c., £10.; Sekondi, 6 c., £23.

OXALIC ACID—

Brisbane (F.), 1 ck., £23.; Calcutta, 1 kg., £8.; Florence, 2 cks., £72.; Fremantle, 1 kg., £7.; Sydney, 1 kg., £8.

PARAFFIN WAX—

Antwerp, 5 t. 4 c.

PARALDEHYDE—

Cape Town, 1 cs. (pt.), £13.; East London, 1 cs. (pt.), £13.

PHOSPHORIC ACID—

Adelaide, 4 cs., £13.; Melbourne, 32 cs., £16.; Paris, 101 cbys., £1,156.

PHOSPHORUS—

Piraeus, 4 c., £55.

PICRIC ACID—

Pladjoe, 1 cs., £6.

PLUMBAGO—

Barcelona, 9 c.; Copenhagen, 7 c.

POTASH COMPOUNDS—

Shanghai, 1 cs. (pt.), £28.

POTASSIUM ACETATE—

Calcutta, 2 cs., 1 cs. (pt.), £26.; Shanghai, 2 cs., £20.

POTASSIUM BICARBONATE—

Calcutta, 1 cs., £8.; Piraeus, 4 pkgs. (pt.), 3 cs. (pt.), £10.; Wellington, 1 c., £7.

POTASSIUM BROMIDE—

Bombay, 1 cs., 2 cs. (pt.), £41.; Brisbane, 2 cs., £27.; Cape Town, 30 pkgs. (pt.), £9.; Durban, 1 cs. (pt.), £9.; East London, 1 cs. (pt.), £9.; Perth, 2 cs., £45.; Piraeus, 1 ck. (pt.), 1 cs. (pt.), £15.

POTASSIUM CARBONATE—

Constantinople, 1 cs. (pt.), £5.; Rio de Janeiro, 1 ck. (pt.), £7.

POTASSIUM CHLORATE—

Perth, 1 cs., £7.

POTASSIUM CITRATE—

Bombay, 2 cs., £52.; Durban, 1 cs. (pt.), £7.; Melbourne, 1 cs. (pt.), £28.; Shanghai, 1 cs. (pt.), £7.

POTASSIUM CYANIDE—

Bombay, 3 cs., £53.; Bahia, 1 cs. (pt.), £6.

POTASSIUM FERRICYANIDE—

Durban, 1 cs. (pt.), £6.

POTASSIUM IODIDE—

Brussels, 4 cs., £341.; Bombay, 1 cs. (pt.), 2 cs., £179.; Cape Town, 30 pkgs. (pt.), £39.; Christiania, 3 cs., £336.; Galatz, 1 cs., £86.; Melbourne, 1 cs., £84.; Piraeus, 1 cs. (pt.), £20.; Rotterdam (F.), 2 cs., £160.; Shanghai, 2 cs., £173.

POTASSIUM METABISULPHITE—

Montreal, 1 t., 40 cs., £877.; Paris, 15 cs., £70.; Piraeus (F.), 2 kgs., 3 cs. (pt.), £29.

POTASSIUM PERMANGANATE—

Brussels (F.), 1 cs., £10.; Calcutta, 1 cs. (pt.), £13.; Piraeus, 1 ck. (pt.), 1 cs. (pt.), £17.

POTASSIUM PRUSSIANE—

Ghent, 5 c., £52.; Santos, 1 drm., £15.; Yokohama, 5 t., £986.

POTASSIUM SULPHATE—

Brisbane, 1 cs., £4.; Lisbon, 2 c., £22.

POTASSIUM SULPHOGUAIACOLATE—

Piraeus, 1 cs. (pt.), £9.

POTASSIUM TARTRATE—

Stockholm, 3 kgs., £21.

QUININE—

Bombay, 30 ozs.; Calcutta, 1,295 ozs.

RESORCIN—

Galatz, 1 cs. (pt.), £6.

SAL ACETOS—

Florence, 1 ck., £51.

SALAMMONIAC—

Bombay, 7 t. 10 c., £543.; Melbourne, 3 c., £13.; Smyrna, 2 t., £150.; Sydney, 4 c., £18.

SALICYLIC ACID—

Bombay, 1 cs., £15.; East London, 1 cs. (pt.), £5.; Singapore, 2 cs., £28.; Sydney, 2 cks., £28.

SALT—

Auckland, 20 t.; Dunedin, 10 t.; Lyttleton, 101 t.; Pt. Elizabeth, 1 c.; Pt. Sudan, 4 c.; Singapore, 1 t. 7 c.

SALTCAKE—

Santos, 200 t.

SALTPETRE—

Aalborg, 1 t., £52.; Accra, 3 c., £8.; Bilbao, 9 t., £478.; Bombay, 1 t., £61.; Buenos Ayres, 1 t. 16 c., £130.; Dantzig, 1 t., £53.; Durban, 3 t. 6 c., £218.; Delagoa Bay, 3 c., £8.; Ghent, 14 c., £34.; Lisbon, 2 t. 13 c., £206.; Madagascar, 10 c., £38.; Montreal, 1 t. 15 c., £94.; Pernambuco, 14 t. 17 c., £960.; Porto Alegre, 10 c., £32.; Rio de Janeiro, 1 t. 9 c., £88.; Santander, 1 t., £52.; Santos, 27 t. 17 c., £1,689.; Shanghai, 1 c., £6.; Valencia, 3 t., £174.

SHEEP DIP—

Buenos Ayres, 83 t. 5 c., £2,119.; Dunedin, 2 t. 3 c., £112.; Monte Video, 8 t. 1 c., £653.; St. John, N.B., 1 t. 18 c., £47.

SILVER NITRATE—

Batoum, 1 cs., £85.; Buenos Ayres, 1 cs. (pt.), £27.; Lisbon, 1 cs. (pt.), £30.

SOAP—

Accra, 1 c.; Aden, 1 t. 8 c.; Amsterdam, 3 t. 1 c.; Alexandria, 7 c.; Antwerp, 232 t. 15 c.; Arica, 2 c.; Auckland, 16 c.; Bangkok, 10 c.; Beira, 8 c.; Bombay, 6 t. 18 c.; Bilbao, 6 c.; Boulogne, 9 t. 17 c.; Brisbane, 6 c.; Buenos Ayres, 3 c.; Canary Islands, 1 c.; Calcutta, 1 t. 13 c.; Cape Town, 1 c.; Christiania, 1 t. 17 c.; Colombo, 1 t. 5 c.; Copenhagen, 1 t. 16 c.; Dantzig, 9 t. 1 c.; Demerara, 1 c.; Durban, 1 t. 6 c.; Dominica, 2 c.; East London, 1 c.; Fremantle, 1 c.; Genoa, 1 t. 8 c.; Gibraltar, 1 t. 4 c.; Haifa, 2 t. 9 c.; Hamburg, 53 t. 3 c.; Hankow, 3 c.; Havana, 3 t. 13 c.; Hong Kong, 5 c.; Iloilo, 2 c.; Italy, 1 t. 6 c.; Jaffa, 2 c.; Karachi, 3 c.; Madagascar, 30 t. 5 c.; Madras, 1 c.; Marseilles, 1 c.; Malta, 4 t. 16 c.; Montreal, 3 c.; Naples, 4 c.; New York, 3 t. 14 c.; Perth, 4 c.; Penang, 3 t. 14 c.; Piraeus, 5 c.; Pt. Said, 8 c.; Pt. Swettenham, 4 c.; Rangoon, 5 c.; Rotterdam, 31 t. 8 c.; Rio de Janeiro, 4 c.; Shanghai, 8 c.; Singapore, 5 c.; Sydney, 5 c.; Stockholm, 7 c.; Tientsin, 4 c.; Trinidad, 1 c.; Trondhjem, 3 c.; Wellington, 2 t. 6 c.

SODA (CALCINED)

Havre, 8 c., £7.

SODA ASH

Genoa, 15 t. 10 c., £175.; Rotterdam, 9 t., £84.

SODA COMPOUNDS—

Bombay, 2 cs. (pt.), £14.; Shanghai, 1 t. 1 c., £11.

SODIUM ARSENATE

Cape Town, 1 kg., £10.

SODIUM ARSENITE

Durban, 18 c., £64.

SODIUM BENZOATE

Athens (F.), 1 c., £34.; Piraeus, 1 cs. (pt.), £7.; Malaga, 1 c., £26.

SODIUM BICARBONATE—

Antwerp, 15 t., £138.; Bombay, 6 c., £6.; Calcutta, 2 c., £6.; Cape Town, 1 t. 4 c., £47.; Christiania, 2 t., £74.; Cologne, 5 t., £70.; Durban, 4 c., £8.; Geraldton, 5 c., £7.; Hamburg, 25 t. 10 c., £383.; Mossel Bay, 12 c., £23.; Piraeus, 1 t., £18.; St. John, N.B., 4 c., £7.; Smyrna, 5 c., £11.; Tientsin, 1 c., £5.

SODIUM BISULPHITE—

Paris, 5 c., £8.

SODIUM BROMIDE—

Christchurch, 2 pkgs. (pt.), £7.

SODIUM CARBONATE—

Rio de Janeiro, 2 c., £12.

SODIUM CHLORIDE—

Brussels, 10 c., £14.

SODIUM CITRATE—

Calcutta, 12 cs. (pt.), £6.

SODIUM HYDRATE—

Lisbon, 1 cs. (pt.), £8.

SODIUM HYPO—

Antwerp, 5 t., £112.; Colombo, 2 c., £6.; Constantinople, 2 t. 5 c., £63.; Lisbon, 1 t. 7 c., £24.; Shanghai, 1 t., £14.; Singapore, 1 t., £28.; Swatow, 10 c., £15.

SODIUM HYPHOSPHITE—

New York, 20 cs., £510.

SODIUM IODIDE—

Bombay, 1 cs. (pt.), £12.; Calcutta, 2 cs. (pt.), £35.; Gothenburg, 3 cs., £282.; Shanghai, 1 cs. (pt.), £23.

SODIUM METABISULPHITE—

Antwerp, 2 t. 5 c., £100.

SODIUM PYRO—

Leghorn, 1 t., £85.

SODIUM SALICYLATE—

Batoum, 7 kgs., £135.; Bombay, 1 cs., £11.; Cape Town, 2 cs. (pt.), £20.; Durban, 1 cs. (pt.), £8.; East London, 1 cs. (pt.), £9.; Fremantle, 1 kg., £17.; Montreal, 1 kg., £19.; Piraeus, 3 kgs. (pt.), £16.; Shanghai, 1 cs. (pt.), £5.; Sydney, 1 cs. (pt.), £8.

SODIUM SILICOFLOURIDE—

Copenhagen, 1 bg., £5.

SODIUM SULPHATE—

Durban, 8 c., £10.

SODIUM SULPHATE (GLAUBER SALTS)—

Barbados, 13 c., £7.; Boulogne, 1 t., £12.; Melbourne, 9 c., £6.; Paris, 6 t. 1 c., £45.

SODIUM SULPHITE—

Colombo, 2 c., £7.; Otago, 9 c., £5.; Rio de Janeiro, 2 c., £19.; Sourabaya, 1 cs., £14.

SODIUM TARTRATE—

Melbourne, 3 c., £17.; Montreal, 5 c., £35.; New York, 1 t., £140.

STEARINE—

Rotterdam, 5 c.

STRONTIUM AND BARIUM NITRATE—

Madras, 33 cs., £129.

SULPHUR

Aden, 5 c., £10.; Copenhagen, 1 t. 1 c., £70.; Lisbon, 22 t. 11 c., £597.; Stockholm, 10 c., £31.

SULPHUR (FLOWERS)—

Lisbon, 2 t. 3 c., £79.

SULPHURIC ACID—

Antofagasta, 15 c., £55.; Hong Kong, 3 c., £5.; Pt. Swettenham, 10 c., £12.; Rio de Janeiro, 1 t. 4 c., £63.; Sekondi, 2 t. 10 c., £100.; Shanghai, 7 c., £34.; Tarquah, 1 t. 4 c., £36.; Suez, 2 c., £6.

TALLOW—

Colombo, 7 c.; Marseilles, 10 c.

TANNIC ACID—

Piraeus (F.), 1 cs. (pt.), 4 pkgs. (pt.), £14.; Sydney (F.), 1 cs., £7.

TANNIN ALBUMINATE—

Dantzig (F.), 1 ck., £14.; Galatz, 1 cs. (pt.), £7.

TAR (STOCKHOLM)—

Durban, £49.

TARTARIC ACID—

Beira, 1 c. (F.), £12.; Bombay, 13 c., £242.; Cape Town, 2 c. (F.), £47.; Calcutta, 1 c. (F.), £22.; Christiania, 15 c., £290.; Durban, 1 c., £18.; East London, 2 c., £39.; Hong Kong, 9 c., £177.; Melbourne, 1 t., £304.; Montreal, 5 t., £1,551.; Mossel Bay, 1 c. (F.), £23.; New York, 2 t. 10 c., £890.; New York, 1 t. 5 c. (F.), £450.; Pt. Elizabeth, 2 c. (F.), £46.; Stockholm, 10 c., £182.; Tientsin, 1 c. (F.), £16.

WAX—

Barcelona, 11 c.; Bordeaux, 1 t. 6 c.; Malmo, 1 t. 4 c.; Sydney, 2 c.

WHITE LEAD—

Accra, £20.; Antofagasta, £830.; Barbados, £107.; Bordeaux, £316.; Bombay, £570.; Cape Town, £32.; Calcutta, £875.; Channel Islands, £16.; Lagos, £52.; Madras, £1,898.; New York, £12.; Paris, £651.; Rangoon, £103.; Shanghai, £200.; Singapore, £152.

XYLIDINE—

Paris, 1 drm., £185.

MANCHESTER.

Week ending November 26.

AMMONIUM CARBONATE—

Rouen, 30 cks.

BARIUM CHLORIDE—

Rouen, 17 cks.

BARIUM SULPHOCYANIDE—

Rouen, 17 cks.

BORAX CRYSTALS—

Rouen, 50 bgs.

CAUSTIC SODA—

Puerto Mexico, 226 drms.

SIZE—

Antwerp, 3 cks.

SOAP—

Antwerp, 152 cs.

SODA ASH—

Puerto Mexico, 50 bgs.

MIDDLESBROUGH.

Week ending November 29.

AMMONIUM SULPHATE—

Kobe, 1,150 t., £13,581.; Yokohama, 1,000 t., £13,002.

BARIUM CITRATE—

Antwerp, 21,572 t., £2,411.

CAUSTIC SODA—

Kobe, 50 t., £770.; Yokohama, 50 t., £770.

COAL PRODUCTS—

Benzol
Germant, 21,572 t., £2,411.; Rotterdam, 1,000 t., £197.
Cresylic Acid
Kobe, 2 t., £38.

Naphthalene
Shanghai, 40 t., £180.

MAGNESIUM CARBONATE—

Milan, 20 t., £891.

PITCH—

Antwerp, 2,250 t., £8,326.; Bizenta, 2,489 t., £8,020.; Caen, 901 t., £2,931.

NEWCASTLE-ON-TYNE

Week ending November 29.

ANTIMONY—

Rotterdam, 100 t.

ANTIMONY (RUDE)—

Rotterdam, 50 t.

BITUMASTIC SOLUTION

Rotterdam, 2 t.

BLEACHING POWDER

Rotterdam, 5 t.

CAUSTIC SODA—

Rotterdam, 33 t.

CHINA CLAY

Bergen, 17 c.

RED LEAD

Rotterdam, 11 t. 5 c.

SOAP—

Rotterdam, 1 t. 5 c.

SODA CRYSTALS

Rotterdam, 10 t.

WHITE LEAD—

Rotterdam, 5 t.

N. & S. SHIELDS.

Week ending November 29.

CAUSTIC SODA—

— 1 t. 182 c.

SOAP—

— 2 t. 81 c.

SWANSEA.

Week ending November 29.

NIL.

PRICES CURRENT.

THURSDAY, Dec 4, 1919.

PREPARED BY MESSRS. HIGGINBOTTOM AND CO., 21, SPRING GARDENS, MANCHESTER.

The values stated are F.O.R. at makers' works, or at usual ports of shipment in U.K., unless otherwise specified.
The prices in different localities may vary.

Acids:—

		£	s.	d.
*Acetic 40% and 60%	per cwt.	31/-	&	46/-
* " Glacial	per ton	85	0	0
Arsenic, S.G. 2,000°	per ton	80	0	0
Boric Crystals	"	72	0	0
*Fluoric	per lb.	0	0	7
*Muriatic (Tower Salts), 28° Tw.	per carboy	0	7	0
*Nitric, 80° Tw.	per ton	32	0	0
Oxalic	per lb.	0	1	5
Phosphoric, 1,750°	"	0	1	9
*Sulphuric (fuming, 70%)	per ton	—	—	—
* " (Pyrites, 168°)	"	7	18	9
* " (" 140°)	"	4	10	0
* " (free from arsenic, 144°)	"	5	7	4
Tannic (commercial)	per lb.	0	2	6
Tartaric (crystals)	"	0	3	1
*Acetone	per ton	85	0	0
*Alum, loose lump (delivered)	"	16	10	0
Alumina Sulphate (pure)	"	16	10	0
Aluminoferric (in slabs)	"	8	10	0
Aluminium (Ingot Metal, 98/99%)	per ton	150	0	0
*Ammonia, Anhydrous	per lb.	0	2	0
* " 850	per ton	33	0	0
* " 920	"	20	0	0
" Carbonate	per lb.	0	0	7½
" Muriate (grey)	per ton	47	0	9
" (sulphammoniac) 1st & 2nd,	per cwt.	80/-	&	75/-
" Nitrate	per ton	60	0	0
" Phosphate	"	110	0	0
" Sulphate (grey), London, net	"	—	—	—
" " " Hull	"	—	—	—
" " " Manchester	"	—	—	—
*Aniline Oil (pure)	per lb.	0	1	6
Aniline Salt	"	0	1	6
Antimony	per ton	45	0	0
" (tartar emetic), 43/44%	per lb.	0	3	1
" (golden sulphide)	"	0	1	3
Arsenic, white powdered	per ton	65	0	0
Barium Chloride (in casks)	"	22	10	0
" Carbonate (native), 92/94%	"	11	0	0
" Sulphate (native levigated)	"	£7 to £14		
Baryta Chlorate	per lb.	0	1	1
*Bisulphide of Carbon	per ton	55	0	0
*Bleaching Powder, 35%	"	17	0	0
* " Liquor, 7%	"	6	0	0
Casein (commercial)	"	85	0	0
Chromium Acetate (crystals)	per lb.	0	1	0
Calcium Chloride	per ton	8	0	0
China Clay (at Runcorn), in bulk	"	70/-	to	90/-

Lead, Carbonate (White lead), pure	per ton	52	10	0
" Nitrate	"	56	0	0
Lime, Acetate (brown)	"	14	10	0
" (grey), 80%	"	20	0	0
Magnesium Chloride	"	15	10	0
" Carbonate (light)	per cwt.	2	7	6
" Calcined (heavy)	per ton	36	0	0
" Sulphate (Epsom Salts) (coml.)	"	12	0	0
" (druggists)	"	16	0	0
Manganese, Sulphate	"	75	0	0
" Borate	"	110	0	0
*Methylated Spirit, 64° (industrial)	per gal.	0	5	7
*Naphtha (Wood), Solvent	"	0	10	0
" " Miscible, 60° p.	"	0	10	6

Oils:—

*Cottonseed	per ton	95	0	0
*Linseed, Raw	"	98	0	0
Stearine, 115-120° M.P.	"	105	0	0
Potassium, Bichromate	per lb.	0	1	6
" Carbonate, 85%	per ton	100	0	0
" Chlorate	per lb.	0	1	0
" Hydrate (Caus. Pot.) 88/90%	per ton	105	0	0
" " 75/80%	"	95	0	0
" Potash Hydrate Liquid, 50° B.	"	65	0	0
" Nitrate (refined)	"	25	0	0
" Permanganate (commercial)	per lb.	0	3	3
" Prussiate (yellow)	"	0	2	1
" " (red)	"	0	5	6
" Sulphate, 90% (ex ship)	per ton	25	0	0
" Muriate, 80%	"	25	0	0
Silver (metal)	per oz.	0	6	2½
Sodium (metal)	per lb.	0	1	3
" Acetate	per ton	48	0	0
" Arseniate, 45%	"	45	0	0
" Borate (Borax), Crystals	"	39	0	0
" Bicarbonate (2 cwt. bags)	"	8	5	0
" Bichromate	per lb.	0	0	11
" Carb. (Caustic Soda-ash), 48%	per ton	12	10	0
" " (Alkali), 58% (bags)	"	6	10	0
" " (Soda Crystals), (bags) car. pd.	"	5	10	6
" Chlorate	per lb.	0	0	6
" Cyanide (100% basis) for export	"	0	0	11
" Hydrate (76% C. Soda) (f.o.r.)	per ton	24	0	0
" " (74% C. Soda)	"	23	5	0
" " (70% C. Soda)	"	22	0	0
" " (60% C. Soda)	"	21	0	0
" " (pure liquid, 90° Tw.)	"	10	2	6
" 77/78% Powdered (99%) Hydrate	"	24	10	0
" Hyposulphite (commercial)	"	19	0	0
" Manganate, 25%	"	65	0	0
" Nitrate, 96%, refd., f.o.r., L'pool	"	21	0	0
" Nitrite, 100%	"	61	0	0
" Phosphate	"	29	0	0
" Prussiate	per lb.	0	1	0½
" Silicate (glass) Alkaline	per ton	12	5	0
" " (liquid, 100° Tw.)	"	9	10	0
" Sulphate (Salteake), delivered	"	3	10	0
" " (Glauber's Salt)	"	4	0	0
" Sulphide (conc.), 60/65% casks	"	25	0	0
" Sulphite	"	12	10	0
Sulphocyanide, Ammonium, 95%	per lb.	0	2	0
" Barium, 95%	"	0	1	4
" Potassium	"	0	2	4
" Alumina	"	0	0	9
Sulphur, (Flowers)	Sicilian per ton	23	0	0
" (Roll Brimstone)	"	22	10	0
" Brimstone (best thirds)	"	13	10	0
" (ex ship)	"	105	0	0
Tallow	"	0	2	1
Tin Crystals	per lb.	296	0	0
" English Ingots	per ton	0	1	6
Titanium, Potass. Oxalate	per lb.	4	10	0
Titanous Chloride	per cwt.	51	0	0
Zinc (Spelter)	per ton	75	0	0
" Powder, 88/92%	"	23	0	0
* " Chloride (solution, 102° Tw.)	"	21	0	0
" Sulphate, Crystal	"	21	0	0

Coal-tar Products and Dyes:—

Alizarine (artificial), 20%	per lb.	0	2	0
Magenta	"	18/-	to	35/-
Anthracene, 40/50% A, f.o.b., L'don, per unit,	"	0	0	7
Benzol, 90's (naked)	per gal.	0	2	0½
" 50/90's	"	0	1	10½
Carbolic Acid (crude, 60°)	"	0	2	3½
" (crystallised, 40°)	per lb.	0	0	9½
" Acid (pale liquid, 97/98%)	per gal.	0	2	9
*Creosote (ordinary), naked	"	0	0	6½
*Crude Naphtha, 30% at 120°C.	"	0	0	9
*Grease Oils, 18° Tw. (naked)	per ton	6	10	0
Solvent, f.o.b., Liverpool or Garston	"	3	12	6
*Solvent Naphtha, 90% at 160°	per gal.	0	2	9½
Copper	per ton	98	5	0
" Sulphate	"	40	0	0
Dross Salts	"	39	0	0
*Glycerine (crude), 80%	"	72	0	0
" (industrial, S.G. 1,260)	"	110	0	0
*Iodine	per oz.	0	1	0
*Iron Nitrate, 30° Tw.	per ton	12	0	0
" Sulphate (copperas), delivered	"	4	5	0
" Sulphide	"	9	0	0
Lead (Foreign Pig)	"	39	7	6
" Litharge Flake	"	50	0	0
" Acetate (white)	"	84	0	0
" " (brown)	"	67	0	0

* Packages extra or returnable; otherwise, prices usually include packages

THE CHEMICAL TRADE JOURNAL

AND CHEMICAL ENGINEER.

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Readers are invited to forward items of intelligence, company reports and balance-sheets, or cuttings from local newspapers of interest to the trades concerned.

Communications for the Editor, if intended for insertion in the current week's issue, should reach the office not later than Wednesday morning.

CURRENT TOPICS

TRADE RETURNS.

BRITISH overseas trade, as reflected in the Board of Trade returns for November, appears to be making good progress towards recovery, and in this respect continues the tendency exhibited by the preceding month's statistics. In one important respect, however, last month's returns differ from those of October, and that is in the value of the total imports, which were nearly £10,000,000. less in the month under review and the lowest since June. Exports were higher by over £8,000,000. compared with the previous month, and the combined effect has been a marked contraction in the margin between imports and exports. The total imports were valued at £143,565,000., against £153,486,000. in October, and £116,771,000. in November, 1918; the exports were valued at £87,110,000., compared with £79,061,000. and £43,219,000. Whilst on the import side the increase, compared with a twelve-month ago, was divided between foodstuffs and raw materials and semi-manufactured goods—the receipts of manufactures being less than in the corresponding month of last year,—the improvement in exports was due mainly to bigger shipments of articles "wholly or mainly manufactured." As regards the foreign trade in chemicals and allied products, the most striking feature is the remarkable increase in exports compared both with October and November of last year. Imports of chemicals, drugs, dyes, and colours were slightly less than in the preceding month, but nearly £1,500,000. below the level of the imports in the corresponding period of 1918. The exports of chemical products were valued at £2,866,000., compared with £2,547,000. in October, and £2,016,817. in November, 1918; and the imports £1,922,000., against £1,967,000. and £3,394,000. As one might expect from the figures quoted, few chemical products included in the export section declined as compared with a year ago. The shipments of bleaching powder increased from 3,648cwt. in November, 1918, to 35,021cwt. last month; coal products, not dyes, an increase in value from £313,919. to £391,790.; dyestuffs, from 9,618cwt. to

16,973cwt. ; crude glycerine, from 1,390cwt. to 1,459cwt. ; distilled glycerine, from 1,803cwt. to 5,221cwt. ; sulphate of ammonia, from 2,697 tons to 10,058 tons (mainly to France, Spain and the Canary Islands, Japan, and "other countries"); superphosphates, from 499 tons to 757 tons; basic slag, from 426 tons to 1,237 tons; chemical manures, unenumerated, from 3,524 tons to 4,915 tons; muriate of ammonia, from 2,867cwt. to 8,375cwt. ; white lead, from 434cwt. to 14,365cwt. ; zinc white, from 198cwt. to 2,676cwt. ; painters' colours and materials, unenumerated, from 36,512cwt. to 118,290cwt. ; saltpetre, from 1,491cwt. to 11,090cwt. ; chromate and bichromate of potash, from 488cwt. to 1,281cwt. ; potash compounds, other sorts, an increase in value from £2,589 to £12,259 ; sodium bicarbonate, from 29,162cwt. to 47,868cwt. ; caustic soda, from 52,289cwt. to 89,153cwt. ; soda crystals, from 213cwt. to 14,431cwt. ; sodium sulphate, from 68,204cwt. to 124,408cwt. ; soda compounds, other sorts, from 48,331cwt. to 57,104cwt. ; sulphuric acid, from 457cwt. to 934cwt. ; tartaric acid, from 62cwt. to 800cwt. ; and chemicals, other sorts, an increase in value from £449,333. to £503,847. The exports of copper sulphate declined from 2,792 tons to 1,340 tons; barytes, from 2,400cwt. to 1,698cwt. ; soda ash, from 459,572cwt. to 261,944cwt. ; and sodium chromate and bichromate, from 3,884cwt. to 3,774cwt. In the import branch, acetic acid increased from 567cwt. to 6,390cwt. ; boracite, borate of lime, etc., from 1,993cwt. to 18,768cwt. ; cream of tartar, from 3,754cwt. to 5,683cwt. ; potash compounds, other sorts, an increase in value from £28,093. to £68,715. ; tartaric acid, from 877cwt. to 3,330cwt. ; barytes, from 9,600cwt. to 23,578cwt. ; red lead, from "nil" to 102cwt. ; white lead, from "nil" to 12,568cwt. ; zinc oxide, from 2,721cwt. to 6,096cwt. ; painters' colours and pigments, unenumerated, from 17,019cwt. to 28,835cwt. ; and nitrate of soda, from "nil" to 1,900 tons. Declines were shown in the imports of sulphur, from 68,385cwt. to 9,947cwt. ; carbide of calcium, from 48,537cwt. to 27,252cwt. ; crude glycerine, from 20,124cwt. to 6,112cwt. ; saltpetre, from 54,859cwt. to 2,000cwt. ; soda compounds, from 9,406cwt. to 4,026cwt. ; chemicals, unenumerated, a decline in value from £1,666,990. to £197,472. ; nickel oxide, from 1,958cwt. to "nil" ; and phosphate of lime and rock phosphate, from 43,507 tons to 18,567 tons.

WHAT IS A CATALYST?

DURING the reading of the paper at the Royal Society of Arts on the oil seed crushing industry, dealt with on another page, there was a more or less light interlude, for which the Chairman (Lord Lamington) was responsible. Whilst Mr. J. W. Pearson, the author of the paper, was giving a few details of the hardening or hydrogenating process and mentioned the use of a catalyst, the Chairman innocently asked "What is a catalyst?" The author and a large proportion of his audience, who were evidently chemists, saw the humour of the question and a hearty laugh greeted it. Mr. Pearson cleverly put it on to his chemist friends to give the explanation, adding that he could only describe

the effect of a catalyst. Several subsequent attempts, however, did not throw any light on the much-discussed problem of how it is that a catalyst produces the effect it does. For instance, Mr. E. C. de Segundo, in his usual eloquent manner, said he had inquired of his chemist friends how that mysterious agent which was called a catalyst works, but they simply referred him to the Greek derivation, which, however, left him absolutely cold. He himself thought the action of a catalyst could best be described as a function in chemical force analogous to that filled by a clergyman in human affairs, in that it brought about the combination of two bodies while itself remaining unaffected thereby or the consequences thereof. The next effort was by Mr. Walter F. Reid, who said it was one of those names which chemists invented to hide up a large amount of ignorance. Dr. Voelcker, however, was determined to be serious, and he described a catalyst as a body, the presence of which is necessary for the production of changes in other bodies, whilst itself undergoing no change. This seems to be the length to which our best dictionaries go, but although we agree with Dr. Voelcker that a definition of that kind must be accepted as meeting our present knowledge, it does not answer the question of Lord Lamington, who, we fancy, rather enjoyed being in the position of the child who puts embarrassing questions to its elders. In the hope that somebody else may have a try to explain the precise reasons why a catalyst produces the effect it does, we conclude as we began by asking "What is a catalyst?"

SHIFT WORKERS' WAGES.

AS announced in our issue of October 11, the proposals of the workmen's representatives on the Chemical Trade Shift Inquiry Committee were to be submitted at an early date to the members of the Chemical Employers' Federation, which body has now announced its decision. The proposals, it may be stated at once, have been rejected, for reasons which to any impartial mind will appear to be wholly justified. Briefly stated, the proposals were that, in order to compensate for the reduction in earnings resulting from the rearrangement of working hours, minimum rates of 1s. 6d. and 1s. 8d. per hour for day workers and shiftmen respectively should be fixed. The case for the employers could not have been more clearly or more simply stated than has been done in the report prepared by their representatives. Day labourers have received advances averaging 176 per cent. and shiftmen 160.7 per cent. on pre-war wages, in order to meet an increase of 125 per cent. in the cost of living, and notwithstanding a considerable reduction in the number of working hours in accordance with an agreement arrived at by the men's leaders and the employers' representatives, which agreement, the Federation rightly urges, should be loyally adhered to. The employers submit that the demands emanated not from any unrest among the workmen themselves, but from the trade-union officials, and it is this mischievous activity, which seems to be a fundamental part of the equipment of the present-day trade-union leader, that has been responsible for most of the labour troubles of the past few years.

CHLORINE CELLS.*

By F. G. WHEELER.

IN the operation of all chemical machinery questions regarding the various forms of construction and the best methods of operation are of prime importance to the engineer. This is particularly true of the electrolytic alkali industry, where many varying conditions in the application of the process exist. To answer some of these questions, the writer has experimented for many years and has investigated many phases of this process. The results of these experiments have been embodied in several plants which are working on a large commercial scale to-day.

The most prominent questions which were solved were those regarding the efficiency of a cell, the overload capacity, the influence of temperature, the problem of feeding a cell constantly with brine, the impregnation of anodes, and the many conditions governing cell operation.

The type of cell which the writer adopted is one the form of which was first used by James Hargreaves in 1894. It was later developed by James Mercer and put into practical operation at Haverhill, Mass., in 1898. It was also used by Merry and Noble in England and later by Arthur Gibbs in the United States. The cell is cylindrical in form and built so that the entire exterior surface is cathode. Like a drum, it is able to withstand pressure from within without bracing and without distortion. This form of cell has been adopted by several of the largest electrolytic alkali manufacturers, and there are undoubtedly more cells of this type in operation than any other one form, and possibly all forms combined.

The cylindrical shape has the advantage of requiring no joints except those at the ends, which are held tight by means of a hoop. As a barrel is one of the cheapest forms of package, this form of cell is the cheapest to build. It adapts itself with the greatest ease to the many varying conditions which arise and is remarkably successful from a commercial standpoint.

The efficiency of a cell, by which we mean the proportion of product made compared to the amount of electricity used, was early observed by Hargreaves to be a function of the strength of liquor delivered—that is, the lower the percentage of hydroxide in the cathode liquor, the higher the efficiency. Hargreaves concluded that it was impossible to produce caustic soda with an electrolytic cell because of this action of the concentrated caustic soda. He fully understood the fact that if brine were passed through a diaphragm in contact with a perforated sheet of metal, which was made the cathode of a cell, and if one-half of the brine or less were converted to caustic soda, an efficiency approximating unity was easily obtained. He also used the idea of adding steam to the empty cathode compartment in order to wash the caustic away from the cathode to prevent the hydroxide ions from migrating into the anode solution. His idea, however, was to make a pure product in the cell, and he did not consider the manufacture of a solution of caustic soda mixed with salt and purifying it for commercial use.

THE DIAPHRAGM PROBLEM.

In our first experiments, we found that the caustic could be washed away from the cathode by using a very thin diaphragm which was very easily permeable to the

brine. In the commercial operation of a cell, the diaphragm becomes plugged not only with the impurities which might escape the filters, but with those made in the cell itself—such as disintegrated graphite—and from the action of the liquor on the diaphragm itself. It is obvious from this that the thinner a diaphragm can be made, the more slowly will it become impermeable. It is also apparent that the thinner it is, the less capillary action is present to hold the caustic soda solution between the two electrodes after it has once been formed.

The problem of making cheaply a very thin diaphragm is one of using a cathode which will hold such a diaphragm in position. The idea of supporting a diaphragm with the cathode is an old one and was used first by Hargreaves, and mentioned in his patent of December 28, 1897. To apply this principle, a cathode was first designed using two sheets of metal. The inner sheet was a thin sheet having large perforations, and the outer was a heavier one having fine perforations. The idea was to place a thin sheet of asbestos paper against the inner sheet of the cathode. If it should attempt to burst through the large perforation of the inner sheet due to the pressure of the brine from within, the outer sheet would prevent its rupture, yet would still allow the products of electrolysis to be removed from the field of reaction.

A double cathode of this type is expensive to build and difficult to handle, so that a single sheet was devised which had all of the advantages of the double sheet. This cathode is made by displacing the metal removed from the large perforation backward, but not detaching it from one edge, leaving the flap in such a position that it prevents rupture of the diaphragm, but still leaves a three-sided perforation for the removal of the products of electrolysis. A cell with this cathode is so designed that the edge formed in each large perforation is not thick enough to cut the diaphragm, yet at the same time the sheet of metal is heavy enough to conduct the current economically. These properties have been ascertained, so the construction of a commercial cell is simple.

Cells built as described have an efficiency approximating unity over long periods of time, and plants are now operating with a commercial efficiency of over 95 per cent. with no difficulties from diaphragms or cathodes.

Many industries require cells which can be shut down without damage, so this question was carefully examined. The usual difficulties connected with shutting down a cell arise from changes of temperature and also changes in the delivery of the hydrogen gas. The caustic soda which is formed on the cathode passes with the hydrogen gas through the openings in the cathode and is discharged into the cathode chamber. When a cell is shut down the evolution of the hydrogen ceases, together with the consequent reducing action of the nascent hydrogen at the cathode. The diaphragm is then pressed against the cathode by the brine in such a way that the tiny passages which have been occupied by hydrogen are closed. The chlorine in the brine is not reduced by the nascent hydrogen evolved at the cathode during operation, but attacks the metal, forming ferric chloride. This passes with the brine into the cathode compartment of the cell. A small amount is retained in the diaphragm by capillary action. When the current is again started, the caustic

* *Met. and Chem. Eng.*, New York.

soda, which is first formed, changes the ferric chloride into gelatinous ferric hydroxide, which partially plugs the diaphragm. The hydrogen formed simultaneously with the caustic soda has no easy method of egress or open passages, but must force its way through the pulpy diaphragm until it reaches the nearest opening in the cathode. The cells, therefore, do not deliver the caustic after a shut-down as easily as they did before. As the cell becomes warmer, the viscosity of the brine decreases so that it flows through the diaphragm more readily, the ferric hydroxide is slowly removed by the brine, the hydrogen creates passages to the nearest openings, and the cell returns to its previous operating condition.

EFFECT OF STEAM TREATMENT.

The effect of steam, which is blown into the cathode compartment, was tested with various results. As predicted by Hargreaves, the steam dilutes the caustic soda on the cathode, and in this way helps to keep the efficiency of a cell high. The condensation of the steam on the jacket is easily cared for by trapping it away from the cathode liquor, so that this steam does not dilute the solution, but the condensation on the cathode itself has to be re-evaporated in the concentration department. The steam keeps the cell hot, lowers the viscosity of the brine, causing it to flow more easily through the diaphragm, reduces the concentration of the hydroxide ions, increasing the efficiency. A cell was operated for several months at an efficiency so close to unity that the difference could not be found by ordinary experiments. Cells which were old and worn out, and had been impermeable to the brine, were treated with steam and responded as mentioned above, the efficiency being increased somewhat, but the cost of renewal of a diaphragm is so small, and the additional cost of reconcentrating the solution so high, that no real advantage is gained. The question is simply a commercial one. If power is expensive, it may pay to use steam to save power, but where the power is cheap, the question would be an entirely different one.

RATING OF CELLS.

Many cells are given a normal rating, which is described as being so many amperes. The writer often wondered upon what facts this capacity rating was based. Accordingly, an experiment was tried in which a cell was subjected to an enormous current with the hope of learning what would happen when an excess of current was passed through the cell. A cell was selected which would carry 750 amperes at 3.5 volts. By means of an experimental generator, an additional current was superimposed upon the regular current, with the result that this cell carried 2,300 amperes at 4 volts. Unfortunately, the experimental generator could not be operated at a higher current, but the experiment was continued, with the result that at the end of four weeks two cells, which had been carrying 2,300 amperes for this length of time, were delivering 93 per cent of the theoretical amount of caustic soda. We naturally concluded that there was no specific rating for any cell. If power is cheap, it is obvious that it does not pay to install a large number of cells and work them at a low current. The interest and depreciation on the cells will more than offset the power which is saved by operating these cells at a low voltage, and it therefore pays to use a higher voltage and pass a higher current. The whole question was worked out very carefully, numerous curves were drawn, and it was found that a minimum cost could be easily ascertained when local conditions were considered.

FEEDING DEVICE FOR SUPPLYING BRINE.

Another phase of the subject is the method of supplying brine to a cell. A successful feeding device must be one which has in it several important features. In the first place, it must be fool-proof and require practically no attention when once started. It must maintain the level in the cell automatically, so as to keep conditions constant. It must be totally enclosed, so that no evaporation of brine will cause salt to crystallise in the feeding device. It must also have no constriction, nor can it be made to operate by means of a small aperture, for in any such device a particle of dirt, salt, or even an air bubble will cause it to fluctuate in the quantity of brine delivered. It must be cheap to construct. It must not allow any electrical current to flow through the brine being fed to the cell, because this to some extent grounds each cell and causes "electrolysis" in the pipe lines and other metallic parts of a plant. Bearing all of these things in mind, a feed was devised which delivers a broken stream through an enclosed piece of apparatus, in which there is no throttling effect and the quantity of brine delivered is controlled by the level in the cell itself. It consists in passing the brine through a chamber of gas. The gas in the chamber is held under a certain pressure due to the level of the brine in the cell, and this pressure regulates the brine being admitted to the chamber.

PROBLEM OF ELECTRODES.

A very interesting experiment was made in connection with the preservation of graphite anodes. The first idea was to fill the pores of an anode with an inert material which would prevent the current from detaching particles of graphite. In this way the anode would have a much longer "life" than without this treatment. The graphites were first impregnated with various oils. It was soon found that the excess of oil in the pores of the graphite was discharged and floated on the surface of the brine, then chlorinated, forming a wax. This prevented the chlorine from escaping from the cell, and caused trouble.

A method was devised in which the inside of each pore in the graphite was painted with an inert liquid, in such a way that the wall of the pore only would be covered. There was no excess of oil to be discharged from the graphite after it had once been treated. After this problem was solved, almost every kind of oil was tested. Not only the common oils, but such material as vulcanised oils and mixtures with asphalt and pitch were used. A good selection was finally made and thoroughly tried out. The question of impregnation resolved itself into one involving the cost of power. It seems that impregnation not only saves graphite by making the inner surface of the pores resistant to the chlorine, but it also presents a smaller surface for the electricity in passing from the anode. The increase in the current density on the graphite is shown by an increased terminal voltage of the cells, with the result that an anode which has been impregnated requires more power per ton of product than a cell in which the anodes have not been impregnated. The problem becomes one of choosing whether the cost of impregnation plus the cost of power is cheaper than the cost of graphite. Where power is cheap, it pays to impregnate.

NEW ISSUE.—Electro Bleach and By-Products, Ltd., Middlewich, Cheshire, are making an issue of 80,000 preference shares of £1. each and 80,000 ordinary shares of 10s. each. The subscription list will close on or before December 17.

ANILINE SALT—THE HYDROCHLORIDE.

ITS MINUTE MODIFICATIONS.

BY JAMES SCOTT.

ANILINE SALT is one of the most important and useful coal-tar substances devoted to the manufacture of dyestuffs and their fundamental intermediates; for which it is produced on a very extensive scale. The term "aniline salt" generally indicates the hydrochloride of aniline, although the nitrate and sulphate have also been made. But in speaking of these two last-mentioned materials reference is generally made direct to their names.

The formula for aniline salt—the hydrochloride, which alone will be hereafter meant—is $C_6H_5NH_2Cl$. The process by which it is most commonly prepared at the present time is as follows: From 130 to 135 parts of pure commercial hydrochloric acid are very slowly added to 100 parts of aniline. The mixture has to be vigorously agitated meantime, and evolves a considerable amount of heat and fumes. To ensure safety and as steady a

distilled entirely unchanged in composition. When exposed to the air for a sufficient length of time it becomes tinged with a greyish-green colour.

I propose to describe the principal microscopical characteristics of this valuable salt. As already stated, aniline salt occurs as flaky pieces. To the naked eye these particles present no structural features that can be referred to by any definite name, but upon being magnified there is disclosed to view a very systematic crystallisation of the kind depicted in Fig. 1. The substance can be rendered transparent for observation by passing the light up through it, with the exception of areas which are more highly refractive than the others, and therefore appear to be dark and opaque.

Long bars cross one another internally, and give patterns resembling rhombs and squares. Scattered densely throughout the crystals are smaller ones of less well-marked forms, besides mere wavy lines representative of wrinkling during solidification of the substance. A few number of minute shapely crystals are dispersed among the others. Fairly large angular

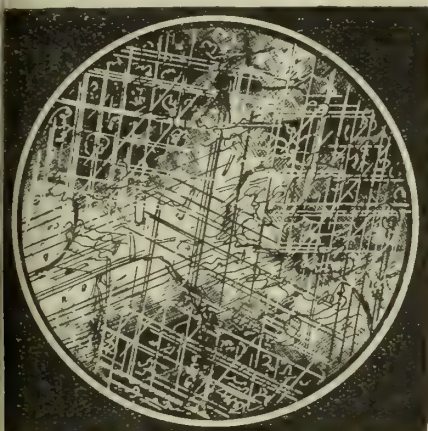


Fig. 1.—One twenty-fourth inch portion of aniline salt—the hydrochloride—in its ordinary condition; magnified.



Fig. 2.—One twenty-fourth inch of a sublimed layer of aniline salt—the hydrochloride—magnified.

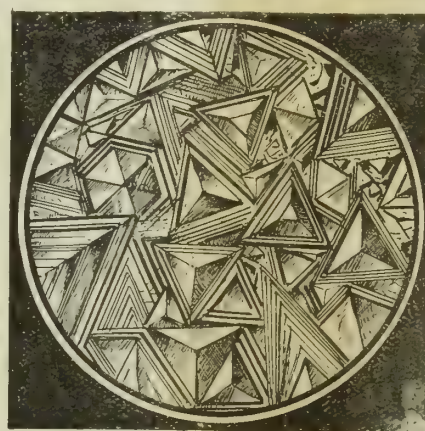


Fig. 3.—One twenty-fourth inch of a layer of aniline salt—the hydrochloride—after dissolving in, and evaporation of, absolute alcohol; magnified.

reaction as possible, the pipe through which the hydrochloric acid passes must dip below the surface of the aniline, and, of course, be kept there constantly during the process.

Owing to the severely corrosive tendencies of the respective substances, stoneware or enamelled iron vessels have to be used in connection with the production of this salt. The agitator must be composed of the same material as that of the receptacles. When timber has been used for this purpose it has imparted an undesirable yellow tinge to the salt, which undoubtedly interferes with the subsequent treatment of the product.

After the contents of the vessel have been cooled, the salt is filtered off and whizzed in a hydro-extractor lined with vulcanite, and is finally dried on flat or enamelled trays at a temperature of $50^{\circ}C$, which appears to suit it best.

Aniline salt is distributed in the form of small, irregular wafer-like scraps, the flatness of which is accounted for by the preceding description relative to the drying treatment. It is in colour a greyish, glistening white and has a melting point of $192^{\circ}C$. It is very soluble in water, and the solution thus obtained reddens blue litmus. The acidity is not very strong, and appears to vary slightly in different makes or grades. It can be

granules—speaking in a comparative sense—adhere to the others at odd intervals, and can be easily picked off with the help of the point of a very fine needle, or something still more suitable. The formation can be seen to more advantage by adding a little water to the salt and thus dissolving off minute surface crusts. In this way, if observation is undertaken during the disappearance of the salt, many of the crystals—prismatic, feathery, and raphidic—will be detected breaking away from the remainder, and floating off into the surrounding fluid. The whole spectacle becomes remarkably clear and distinct.

Upon heating some aniline salt in a subliming cell its preliminary vapour subsides on the upper glass in the shape of very minute white specks, discs, and perfect hexagons. So closely set together are these figures that they constitute a kind of mosaic film. Continued heating causes additional vapour of aniline salt to sublime upon the first layers as much larger, variously modified, objects, a delineation of the most striking ones of which is given in Fig. 2. They are bladed, and range from geometrical plates to feathered, arborescent, and dendritic conglomerations, and stand elevated upon the glass, some being almost upright, others at various angles. Collectively they present a very curious

imitation of fungus growth. An examination of the salt still left on the lower glass will disclose the presence of crystals similar to the completely sublimed ones, lying among depressions occasioned by the disruptive influence of heat. They fringe the borders of the nodules in a very picturesque manner.

It is advisable, in order to obtain the best possible spectacles, to illuminate the sublimed salt from more than one direction; otherwise (but not always for a certainty) one may see only a sparkling mass, devoid of the symmetrical structure which actually exists. This fact is due to the surface of the crystals being coated with numbers of mere specks and flutings.

A very good practice for subliming is to lay a pinch of the salt in a long, narrow test-tube furnished with a wire ring with extended loop round it, so that by clasping it in a pair of pincers the whole may be held over a lighted lamp, or in a spirit flame. Sublimed material gets arranged along the inside of the tube in every available grade.

An exceedingly beautiful formation is obtainable by treating aniline salt with absolute alcohol. It does not really matter much whether the salt is dissolved in a test-tube containing the spirit—and then poured out and exposed to the air,—or is held on a glass slide while the solvent is poured over it. Personally, I prefer the latter method, and in undertaking it I leave an excess of salt so that many phases of crystallisation can be secured.

Fig. 3 shows a typical result of dissolving aniline salt in absolute alcohol. The crystals are modified within a few seconds, and it is very interesting to watch the changes through the microscope meantime. The mobile, swirling, alcohol washes the salt down to invisibility, and then spreads with it as a film, from which rapidly arises, during evaporation of the solvent, clusters of bold, triangular, trihedral, and kindred shimmering objects. The observer can trace the genesis of the crystal shapes from the merest, faintest rows of ridges—indicative of laminations—right up to the perfect specimens. Interstices between the more regular ones may happen to become occupied with less regular substance. In some parts of the layer we can see arrangements of scattered, flat, very minute triangular crystals, they themselves evidently lying in similarly shaped larger outlines.

Effects of a like nature can be obtained by dissolving the aniline salt in water; but then, one has to wait longer for them, and they are not so attractive, nor quite so well-shaped as the alcoholic yields.

It is not pretended that this particular article upon the subject of aniline salt has much practical value, but it is capable of surprising people who do not customarily use the microscope for investigating the structure of chemical products. We hear, and read, so much about the disposition, shifting, combination, and so on, of so-called atoms and molecules in connection with the manufacture of dyestuffs and their associated substances that it is advisable occasionally to show how difficult it becomes to prove any special hypothesis. Non-technical men wrongly believe that atoms and molecules are observable details, and that every formula given is based on ascertainable *minute* data. Microscopists, however, are fully aware of the truth, and the difficulties of ensuring that statements bearing on atomic and molecular re-arrangements are absolutely correct.

When one watches the ever-changing commotions which go on in a magnified space actually no wider than

one of the full-stops on this page, one realises the necessity for being careful in regard to theories promulgated along chemical lines. It is not always a case—as is generally supposed—of arguing from the atom or molecule to bulk; but *vice versa*, ideas relative to bulk, theoretically sub-divided, being applied to cover imaginary atoms and molecules, which, after all, may turn out to be the effects of electrical ionisation, and not the creative members many scientists take them to be.

At any rate, seeing that the subject of dyestuffs is a blending of practical methods and unusually complex theories, microscopical observations on the substances involved may be worth more attention than they have received.

CHEMICAL EMPLOYERS AND SHIFT-WORKERS' WAGES.

THE Chemical Employers' Federation have prepared a memorandum on the report of the employers' representatives on the Shift Inquiry Committee. They remark that they are impressed by three particular features of the report. One of these is that the evidence of unrest was submitted in the main by trade-union officials, and was not in any single instance corroborated by the employers, whose experience was that their workmen have not exhibited signs of unrest and discontent. The second feature is that the reductions in earnings of which complaint was made to the Shift Inquiry Committee were the direct and logical result of a national agreement between the men's unions and their employers. The Chemical Employers' Federation feel that the workmen concerned have no reasonable ground for complaint, and should loyally abide by the agreement made on their behalf. The third point is that the claim for a shorter working week for shiftmen, or, alternatively, that a cash advance be conceded to these men, was put forward in accordance with the usual rule that a concession made to one class of workmen must be extended to all.

The present position, the Federation state, is that, on the average, day labourers have received advances amounting to 176 per cent. and shiftmen 160.7 per cent. over pre-war rates; whereas the cost of living is given as being 125 per cent. in excess of pre-war. Chemical manufacturers feel, therefore, that these figures discount entirely the grievance in regard to the conversion of 12 to 8 hour shifts. The proposal of the unions for minimum rates of 1s. 6d. and 1s. 8d. would impose an impossible burden on the great majority of manufacturers and certainly create unemployment. Further, the chemical trade has been endeavouring to ascertain what are likely to be its commitments under the Hours of Employment Bill, but so far has failed to do so. It may be that each manufacturer will be obliged to employ one-sixth additional shiftmen in order to reduce the present shiftmen's hours to 48, and this means very serious additional expenditure. Having regard, therefore, to all the circumstances, the Chemical Employers' Federation cannot agree to any further advance in wages as proposed by the union representatives on the Shift Inquiry Committee.

PACIFIC PHOSPHATE COMPANY, LTD.—Interim dividend on ordinary in respect of the half-year to June 30 at the rate of 5 per cent. per annum.

THE OIL-SEED CRUSHING INDUSTRY.

A PAPER on this subject which was read at the Royal Society of Arts, on December 3, by Mr. J. W. Pearson, chairman and managing director of the British Oil and Cake Mills Ltd., gave an admirable review of the present position of the industry, as well as an insight into its history. Brief reference to the paper was made in our last issue.

After explaining how for a long time, the industry was centred mostly at the ports of London, Hull, and Liverpool, he gave a list of places where oil mills are now to be found, adding that at the outbreak of war, there were sixty different firms engaged in the trade ranging in importance from small country owners with a mill capacity of 5,000 tons of seed per annum to the establishments of his company, which handled something like 45 per cent. of the entire industry. In connection with the development of the oil-seed crushing industry, he mentioned the fact that the importance of keeping the oil-seed factories fully at work was first called attention to by the firms engaged in the soap trade, who pointed out that the supply of glycerine for the manufacture of explosives was dependent upon the maintenance of adequate supplies of oils for soap manufacture. It was for that reason that the trade was first included in the group of controlled trades under the Ministry of Munitions. Later on, when the importance of the trade for the manufacture of margarine was recognised, the control was transferred to the Ministry of Food.

The paper then described how in the past oil seed crushers in the country have used only the poorer oil bearing seeds, as the main object in view was to produce cattle feeding cake, leaving those rich in oil to be acquired by Continental countries, who always made greater use of these oils for edible purposes than we did prior to the war. We all know now, how under compulsion, the British people have been compelled to eat margarine to an extent not dreamed of five years ago, and at the present time British plants are capable of producing 10,000 tons of margarine per week, whereas no more than 2,000 tons were produced before the war. The seeds rich in oil were classified as ground nuts, sesame, castor, mowrah, copra, and palm kernels, whilst the group less rich in oil—containing less than 45 per cent.—comprises linseed, cotton seed, niger seed, poppy seed, rape seed and soya. Notwithstanding that the majority of the oil-seed crops of the world are produced within the British Empire, it is the fact that we in England, before the war used only the last-named series. The effect of the use of richer oil-bearing seeds for edible purposes, had been that soap-makers and others had had to find substitutes for the oil now used for margarine. In years to come, the author anticipated that means would be found to use such other seeds as cohune, coquilla, cognita nuts, and the many hundred seeds which at present were not suitable for cracking and effective separations.

The history of the development of oil crushing plant was gone into with some detail from the original breaking plant—the horizontal stone—used for the olive, to the modern hydraulic press now commonly used, and found to be conveniently adapted for the treatment of the group of seeds of the lower oil-bearing variety. The cage press, particularly adapted for the treatment of the richer oil-bearing seeds, was also referred to, and in a tone of regret, it was stated that no system has yet been discovered which will enable the whole process of oil manufacture to be conducted automatically from the cooling-

kettle to the point of oil expression; this was the stage where there is much scope for development in manufacture.

Attention was next called to the chemical extraction process which has come much more into favour in recent years. The preliminary treatment plant for breaking or crushing the material is similar to that adopted in hydraulic mills, but the crushed material is thereafter transferred to large pots or extractors, where it is subjected to the action of a chemical solvent, the ordinary forms of which are petroleum ether, carbon bisulphide, carbon tetrachloride, and trichlorethylene. The first is in more general use, while all have certain advantages and disadvantages. In this process the residue is left in the form of meal and not in the form of cake, and one of the principal drawbacks is the difficulty of getting rid entirely of all traces of the solvent both in the meal residue and in the oil product. The process is in much more general use in North Europe than in England, because the farmers there are more accustomed to use feeding-stuffs in the form of meal, while in England the whole cake, bearing a brand, is generally preferred. In the oil there is frequently found a faint aroma from the solvent which is difficult to remove entirely in the process of refining. For a long time oil obtained by the extraction process was regarded as unsuitable for edible purposes, but improvements in the manufacture and purity of the solvent, and also in refining processes, now enable the oil to be used by almost all the edible trades.

The author is using the latter process side by side with the hydraulic process and reckons that the cost of working is about 50 per cent. greater in the case of the extraction process.

We will not follow the author through his detailed description of the five operations involved in oil seed crushing, viz., cleaning, rolling, cooking, pressing and paring. After mentioning the possibilities of cotton-seed oil and describing how all the ingredients are now made use of instead of being wasted, attention was given to what the author described as the most interesting process of recent date, viz., the hardening or hydrogenating process which enables most liquid oils to be turned into a solid substance almost indistinguishable from tallow, and relies in its operation upon a purely chemical change. All liquid oils contain a large proportion of unsaturated fatty acids, usually described as oleic, which by the absorption of two extra atoms of hydrogen are capable of conversion into stearic acid. While the unsaturated oleic acids retain the physical form of liquids, the saturated stearic acids containing their full complement of hydrogen have the form of solid waxes or tallows. The hydrogenating process is the result of an invention based upon a discovery of a system under which it was possible to introduce the necessary additional hydrogen to complete saturation. The plant is not dissimilar to that used in the deodorising and refining process, but in this case the neutralised oil, instead of being subjected to the operation of a passage of superheated steam, is exposed to a stream of heated hydrogen gas in the presence of a catalyst.

The catalyst was a perfectly neutral body, whose mere presence facilitated the absorption by oleic acids of the extra hydrogen necessary to complete saturation, and without which no action takes place. The catalyst usually employed was very finely divided nickel. He doubted whether the exact action of the catalyst was yet clearly understood, because at the end of the process it apparently remained in exactly the same condition as at the commencement, subject only to a gradual loss of

efficiency through oxidisation. Several large plants had been erected in England and in North Europe for the treatment of oil by the hydrogenating process, and the general effect was to enable liquid oils to be used by either soap makers or margarine makers in place of hard oils. He hoped that the manufacture of edible oils, being so largely the product of raw materials grown in our own Colonies, would be retained as a permanent trade for the United Kingdom.

Finally the paper dealt with the production of oil cake, more especially with cottonseed oil cake, a description being given of the difference in the treatment of cotton seed in this country and America. [The process of decortication as practised in America, by which the kernel is taken from the shell before crushing, was dealt with before the London Section of the Society of Chemical Industry last session by Mr. E. C. de Segundo and was dealt with at the time in the *Chemical Trade Journal and Chemical Engineer*.]

The discussion centred almost entirely upon the production of oil cake for cattle feeding. Mr. E. C. de Segundo again dealt with the cotton seed and exhibited a number of rolls made of cottonseed flour, which are said to be valuable in the treatment of diabetes. Our representative was presented with a few and found them not distasteful, but as he is credited with having a palate past praying for we hope this will not be taken as a recommendation or otherwise of bread made from cottonseed flour.

Mr. D. T. Chadwick, the Indian Trade Commissioner in London, reminded us how in the past the richer oil-bearing seeds of Southern India especially were sold in foreign markets. The author had explained the reason for that, and added later that it was a position which was being remedied.

Dr. J. A. Volcker doubted whether the change over of the English crushers to producing oil was altogether in favour of the farmers, because it meant they were getting a cake with a lower percentage of oil in it, which was not good for the cattle.

Mr. H. J. Pooley said his experience of the extraction process showed that there was 2s. 6d. per ton in working cost in its favour.

Mr. Lloyd, the consulting chemist to the British Dairy Farmers' Association, regretted the tendency to extract the last drop of oil out of the seed, because that meant a larger percentage of albumenoids, which the animals could not digest. What was wanted was a softer cake with a larger percentage of oil.

Mr. McIlwaine, of the Hull Oil Company, said that the so-called chemical process of extracting oil was a physical one. Whilst before the war he had been unable to sell farmers any castor oil seed cake, he was now disposing of it in increasing quantities. One of the reasons why this country had been backward in the crushing of seed for edible oils was that before the war the German Government put a tax of £10. per ton upon palm kernel and other seeds going into Germany, and the result was that the unfortunate people in Germany had to pay £10. per ton too much for the oil they consumed in the interest of the export trade. Without that tax, English crushers would have been able to compete.

Mr. Pearson briefly replied to the discussion, and laid stress upon the necessity for some means of ensuring the purity of cake supplied to farmers. He doubted whether much of the so-called decorticated cotton seed cake was decorticated, and in that case the farmer was paying a high price for an inferior article.

CATALYTIC ACTIONS AT SOLID SURFACES.

A PAPER by Dr. E. F. Armstrong and Mr. T. P. Hilditch, entitled "A Study of Catalytic Actions at Solid Surfaces, Part II.," was communicated by Professor H. E. Armstrong, F.R.S., at a meeting of the Royal Society on Thursday of last week.

It was shown that the catalytic action of metals, like that of certain enzymes, is reversible; in other words, compounds which are saturated in the ordinary sense are capable of interacting with the metal to form a system which breaks down into a more stable equilibrium consisting of hydrogen and a less saturated compound. This was readily demonstrated in the case of cyclohexanol: when a mixture of cyclohexanol and methyl cinnamate is heated at 180° in presence of nickel a considerable transference into cyclohexanone and methyl β -phenyl propionate is effected. It is necessary that both components of the system should be present in the liquid state. Dehydrogenation has also been effected in the case of hexahydroxylene and dihydropinene mixed with methyl cinnamate in presence of nickel: in these cases a temperature of 230° is required. At this temperature small quantities of an ethyl oleate of unknown structure are obtained from ethyl stearate.

The authors' theories of catalytic hydrogenation and dehydrogenation in the liquid state afford some explanation of the products obtained during the hydrogenation of unsaturated glycerides. Moore (*J. Soc. Chem. Ind.*, 1919) has shown that partial hydrogenation of ethyl oleate causes formation of ethyl stearate, and also of ethyl esters of isomeric forms of ordinary oleic acid, most probably ethyl elaidate and an ethyl "iso-oleate" derived from $\Delta^{11,12}$ oleic acid. The appearance of the elaidic ester, the stereo-isomeric form of ordinary oleic ester, was readily explained by the assumed equilibrated action between catalytic nickel and the ethylenic linkage, for on reformation of constituents during balanced action it is plain that either or both stereo-isomeric ethylenic derivatives might result.

SYNTHETIC AMMONIA.

THE Paris correspondent of *The Times*, in a message to that journal, says: "Professor d'Arsonval has made an important communication in the name of M. Georges Claude to the Academy of Science. M. Claude recently showed that contrary to the generally received theory it was not only possible but strikingly easy to produce and turn to industrial uses pressures of 1,000 atmospheres and more. M. Claude has now succeeded in applying these very high pressures to the synthetic production of ammonia. Hitherto this had been done and applied only in Germany. M. Claude, however, has far outdistanced the German chemists. Under the new conditions discovered by him the combination of hydrogen and nitrogen takes place with such intensity that a very small apparatus is capable of a considerable output. M. Claude proposes shortly to exhibit to the members of the Academy a tiny apparatus in regular working order, capable of producing daily 200 litres (44 gallons) of liquid ammonia. Whereas the German chemist Haber obtains only one-third of a gramme of ammonia per catalytic gramme, M. Claude obtains ten grammes

SOCIETY OF CHEMICAL INDUSTRY.

MANCHESTER SECTION.

A MEETING of the Manchester Section of the Society of Chemical Industry was held on Friday (December 5), Mr. John Allan, chairman of the Section, presiding. Before the commencement of the usual proceedings, the Chairman referred to the death of Dr. Grossmann, an original member of the Society and a member of the Manchester Section, and it was resolved that a message of condolence from the Section should be forwarded to Mrs. Grossmann. Mr. Allan also drew attention to the revival of the annual dinner, to be held at the Grand Hotel, Manchester, on January 22 next.

A paper was read by Dr. E. Ardern on

"THE ACTIVATED SLUDGE PROCESS OF SEWAGE PURIFICATION."

Dr. Ardern, in continuation of previous communications before the Society, gave an account of a continuous flow unit for the treatment of sewage which was installed by the Manchester Corporation at their Withington works about two years ago. The plant was designed to treat daily about 250,000 gallons of sewage, with an average aeration period of four hours. No difficulty, said the author, had been met with in connection with the use of the diffusers—300 of which had been in use during the past two years—or in the distribution of the diffused air employed. The sewage treated at the Withington works is a weak domestic type, and the consumption of air varied from about 0.8 to 1.5 cubic foot per gallon of sewage treated. In the works in question it was stated that the air consumption, compressed to 3.11b., need not exceed an average of 1.0 cubic foot per gallon if a high degree of nitrification was not required. The sludge production, apart from detritus tank sludge, was equivalent to 0.6 ton of dry matter per million gallons of sewage treated.

The treated sludge, said the author, contained nitrogen to the extent of 6.5 per cent., and also an appreciable amount of phosphate. He had the advantage of assistance from Dr. Russell, of the Rothamsted Experimental Station, and under his guidance an acre of land was marked out into 45 different plots in order to investigate the fertilising value of the sludge. The land was rather loamy and on the heavy side. The results obtained were very encouraging. Summarising the two years' experience with the plant, it could be said very definitely that the process had undoubtedly been demonstrated to be a practicable one. The capital outlay involved in the installation of plant of the character described was very considerably less than was required for the installation of the usual tank and filter plant. In large works situated in large industrial centres it was necessary, however, to evolve a method of dewatering prior to drying. The Americans reckoned to have solved the problem, but we were not yet in that position in this country. A number of slides were shown giving an indication of developments that are taking place in other parts of the country.

A long discussion ensued, in which Mr. Allan, Major Ross, Miss Robinson, and Messrs. Thompson, H. N. Morris, and Drummond Paton took part.

Mr. Allan said that the diffusers which the author had stated had been found to work very satisfactorily with sewage might be found extremely useful in various branches of the chemical industry for the distribution of air and gases. The Chairman also stated that the use

of sewage sludge for manurial purposes depended upon its production in a form which rendered its carriage easy to where it was intended to be used.

Mr. W. Thompson asked if the methods used in the treatment of peat had been applied to the extraction of water from sewage sludge.

Mr. H. N. Morris suggested the use of a continuous acting centrifugal apparatus for this purpose.

Miss Robinson drew attention to the clogging of agricultural land near London as the result of the continued use of sludge as a fertiliser.

Dr. Ardern replied that, in order to bring the nitrogen content of activated sludge equal to that of sulphate of ammonia, about four times the weight of the former was necessary. Attempts had been made to reduce the water-content of sludge by means similar to those adopted in the treatment of peat, but with what measure of success Dr. Ardern did not make quite clear. Use had also been made of a continuous acting centrifugal, but the results had not been altogether satisfactory. Regarding the clogging of land owing to the cumulative effects of the application of sewage sludge as a fertiliser, this was probably because of the high content of grease. Activated sludge differed from ordinary sludge, inasmuch as the latter contained grease varying from 30 to 40 per cent., and that would, naturally, in time, interfere with the soil. The highest grease content of activated sludge was about 9 per cent., and they had had it as low as 3 per cent.

Captain F. S. Sinnatt, M.B.E., then read a paper, the joint work of himself and Mr. Burrows Moore, on

"A METHOD OF DETERMINING THE RELATIVE TEMPERATURES OF SPONTANEOUS IGNITION OF COALS."

In introducing this paper the authors acknowledged their indebtedness to Mr. Harold Moore, who had designed the apparatus which they were using in their work. The subject of the paper, Captain Sinnatt said, was one that had not been dealt with very frequently, and the paper was brought forward in the hope that suggestions might be forthcoming which would assist them in the work. The real reason why the work was started was because pulverised fuel was coming to the front very rapidly, and there appeared to be very little information as to the way in which that type of fuel would ignite. Describing the method briefly, the author said that a small weight of coal was heated in a nickel crucible, of a capacity of about 10cc., which was maintained at a series of constant temperatures, a record being kept of the time at which glowing in the coal first occurred and also the time of spontaneous ignition. The time of glow was fairly regular. In the case of the ignition curve, on the other hand, there were temperate zones at which ignition occurred with greater difficulty. The temperature-time curve relating to the occurrences of glow was put forward as the one which should be used for classifying the different classes of coal. It was concluded that the degree of fineness influenced very considerably the glow temperature, the tendency being for the glow temperature of fine and coarse mixtures to approach the temperature at which the finest material glowed. It was hoped that the work would serve the useful purpose of affording some indication as to suitability of coals for storing.

Mr. Allan, in the course of the discussion, said the subject of the paper was one of considerable interest to those who were concerned with coal dust firing, in that many of the systems which were using coal dust were also

using preliminarily heated air. Precautions might have to be taken with certain coals to keep down the preliminary ignition if the air was preliminarily heated above the combustion limit.

MICROSCOPE COMBINATION.

Before the commencement of the meeting, Mr. F. Davidson demonstrated and explained the "Davon" microscope combination. The apparatus is unique in combining, in standardised and instantly interchangeable form, the functions of the microscope, telescope, camera, and projecting lantern for laboratory, educational, and general industrial purposes.

HIGH EXPLOSIVES.

PROFESSOR H. B. DIXON, of the University of Manchester, lecturing upon "High Explosives in Theory and Practice" at the Midland Institute, Birmingham, on Monday, said the use of high explosives in warfare, except in the form of detonating caps, had been introduced during the present generation. High explosives were known, but their instability and the danger of handling them prohibited their use. Gun-cotton was the first to be chemically studied and brought under control, but its use was chiefly confined to mines, torpedoes, and to bursting-charges for demolition. Picric acid—lyddite in England, melinite in France—was the first to be used in shells; but it was expensive to make and not free from danger. Both those high explosives would burn rapidly in the open, would deflagrate without explosion, but when burnt in a confined space or when ignited by a shock would explode with extreme rapidity and violence. The chemical mechanism producing those different results had only been made out by the study of gaseous explosions—a study initiated by English chemists—Priestley, Cavendish, and Davy—more than 100 years ago, and then curiously neglected, like other English discoveries, in this country, but taken up by Bunsen in Germany and by Berthelot and Le Chatelier in France.

Forty years ago, said the lecturer, our ideas on the explosion of gases were dominated by three conclusions laid down by Bunsen. The first was that the flame travelled slowly, and in the fastest known mixture it only had a velocity of some thirty yards a second; the second was that where the flame spread there combustion was complete; and the third was that the explosion was not a single act of combustion, but took place in three stages, with intervals of non-burning in between. None of those conclusions explained the processes of deflagration and detonation, and the first and third were difficult to reconcile with observed facts. All three, in fact, were wrong. Berthelot in 1881 was the first to announce the discovery of the explosion-wave in gases, to measure its velocity in a number of different gas mixtures, and to compare it with the rates of movement of the gas molecules themselves at the moment of their formation.

Le Chatelier had made many interesting experiments on the progress of gaseous explosions, which he had divided into three parts according to the motions of (1) a uniform slow movement of the flame, (2) a vibratory period with rapid changes of rate, and (3) very rapid motion, which constitutes the "explosion-wave." It was the explosion-wave itself which he, personally, had studied with a view to explaining it according to the molecular theory, and at the same time to explain the

detonation of all high explosives. The most complete interpretation and the results obtained had been furnished independently by one of his former assistants, Mr. D. L. Chapman, of Oxford, and by Professor Jougné, of Paris. They had shown, theoretically, that the burning gas in the wave-front was shot forward with the velocity of sound, and the explosion-wave travelled forward with that moving gas, also with the velocity of sound, so that the real forward motion had twice the velocity of sound with the burning gases.

It was possible to photograph the explosion-wave on a rapidly-moving film so as to analyse its movements and the effect of the pressure waves upon it, and that it was really travelling with the velocity of sound could be demonstrated by starting a sound-wave behind the wave-front and showing photographically that they kept pace with one another. The high explosive for war must give complete detonation when once the explosion-wave is started, but it must not be sensitive to ordinary jars or vibrations; it must not be liable to change either in itself or in contact with the metal holding it. The high explosive Britain made use of in the war—tri-nitro-toluene—had never been made in quantity in England before. Its pulverising power, too powerful for many purposes, was diluted down with ammonium nitrate; and the mixture amatol became in the end the standard high explosive, though other mixtures were used sometimes with metallic powders where large flames were needed.

SOCIETY OF DYERS AND COLOURISTS.

WEST RIDING SECTION.

AT a meeting of the West Riding Section of the Society of Dyers and Colourists, held at the Hotel Metro-pole, Leeds, Professor T. J. Hewitt, F.R.S., gave a lecture on "Non-Aromatic Intermediates in Dye Manufacture." Many members of the Society of Chemical Industry were also present.

Mr. John C. Oxley, the chairman, explained that that was the first meeting of the Society which had been held in Leeds, and it had been arranged as an experiment to bring their work before their members in that district.

Professor Hewitt gave an exhaustive lecture covering the work which had been done up to date, including a review of the methods and patents emanating from other countries. He also dealt with the aliphatic compounds used in dye manufacture, such as methylated alcohol, succinic acid, aldehydes, acetone, and phosgene, used in the manufacture of such dyestuffs as rhodamin S., tartrazene, and indigo.

Following an interesting discussion, Professor A. G. Perkin moved a vote of thanks to the lecturer, and said that when the war broke out they had found that they had only three or four able chemists who could be considered as leaders in the colour industry, and of those Dr. Hewitt was one. Unless they could increase the number of such experts in the future, they could not hope to wrest from Germany her superiority in that sphere, and, consequently, there must be a larger number of young men devoting themselves to research work. Of all the branches of chemistry, organic chemistry had been the least fashionable in this country during the last 20 years.

Mr. G. H. Frank seconded the vote of thanks, which was carried unanimously.

CENTRIFUGAL EXTRACTION.

AN interesting lecture on "Centrifugal Extractors and Separators" was given by Mr. E. A. Alliot at the College of Technology, Manchester, on Tuesday. After explaining the functions of centrifugal apparatus and their industrial applications, the lecturer stated that in an ordinary large type of extractor the force exerted on a drop of water or other liquid contained in the machine would be between 400 and 600 times the weight of the liquid, the basket attaining a speed of over 100 miles per hour. In special separators of very small size a force could be exerted up to as much as 40,000 times the weight of any particles on the rim of the machine.

The lecturer proceeded to describe the construction of a typical centrifugal. A steel or copper plate basket, suitably perforated to admit of the escape of the liquid, is supported on a dome carried by the top of a revolving spindle. In the particular machine referred to the dry material is discharged from the basket through holes, an opening being provided also in the pan above which the holes are brought. The holes are covered by hinged doors while the machine is in operation. The liquid draining from the basket is collected in the outer pan, a spout being provided to allow the liquid to run off. To permit of the basket being withdrawn from the machine the top ring of the pan can be lifted off.

The baskets are, preferably, made of steel or other plates, and where materials difficult to drain are being dealt with the inside of the basket is often fitted with wire gauze—first, a coarse gauze next to the plate so as to allow the liquid to get freely to the holes, and over this a finer gauze to prevent the escape of small crystals. In some cases, where very fine material is under treatment, a filter cloth is also used. Besides being made in steel plate or wire, in which case they are usually galvanised, baskets may be constructed in copper or aluminium, or covered with vulcanite to withstand the action of weak acids. A covering of homogeneous lead is also sometimes applied, or occasionally porcelain liners fitted inside the baskets.

Mr. Alliot considered in detail, with the aid of a series of lantern slides, the principal features of a number of centrifugals, and showed curves depicting the power requirements for electrically driven centrifugals of different sizes. For a 26in. diameter centrifugal, about 3H.P. is required to start the machine and $1\frac{3}{4}$ H.P. to run it; for a 36in. machine, $4\frac{1}{2}$ H.P. and $2\frac{1}{2}$ H.P.; and for a 60in. machine, 15H.P. and 7H.P. The theory of the rim speeds and the extractive powers of centrifugal machines was then gone into at some length. A simple device for preventing vibration when machines are in operation, consisting of suspending the whole of the machine on four rods carried by pillars, was also described. This arrangement is applied with advantage to a bottom-discharge machine, raised on pillars to a convenient height for emptying into a truck or barrel placed below the discharge chute. Such a type was said to be extremely useful for dealing with such crystals as nitrate and sulphate of ammonia and Epsom salts.

Referring to the capacities of centrifugals, Mr. Alliot said that in dealing with liquid slurries the charge should be something under the net cubic content below the basket rim or lip. For more solid materials, the capacity will be a little greater, as their angle of repose enables them to pile up without flying about. Sulphate of ammonia, for example, will pile up over the lip to a very considerable extent. Very rarely, however, is the

basket filled to the extent of its gross capacity. A 36in. machine would take a charge of about 2cwt. of Epsom salts (dry weight), and, using bottom discharge doors, six charges per hour would quite easily be obtained. Caustic lime, however, is more difficult to deal with, as it cakes very firmly against the side of the basket and is not easily persuaded to break up. Two charges per hour in ordinary-sized machines would be tolerable, whilst if the conditions were less favourable one charge might take three-quarters of an hour. For a 40in. self-balancing, under-driven machine the usual charge was about 5cwt., the time for each charge varying according to arrangements.

Most fine crystals will retain 3 to 4 per cent. of water after treatment in a centrifugal, larger crystals about 1.5 per cent, and very large crystals as little as 0.5 per cent. Caustic lime will readily retain 30 per cent of moisture, or even more, as will other materials of a very fine nature. The moisture extracted was mainly external, the liquid being caught within the body of the crystals or in structural cells being more difficult of removal. A word of warning was given against running machines at their highest-rated speeds, as solid matter may be thrown so heavily against the side of the pan as to interfere with the escape of the liquid.

The lecturer also dealt with continuous operating centrifugals. There were many difficulties, he said, to be overcome in connection with these; for instance, very heavy pressure on the working parts, abrasion by gritty materials, and the difficulty of getting loads in balance. Attempts had been made, with varying success, to surmount these.

SOCIETY OF PUBLIC ANALYSTS.

AT an ordinary meeting of the Society of Public Analysts, held at the Chemical Society's Rooms, Burlington House, last week, Dr. Samuel Rideal, president, in the chair, the following papers were read:—

"NEW DISTILLATION METHOD FOR DETECTING ADULTERATION IN BUTTER, AND FOR ESTIMATING FATS OF THE COCOANUT GROUP."

By GEORGE VAN B. GILMOUR, B.Sc.

The method described consists in separating the volatile acids into two groups, depending on their solubility or insolubility in saturated brine (NaCl). Results were given for the application of the method to the distillate from the Blichfeldt apparatus. These results indicate that the composition of a fatty mixture deduced in this manner is more reliable and more rapidly obtained than by the combination of the Reichert-Meissl-Polenske-Kirschner method.

"A NEW PROCESS FOR THE DETERMINATION OF ARSENIC, WITH NOTES ON THE CHEMISTRY OF THE MARSH-BERZELIUS PROCESS."

By B. S. EVANS, M.C., B.Sc., F.I.C.

Arseniuretted hydrogen evolved by reduction with zinc and sulphuric acid is decomposed by ignited copper. The increased weight of copper is divided by a factor which was discussed. The necessity was shown for the absence of heavy metals. The retention of arsenic in the Marsh-Berzelius test was considered to be due to (a) metallic arsenide; (b) arsenic. The author also put forward an explanation of Chapman's modification using cadmium.

INSTITUTE OF CHEMISTRY.

LIVERPOOL SECTION.

THE first annual dinner of the Liverpool Section of the Institute of Chemistry was held at the Adelphi Hotel, Liverpool, on Friday (December 5), Sir Herbert Jackson, the president of the Institute, presiding.

Mr. John Grey proposed, "Liverpool, with Its Industries and Commerce," saying that Lancashire was the home of the heavy chemical industry, and some of the most important factories in the country were near Liverpool. As to the future of the chemical industry, we had not much to fear from Germany or the United States, the uncertain position of labour at home being what we had to fear. They must consider what could be done in the general bringing up to date of the processes employed in chemical industries.

Alderman Muirhead, in replying, said that at the present time we were at a parting of the ways, and we had either to go backward or forward. He spoke of the particular importance of motor transport in regard to trade and commerce. Motor transport was coming into its own, and he believed the railways would be left behind. There would be considerable expenditure on roads. He thought it would be a good thing to endow a chair at the University for the purpose of teaching trade-union leaders something of political economy. Production only would promote prosperity, and the limitation of production distinctly meant that we were on a downward grade. Later, Alderman Muirhead proposed "The Institute of Chemistry," saying that the co-ordination between the chemist and the engineer was an important thing for this country. The chemist was now a necessary adjunct to other trades.

Sir Herbert Jackson congratulated the Liverpool Section, the first local section to be formed and organised. There were nearly 3,000 members in the Institute, which had aimed to become the professional body, ensuring that those who belonged to it had the necessary training, and maintaining in those who practised chemistry the highest integrity and efficiency. The Institute had filled a definite place in the history of the progress of chemistry. He wished the Liverpool Section every possible prosperity.

Mr. D. Cardwell, of the Manchester Section, proposed "The Liverpool Section of the Institute."

NATIONAL ASSOCIATION OF INDUSTRIAL CHEMISTS.

NEWCASTLE SECTION.

THE annual general meeting of the Newcastle and District Section of the National Association of Industrial Chemists was held at Newcastle on Saturday last, under the chairmanship of Mr. J. S. F. Gard, B.Sc., A.I.C. The treasurer's report and financial statement were read and adopted, and the following officers were elected: Chairman, Mr. E. L. Burt, in succession to Mr. J. S. F. Gard, the retiring chairman; Mr. E. Turner was elected vice-chairman, in succession to Mr. J. Martindale, retiring; secretary, Mr. E. P. Lumley, re-elected; assistant secretary, Mr. W. M. Sowerby, re-elected; treasurer, Mr. A. R. Hord, re-elected. The following gentlemen were elected to the Council: Messrs. D. Stenhouse, W. M. Sowerby, J. W. Martindale, J. S. F. Gard, J. W. Macaulay, D. Rogers, A. Shaw, and J. B. Ridley. Mr. A. R. Hord and Mr. E. Turner were elected delegates to attend the National Council meetings.

It was decided that all meetings of the Section for the coming year should be held in the Church Institute, Newcastle, and that an annual dinner should be held, to immediately precede the annual general meeting. The first dinner is to be held early in January of next year.

A new form of H_2S apparatus, which is claimed to be both simple and efficient, was described by Messrs. S. Richardson and H. W. Keenan.

THE GLASS INDUSTRY.

IMPORTANT DEVELOPMENTS.

M R. W. BRADFORD, General Financial Secretary of the National Flint Glass Makers' Society, presiding at a meeting of the members at Dudley on Saturday last, stated that owing to the competition of foreign manufacturers, the glass trade before the war was approaching extinction.

It was frankly admitted that at present English manufacturers could not produce anything approaching the total requirements of the nation. The number of employees in the industry had, however, considerably increased, and very soon there would be a marked expansion of the output. The removal as from September last, of all restrictions on imports of table and decorative glass had had a most unfortunate effect on manufacturers. Those who had already extended their plant were unsettled, and other manufacturers who were awaiting the announcement of the Government's policy before embarking further capital were now discouraged from steps which they would otherwise have taken.

Before the war, with the exception of two firms manufacturing electric lamps, practically no electric lamp bulbs were produced in England. The development of the trade was such that now upwards of 1,000,000 bulbs per week, together with the necessary tubing and rod, were being produced and the Board of Trade had stated within the last few days that the requirements of the country were being fully met by home manufacturers. Several plants were being installed which would, if necessary, greatly increase the weekly production, and there was no doubt that manufacturers could amply meet both home requirements and the requirements of all the export trade they could secure. It would be a catastrophe if the employment which this new industry provided for some thousands of people was jeopardised by the unfair competition of foreigners receiving incomparably lower wages and working under much less satisfactory conditions.

With regard to lamp chimneys, these were before the war largely imported. At the present time English manufacturers were taking up their production in large quantities, and it was anticipated that within the next six months their production would be increased by at least 100,000 per week. In regard to scientific glassware and essential illuminating glassware, in which the industrial chemist had played a great part, both manufacturers and workers had demanded that importation should be strictly limited until time had permitted the development of productive capacity sufficient to enable them to take care of their former trade. The development of this section of the trade, which should take place very rapidly, should provide healthy and well-paid employment for considerable numbers of skilled and unskilled men and women.

LEAD AND ZINC MINING INDUSTRY.

THE Non-ferrous Mining Committee has held several meetings recently under the chairmanship of Mr. H. B. Betterton, M.P. It has now concluded hearing evidence on tin mining and has begun its inquiry into lead and zinc mining.

The views of the Lead and Zinc Mine Owners' Association were stated by Mr. Arthur L. Onslow, the chairman of the Association, and by Mr. Anthony Wilson, vice-chairman. With regard to the mines producing galena only, they said that it would be impossible, with current working costs, to work at the prices for lead ruling throughout the summer, but that they saw no difficulty in carrying on the industry at the present market price for that metal. The mines producing blende only or both blende and galena were in a less hopeful position, owing to the impossibility of disposing of their blende except at unremunerative prices. It was stated that the withdrawal of the bonus on production and the cessation of the refund of the Coal Controller's awards now made it impossible to carry on zinc mining at a profit, and these witnesses were of the opinion that with present costs the mines would be unable to pay their way with a price for 50 per cent. blende of less than £12. 10s. per ton.

Mr. Wilson complained of the heavy burdens now borne by the industry in royalties, rates, and taxes. He stated that the sliding scales for royalties, based on the price of the product, were fixed when working costs were much lower than they now are, and, consequently, there was a much greater margin between costs of production and selling price. The system of assessing for rates on the basis of the royalty charge, whether any profit were earned or not, now involved a heavy charge on the industry not only on account of the increase in the basis of assessment but also owing to the rapid rise in the rates themselves. Complaint was also made of unfair treatment by the income-tax authorities in the matter of allowances for depreciation and development work.

Mr. H. S. Willis, general manager of the Weardale Lead Co., Ltd., explained the operations of that company and described the developments it was proposed to undertake at the Boltsburn, Stanhopeburn, and Bedling Mines.

TRANSPORT AND DISTRIBUTION OF LIQUIDS.

A CONFERENCE on "The Transport and Distribution of Liquids in Chemical Works," under the auspices of the Chemical Engineering group of the Society of Chemical Industry, is to be held in the Chemical Department of Armstrong College, Newcastle-on-Tyne, on Monday next (December 15), from 3 to 5.30, and from 7.30 to 10 p.m. A provisional list of papers to be read, in abstract, and discussed is given below: "The Squeegee Positive Rotary Pump," By R. A. Pelmore, B.Sc., A.M.I.Mech.E.; "Pumping Acids and other Corrosive Liquids," by W. Hayhurst; "The Marclen Glandless Acid Pump," by R. A. Stewart; "The Handling of Petroleum in Bulk at Thames Haven," by N. A. Anfilogoff, F.I.C., M.I.Mech.E., F.C.S.; "Pumping Acid with Compressed Air," by John Oliphant; "General Types of Pumping Machinery used in Chemical Works," by J. H. West, B.Sc.; "The Elevation of Acids by the Kestner Patent Automatic Elevator," by J. Arthur Reavell,

M.I.Mech.E. The papers will be illustrated by diagrams, lantern slides and models, and will give the latest information and practice in connection with the machinery described. An exhibition of novel and modern pumping devices will be shown by Guthrie and Co., Accrington; Marclen Pumps, Ltd., London; the Avamere Engineering Company, Ltd., London; and other firms.

TEST OF BENZOLE AS MOTOR FUEL.

THE Automobile Association and Motor Union have issued a preliminary report of the 10,000 miles road test undertaken to prove whether benzole conforming to the Association's specification does or does not injure the engine or any other part of the car. The test began on August 28, and was completed on November 5, the number of days on which the car was running being 62 and the actual mileage covered being 10,000.45 miles. The following results were obtained: (1) Total number of gallons used during the test, 406 gallons 7 pints; (2) average mean weight of car, 1.8 tons; (3) average miles per gallon, 24.57 miles; (4) average ton miles per gallon, 44.22; (5) total amount of lubricating oil burnt, 5 gallons 6 pints; (6) average number of miles per gallon of lubricating oil burnt, 1,739.13; (7) highest miles per gallon, 27.71, over a distance of 145.5 miles; (8) lowest miles per gallon recorded, 18.56, over a distance of 129.98 miles; (9) highest ton miles recorded, 50.80, over a distance of 128.04 miles; (10) lowest ton miles recorded, 33.60, over a distance of 129.98 miles; (11) a fair average touring speed was maintained throughout the run, and it is estimated that the average miles per hour may be taken approximately at possibly 23.46. The test was carried out under ordinary touring conditions. In classifying the roads four standards were used, namely: Good, fair, poor, and bad. From 20 per cent. to 25 per cent. of the roads covered could be classified as good to fair, and the balance poor to bad.

COMING EVENTS.

Institution of Petroleum Technologists.—Meeting, Tuesday, December 16, at 5.30 p.m., at the House of the Royal Society of Arts, John Street, Adelphi, W.C. 2. Paper: "The Application of Liquid Fuel to Heavy-oil Engines," by A. J. Wilson, A.M.I.M.E.

Chemical Society.—Meeting, Thursday, December 18. Lecture by Professor J. Walker on "War Experiences in the Manufacture of Nitric Acid and the Recovery of Nitrous Fumes."

The Faraday Society.—Annual general meeting, Burlington House, Piccadilly, London, W. 1, Monday, December 15, at 7.50 p.m. Ordinary meeting, 8 p.m. Papers: "Electrolytic Iron Deposition," by Lieut. W. A. Macfadyen, M.C., B.A.; "The Measurement of Physical Properties at High Temperatures," by A. George Tarrant, B.Sc., A.R.S.C.; "The Electrolytic Formation of Perchlorate from Chlorate," by J. Guilfoyle Williams, B.Sc., A.I.C.; "On the Vapour Pressures of Binary Mixtures," by Professor Alfred W. Porter, D.Sc., F.R.S.; "Some Relations Between the Solubilities of Solutes and Their Molecular Volumes," by Shinkichi Horiba; "An Accurate Method for the Determination of Vapour Pressure," "Some Properties of Copper Ferrocyanide," by E. J. Hartung, D.Sc.; "The Solution Theory of Steel and the Influence of Changes in Carbide Concentration on the Electrical Resistivity," by Professor E. D. Campbell.

MARKET FOR DYES IN BRAZIL.—There is a considerable demand for dyes in Pernambuco, where dye-houses are able at present to dye only in black and one or two other colours. It is possible to get a few colours in aniline dyes in bulk, but, since some experience in the use of these is necessary, the sales to individuals are extremely small.

ITEMS OF INTEREST.

OBITUARY.—Colonel W. Lee Pilkington, who died on Saturday last at his residence, Norley Hall, Cheshire, at the age of 62, was senior partner in the glassmaking firm of Messrs. Pilkington Bros., St. Helens.

MINERALS DEVELOPMENT.—The Minerals Development Association has been formed to assist prospectors and owners of mineral rights. It is hoped in this way to stimulate the mining industry at home and abroad. Its offices are at 24, Lawrence Lane, Cheapside, London, E.C.

LEAD MINES REOPENED.—Lead-mining operations are taking place on a large scale at Llanfrothen, Merioneth. A large number of men are employed at Bwlchplwm Lead Mine, and it is hoped that Penrallt Mine will be restarted at an early date. Both mines had been closed for forty years.

THE ANTI-DUMPING BILL.—A meeting of the Chemical and Allied Trades' Section of the Manchester Chamber of Commerce was held on Monday afternoon to consider the Imports and Exports Regulation (Anti-Dumping) Bill. It is understood that a resolution was adopted demanding that before redrafting the Bill in the next Session the Government will consult the Chambers of Commerce and other trade organisations of the country.

BRITISH SUGAR BEET PROSPECTS.—At the annual meeting of the British Sugar Beet Growers' Society, Sir Veville Stanier, M.P., the chairman, said the Kelham estate had now been so cultivated that they were ready at any moment to begin to grow sugar beet for the factory, which was to be built before the autumn of 1921. Lord Bledisloe, who was chairman of the Royal Commission on Sugar Supply during the war, thought that at no time during the last thirty years had there been such a splendid prospect of the success of this industry in our country. It was agreed to authorise the committee to form a new company, Home Grown Sugar, Ltd., and to transfer the assets of the society to the company.

TITANIUM COMPOUNDS.—In contributing to the discussion of a paper by Mr. V. W. Aubel on "The Titaniferous Iron Sands of New Zealand," Mr. F. E. Bachman said that the titanium compounds, when present in the hearth of a furnace, can be easily removed by introducing materials that will liquify the calcium sulphide and oxidise the titanium compounds. The use of iron oxide, either fine ore or scale, fed into the tuyeres while casting or immediately after casting, offers a convenient means to the end desired. At first thought the introduction of iron oxide through the tuyeres might seem objectionable, owing to its reducing hearth temperature, but where it is reduced by the oxidation of titanium carbide there is a gain instead of a loss of heat.

THE "SINFIELD" STILL.—Patent rights have been applied for covering a very practical type of still involving a great deal which is new in both design and manufacture. The makers, Messrs. Sinfeld Bros. and Chillingworth, Wetmore Works, Burton-on-Trent, supply the following data as an example of one size which they are in a position to supply: Length, 15ft.; diameter, 8ft.; flush capacity, 726.552 cub. ft. (4,526 gallons); flue or firebox, 3ft. 6in. diam.; length of grate, 6ft.; width of grate, 3ft. 4in.; direct (flue) heating surface 82 sq. ft. The main claims are low cost, reduced fuel consumption, accessibility for cleaning, ease with which the firebox can be renewed in a very short period, minimum time still is idle for repairs. The makers undertake to supply sizes to meet all requirements.

GLANDLESS ACID PUMPS.—We have heard great accounts of the new "Marclen" patent centrifugal pump, all of which indicate phenomenal success under the most severe conditions. They involve no cost for labour or packing, and this is a big change where acid pumps are concerned, the reason being that there are no glands to pack, leak, or cut up the spindle. Very severe and protracted tests were made before this pump was put on the market by the makers (Marclen Pumps, Ltd., 25, Victoria Street, London, S.W.1). A very important feature is that no parts liable to wear are exposed to the action of acid, and another the automatic supply control. With static head 40ft. (first stage) or 75ft. (second stage), sizes available range from 800 to 3,300 gallons per hour. Three of these pumps at work in a home county dealing with sulphuric, hydrochloric, and other acids have been at work for two years without repair, and substantially without attention.

ZINC AND ZINC DUST PRICES.—Australian high-grade zinc dust (88-92% metallic zinc) is still in good demand at £75. per ton. The price of Australian electrolytic zinc (99.95% purity) remains at £44. per ton, f.o.b. Australia, for direct shipment to New Zealand, India, South Africa, and the Far East.

PHYSICAL CHEMISTRY AT CAMBRIDGE.—The Council of the Senate of Cambridge University, while putting forward a grace for the appointment of a syndicate to consider the allocation and the administration of the benefaction of the British oil companies, are of opinion, after consultation with Professor Sir W. J. Pope, that it is desirable at once to establish a Professorship of Physical Chemistry, the stipend of which would be furnished out of the benefaction. The stipend suggested is £1,000.

OIL DISCOVERY AT RETFORD.—During the last two years the Butterley Coal Company have been conducting borings for coal at Hayton Smeath, near Retford, and now it is reported that oil has been found present to an extent which seems to justify the possibility of the place being worked as oil wells. The oil is said to resemble in every respect the oil found recently in Derbyshire, and it comes away with the water in a thick, pasty substance, and is very inflammable. Experts pronounce it to be of excellent quality.

SCOTTISH OIL INDUSTRY.—A meeting of the Mining Institute of Scotland was held in the Royal Technical College, Glasgow, on Saturday. Mr. R. W. Dron occupied the chair. The possibility of finding liquid oil in Scotland, which had been referred to in a paper by Mr. H. M. Cadell, was discussed at some length. The opinion was expressed that liquid oil was not likely to be found in the present shale fields, but that it might be looked for farther east and west, in Haddingtonshire and Lanarkshire. A point brought out in the discussion was that while Scottish shale workers were afraid that the new company which had been formed for the purpose of taking over the Scottish oil companies would stop the shale mines and leave them only with the refineries, it had been stated that the Scottish oil was needed along with the other oils, and that mining for oil in Scotland would in all probability continue.

TRADERS AND MERCHANDISE MARKS.—The Merchandise Marks Committee has begun its investigations under the chairmanship of Mr. Harry Greer, M.P., and persons and associations who wish to submit suggestions to or to give evidence before the Committee on any of the matters mentioned below are invited to communicate with the secretary, Mr. M. F. Levy, the Patent Office, 25, Southampton Buildings, W.C. 2. The Committee was appointed by the Board of Trade to consider (1) whether any extension or amendment of the Merchandise Marks Act is required in respect of the provisions relating to indications of origin; (2) the utility and effect of "national trademarks" or other similar (collective) marks, and how far they should be authorised or encouraged in this country; and (3) how far further international action may be necessary for the purpose of preventing the false marking of goods.

ROYAL INSTITUTION.—A general meeting of the members of the Royal Institution was held last week, Sir James Crichton-Browne, treasurer and vice-president, in the chair. Dr. Paul Sabatier, Toulouse; Dr. Pierre Pau, Emile Roux, Paris; Dr. Jacques Loeb, New York; Dr. Robert Andrews Millikan, Chicago; Dr. Arthur Gordon Webster, Harvard; Dr. William Wallace Campbell, California, were elected honorary members of the Royal Institution. Mr. J. H. Batten, Mr. J. W. Butler, Mr. G. R. Coursay, Mrs. C. M. Dunbar, Mr. Arthur Holland, Mr. C. C. Lindsay, Mrs. K. A. Riches, Mr. Arthur Ruck, and Lieutenant-Colonel A. Williams were elected members. The following are among the lecture arrangements at the Royal Institution before Easter, 1920: Sir John Cadman, two lectures on (1) "Modern Development of the Miners' Safety Lamp," (2) "Petroleum and the War"; Professor A. E. Conrady, two lectures on "Recent Progress in Photography"; and Professor Sir J. J. Thomson, six lectures on "Positive Rays." The Friday Evening Discourses will begin on Friday, January 16, at nine o'clock, when Professor Sir James Dewar will deliver a discourse on "Low-temperature Studies." Succeeding discourses will probably be given by the Hon. Sir C. A. Parsons, Mr. S. G. Brown, Professor W. M. Bayliss, Dr. F. J. Russell, Mr. W. B. Hardy, the Hon. J. W. Fortescue, Professor J. A. Fleming, Mr. E. McCurdy, Professor Sir J. J. Thomson, and other gentlemen.

FERTILISER NEWS.

(SPECIALLY CONTRIBUTED.)

Nitrate of Soda.—Owing to strikes at the nitrate ports and delays in the arrival of ships, last month's exports from Chili were again on a very small scale, the total being only 94,000 tons, of which 53,000 tons to Europe, 33,000 tons to the United States, and 8,000 tons to "other parts." December is the last month in which shipments can safely be made by sailing vessels in time for the spring season in Europe, and it is to be hoped that the labour troubles will soon be adjusted, so that the numerous steamers now due on the West Coast may receive prompt despatch. The coal strike in the United States will, unfortunately, detain many of those chartered to load within the next three months; and, in any case, there is now only a remote possibility of shipment before the end of March of all the nitrate sold for delivery up to that date. The December production, although still very small at 122,000 tons, actually exceeded the shipments; and the stocks in Chili, instead of being, as expected, very considerably reduced, increased to about 1,675,000 tons, and many oficinas are restarting with accumulations of raw material. As mentioned in our last issue, the Producers' Association has once more raised its selling price—namely, from 9s. 7d. per quintal f.o.b. to 10s. 6d., the original starting-point in September having, it will be remembered, been 9s., but no more than 100,000 tons will be sold even at the advance. No wonder the market is described as "reserved," sales by producers outside the "combine" being meantime reported at 9s. 10d. for prompt delivery and 9s. 7d. for next year's delivery. The market here is nominally firm at about £22. per ton, with little business passing, as Government nitrate is on offer at less money.

Rise in German Fertiliser Prices.—The progress of the rise in fertilisers in Germany is a subject of a short note from official circles, which clearly shows how serious the position is. The great rise in prices since the springtime this year, before the repeated increased prices in March and November took place, is shown as follows:—The price per 50 kilogrammes taken in complete wagonloads, free at purchaser's railway-station, was: Sulphate of ammonia, springtime 18.90 marks, now 56.70 marks, more than 200 per cent.; nitrate of soda, springtime 28.10 marks, now 52 marks, 83 per cent.; ammonia potash, 29.08 marks in the spring, 60.81 marks now—over 109 per cent.; nitrate of lime, 18 marks in the spring and 43.65 marks now, or an increase of 142 per cent. The Central Association for the purchase of agricultural requirements calls the attention of agriculturists to the position, saying that the present prices will probably undergo a further rise before the coming spring. For the harvest of 1920 they must expect a considerable shortage in nitrate supplies, as the railway position makes it almost impossible to assure punctual delivery of fertilisers.

Sulphate of Ammonia.—Trading in this fertiliser continues to be steady as the end of the year approaches, the higher prices which are to rule for late orders apparently substantially helping current business. Amounts for export are not heavy, and, according to certain figures, they look like diminishing still more next year. The British consumption of sulphate of ammonia increased very substantially during the war, and that increase appears to be still going on. Diligent propaganda in the past, the lessons of the war, and the need for still further food production now are together bringing about this state of affairs. On the other side of the Atlantic the news is that the market for sulphate of ammonia is controlled entirely by available supplies, with some sales closed recently at record prices. Domestic producers are still sold up, with no encouragement in sight for any early relief in the situation—at least, until the steel industry is again in normal operation. The export demand for sulphate of ammonia from America has been unusually strong, but, owing to the scarcity of supplies, nothing in the way of improved trading has been registered.

Basic Slag.—The demand for this continues, and there is no chance of deliveries of present bookings before well on into January. This position seems to be becoming chronic now, so substantially has the consumption grown.

Potash.—The advance in the Government official prices for potassic fertilisers does not appear to have either stimulated or reduced trade, business moving at only a quiet level. American advices report that it was expected that considerable quantities of foreign potash would be brought into the United States, but so far arrivals have been in such limited quantities that the small home supplies have had to be relied

upon. What animation the market has out there is consequently controlled entirely by available supplies. The imports of Alsatian potash salts into the United Kingdom during the week ended December 6 were 2,588 tons of sylvinite, 14 per cent. Current prices are as follows: Sylvinite, 14 per cent. (French kainit), £7. per ton; sylvinite, 20 per cent. (French potash salts), £8. 7s. 6d. per ton; muriate of potash, 80 per cent., £19. 7s. 6d. per ton.

Bone Meal.—Bone meal is inclined to be slow for the time being, and prices are not too firm. There has been an arrival of something like 1,500 tons of bone meal in this country during the last month or so, and at current figures and in the state of the market this looks like filling present requirements. There is bone meal on offer at all sorts of prices. Pure steamed bone meal, 1 per cent. ammonia and 60 per cent. phosphate, in bags, is £13. 10s. to £14., ex works; with pure dissolved bones, 3 per cent. ammonia and 32 per cent. phosphate, in bags, £15. to £15. 10s., ex works. There is also dissolved bone compound at about £8. 10s. per ton, all these being very serviceable descriptions and each having its own following.

Fish Guano.—Some amounts of fish meal of a grade below what is usable for feeding live stock and poultry are said to be now on offer at £17. per ton, and, being rich in phosphorus, are pretty generally satisfactory. Some very good fish guano is also again reported to be available at £18. per ton. In this the phosphatic element is said to amount to 14 per cent.

Other Fertilisers.—Superphosphate of lime is moving off quietly, and trade is passing in potassic super, 4 per cent. and 26 per cent., in bags, at £9. 2s. 6d. per ton. Generally, the fertiliser market looks like ending the year with a quiet, steady undertone of business passing and prices very firm. The new descriptions or revived old ones which were expected to have come along by this time have not matured, but next year a generally improved supply of many sorts is reported to be likely. The market is certainly an attractive one for many manufacturers and importers.

SOUTH WALES NOTES.

(SPECIALLY CONTRIBUTED.)

All the tinsplate works that were stopped last week on account of the absenteeism of the picklers are operating fully this week. The short supply of fuel creates some concern. The demand for tinsplates still increases, and outputs are also improving. More mills are to be started as soon as capable men are found to operate them.

The patent fuel business is brisk, and the production is still increasing. Cardiff manufacturers have sent good cargoes to Brest, Dunkirk, and Dakar. The Swansea shipments include 3,100 tons to Rio Grande de Sul, 3,000 tons to Rouen, 4,000 tons to Piræus, and other smaller parcels to St. Malo, Havre, and Rouen. The controlling interest in the Cardiff and Newport Patent Fuel Company, Ltd., has been acquired by Mr. W. H. Renwick, J.P., Cardiff.

A somewhat unusual application was made to the Swansea County Court judge. The claim was in respect of a recurrence of pitch cancer after the claimant had left the respondents' service, and his Honour held that there was no intervening accident within the meaning of the act since the applicant had left that employment, that the disablement was due to his working on the pitch before he left respondents' employment, and accordingly he was entitled to compensation for recurrences of the disease. A stay of execution was granted.

Relative to the case of breaking up steel drums that had contained sulphuric acid, which led to an explosion, through which a man who was using an oxy-acetylene flame was killed, Mr. Justice Lush has now given his judgment, and has found that there was no negligence on the part of the defendants, Mr. Arthur John, Llanelly, and Messrs. Pearce and Son, Sheffield.

On Wednesday the funeral of Mr. Herbert Selwood Sutton took place at Cadoxton. Mr. Sutton was the principal of the firm of Messrs. T. S. Sutton and Sons, metal refiners, etc., Neath.

Cokes are selling finely, and the by-product ovens are fully operating. Sulphate of ammonia moves off well, there being no difficulty in disposing of all the production in this area. Export business is slightly better, although shipments are still very meagre.

The spelter trade just now is good, and furnaces are working regularly, but there is a difficulty in getting the requisite quantities of coal to the works.

IMPORTS OF CHEMICALS AND ALLIED PRODUCTS.

THE following returns, which are taken from the import statistics of the United Kingdom, give the amount and value of chemicals and allied products imported during the month ending Nov. 30th, 1919, as compared with Nov., 1918.

ARTICLES.	QUANTITIES.		VALUE.		ARTICLES.	QUANTITIES.		VALUE.	
	Month ended		Month ended			Month ended		Month ended	
	1919.	1918.	1919.	1918.		1919.	1918.	1919.	1918.

(To be concluded.)

PARLIAMENTARY NEWS.

Fertilisers.

In the House of Commons on Monday, Sir N. Griffiths asked the Parliamentary Secretary to the Board of Agriculture what quantity of sulphate of ammonia, ground basic slag, and superphosphates is at present imported from Germany, the cost to the British Government of such importation, and the present retail price of such fertilisers?

The Parliamentary Secretary to the Board of Agriculture (Sir Arthur Boscawen): I am informed that no sulphate of ammonia, ground basic slag, or superphosphate is being imported from Germany. The present maximum prices of the respective fertilisers are:—

Sulphate of Ammonia.—For sale in lots of not less than two tons for delivery by rail or water to purchaser's nearest railway-station or wharf in Great Britain, less a trade discount to agricultural merchants, dealers, and co-operative societies:

Month of Delivery.	Price per Ton, in bags.	
	net Cash.	
	£	s. d.
December, 1919	21	0 0
January, 1920	21	7 6
February	21	15 0
March, April, and May	22	0 0

Basic Slag.—The maximum prices range from 62s. per ton for slag containing 12 to 14 per cent. total phosphates to 102s. per ton for slags containing 42 to 44 per cent. total phosphates. The prices include delivery in makers' bags to purchaser's nearest station or wharf for minimum lots of four tons. In the case of both sulphate of ammonia and basic slag the prices given include, in deliveries to Ireland, Isle of Man, or Channel Islands, delivery f.o.b. port in Great Britain.

Superphosphate.—Owing to the varying cost of importing phosphate rock, it has not been possible to arrange for superphosphate to be sold at a uniform delivered price. During the 1918-19 season phosphate rock and other materials were sold to superphosphate makers by the Government at less than market prices. This assistance has been discontinued. The present quotations for 30 per cent. superphosphate are from £7. 5s. to £7. 7s. 6d. per ton, free on rail.

Sir N. Griffiths asked the Parliamentary Secretary to the Board of Agriculture what, if any, profit the Government are making per ton on basic slag now being sold at fixed prices ranging from 62s. per ton for 12 per cent. up to 102s. per ton for 42 per cent. of total phosphates; and will he state what proportion, if any, of such basic slag is made up out of material obtained from Germany?

Sir A. Boscawen: No basic slag is sold by the Government, nor do they profit by the sales made by makers. As regards the latter part of the question, I am informed that no raw slag is being obtained from Germany.

Sir N. Griffiths asked the Parliamentary Secretary to the Board of Agriculture whether he is aware that the trade are unable to accept orders for a quality of basic slag over 22 per cent., and that even this quality is only obtainable after considerable delay; and what steps he proposes to take in this matter in view of the serious effect such delay will have on next year's crops?

Sir A. Boscawen: I must refer my hon. friend to the answer I gave on the 2nd inst. in reply to a question by the hon. member for Monmouth.

Mr. Hohler asked the Parliamentary Secretary to the Ministry of Munitions whether the Government, directly or indirectly, control the supply and the price of sulphate of ammonia, basic slag, and superphosphate; will he state the average price per ton paid for each of these fertilisers by the Government from April 1 to September 30 last, the average price at which they were sold during the like period to the merchant or factor, and the price the merchant or factor was authorised to charge the consumer; did the Government make any and what profit during the above period by dealing in the above fertilisers; and will he give the average profit per ton?

Mr. Hope: The Ministry of Munitions does not control the supply of the fertilisers referred to; the prices at which they could be sold up to May 31 last were fixed by the Fertilisers Prices Order, 1918. The Ministry has never had any trading transactions in superphosphates or basic slag; but at the date of the armistice it had small stocks of sulphate of ammonia, which have since been sold.

Mr. Harry Hone asked the Parliamentary Secretary to the Board of Agriculture whether, in view of the necessity for securing a full supply of superphosphates, he will take steps to enable phosphate rock from Algiers being imported, instead

of the low-grade and inferior quality of phosphate rock at present being brought in from America?

Sir A. Boscawen: Arrangements have already been made for the importation of phosphate rock from Algiers and Tunis which will bring up the total deliveries from these countries to the United Kingdom to 277,000 tons during 1919. Arrangements have also been discussed with the French authorities for the delivery of a substantially larger quantity during 1920. The matter is receiving the close attention of the Board.

British Dyes, Ltd.

Major Barnes asked the President of the Board of Trade if his action in giving preferential assistance to a particular company engaged in the manufacture of dyes by subscribing to the share capital of that company has received the consent of the House of Commons; and, if not, if he proposes to submit his action for the approval of the House?

Sir H. Greenwood: The policy of Government financial support to British Dyes, Ltd., was fully discussed in this House in 1915; and as regards the recent change in the form of that support, I would refer the hon. member to the answer to his previous question.

Major Barnes asked the President of the Board of Trade in what vote or votes appears the whole or any part of the sum of £1,700,000, subscribed by the Government to the share capital of the British Dyestuffs Corporation, or if the whole or any part of it has not yet appeared; and in what vote and when the sum or any part of it will be submitted to the House?

Sir H. Greenwood: Provision for £334,046., being balance of a sum of £1,500,000, for investment in British Dyes, Ltd., will be found in the Board of Trade Estimates, Class II., Vote 8, Sub-head 1, for 1919-20. The sum of £1,165,954. previously invested in such debenture bonds was provided out of the vote of credit, and has appeared or will appear in the appropriation accounts relating thereto. These bonds were cancelled during the present financial year, and the sum of £1,700,000, was invested in the British Dyestuffs Corporation in the purchase of the following fully-paid shares—namely, 850,000 7 per cent. preference shares of £1. each; 850,000 8 per cent. preferred ordinary shares of £1. each. One fully paid preference share (£1.) was allotted to the nominees of the Government conferring special voting powers under the articles of the company. The balance, for which no provision was made in the Board of Trade Estimates, has been temporarily met out of the Board of Trade Vote, and it is proposed to submit a supplementary estimate, to be laid before Parliament in due course.

Alkali Manufacture and the Transport Situation.

Mr. Henderson asked the Minister of Transport whether he is aware that the caustic-soda and bleaching-powder plants in Widnes of the United Alkali Company, Ltd., employing from 1,500 to 2,000 men, will be shut down within a few days unless facilities are afforded for transporting lime from Buxton; whether he is aware that there are 5,000 tons of limestone waiting at Buxton which cannot be brought to Widnes in consequence of the lack of wagons; and whether he can take special action in this case in order to prevent the enforced unemployment of so many men?

Mr. Neal: Wagons for limestone are provided by quarry owners, but whenever possible the railway company have in the past supplemented the supply, and will continue to do so. I understand that the United Alkali Company's reason for requiring additional wagons now is due to the fact that they relinquished last July seventy-five wagons which they had on hire.

Ferro-alloys Manufacture.

Sir A. Geddes, in reply to Mr. I. Griffiths, said: Ferro-tungsten and tungsten powder have been placed in the schedule of products of unstable key industries, of which the importation is prohibited because of their importance in the manufacture of high-speed steel, which is essential for the engineering industries, and the fact that before the war the United Kingdom was entirely dependent for the supply of these products upon Germany. It is difficult to compare the relative values of various alloys with differing applications, and though the importance of ferro-chrome is, I think, fully recognised, the Government felt that the case for its special treatment was less strong than that of the substances and articles whose importation they have restricted. The difficulties in which British manufacturers are placed are, I understand, mainly due to the existence of large stocks in this country. The hon. member will no doubt have an opportunity of raising the matter again when the House comes to consider in detail the problem of safeguarding key industries.

Cumberland Coke Ovens.

Mr. Forrest asked the Minister of Transport whether he was aware that the railway-wagons loaded with Durham coke and sent into Cumberland were brought back empty; and whether he would consider the possibility of using those wagons on the return journey for bringing Cumberland coke to the North-Eastern ports, thereby making greater use of the wagons and assist in increasing employment at the Cumberland coke-ovens, which were now working at less than half their capacity?

Sir E. Geddes: I am aware of this movement of coke in both directions, and am inquiring as to the best means of dealing with it.

Anglo-Persian Oil Company.

Mr. Chamberlain, replying to Major Barnes, said: His Majesty's Government at present hold 2,000,000 £1. shares in the Anglo-Persian Company, out of 3,000,000 ordinary shares, and have agreed to subscribe in the same proportion to the total ordinary share capital for a further 3,000,000 ordinary shares of £1. each, on which 1s. per share will be immediately paid up. It has been arranged that the remaining 19s. per share on 2,000,000 shares will be paid up shortly. The calls on the remaining 1,000,000 shares will not be made for some years. Tentative arrangements for financing the call of 19s. per share on the 2,000,000 shares have been made and will be embodied in a Bill which will be presented to the House immediately.

Mr. Swan asked the Chancellor of the Exchequer whether any limitation of profits was imposed on the Anglo-Persian Oil Company in consideration of the financial assistance given to that company by His Majesty's Government?

Mr. Chamberlain: No, sir; except that the price ruling under the Admiralty contract for fuel oil is subject to reduction in proportion to the profits realised above a certain limit. There is every reason to hope that a substantial saving will be secured by the Admiralty under this head during the ensuing year.

Palm Kernel Exports.

Lord H. Cavendish-Bentinck asked the Prime Minister whether the Government would give a day for the discussion of the restrictions on the export of palm kernels and other vegetable oil products from the British dependencies to territories other than British?

The Prime Minister: I do not think that there would be a general desire for this discussion, and the pressure upon Parliamentary time is very great.

Sales of Explosives.

Mr. Haydn Jones asked the Parliamentary Secretary to the Ministry of Munitions whether the sum of £12,000., mentioned as having been realised for explosives from the store at Dinas Mawddwy, was in respect of the class of explosives which has been for some months and is now contained in the store, or was it in respect of explosives previously removed?

Mr. James Hope: The sum of £12,000. was realised in respect of a sale of explosives of the same type as that at present stored at Dinas Mawddwy.

LEGAL INTELLIGENCE.

Infringement of Copyright in Trade Advertisement.

In the Chancery Division on Friday, (December 5), Mr. Justice Peterson had before him a motion by the Deptford Steel and Iron Works, Ltd., for an injunction restraining John Thompson (Wolverhampton), Ltd., from infringing the plaintiffs' copyright in an advertisement published in the *Chemical Trade Journal and Chemical Engineer*, in connection with homogeneous lead coating for vessels used for chemical purposes.

Mr. Hughes, K.C., for the plaintiffs, stated that they owned a secret process for homogeneously attaching sheet lead to the surface of iron and steel so as to form a perfect union, and that they had entered into a long working agreement with British Dyes, Ltd. The plaintiffs had inserted their advertisement in the *Chemical Trade Journal and Chemical Engineer* for some time, and in the issue of that paper of November 22 it appeared on page xiii. To their astonishment on page xvii. they found an advertisement by the defendants, "as specialists in homogeneous lead coating," which was an obvious copy of the whole of plaintiffs' advertisement so far as it related to lead-lining work. This was calculated to do the plaintiffs serious injury.

Mr. Dighton Pollock, for the defendants: We have agreed an order.

Mr. Hughes: I understand that the defendants are prepared to submit to an order and pay an agreed sum as damages.

Mr. Pollock: It has already been paid.

Mr. Hughes: And will pay the costs as between solicitor and client?

Mr. Pollock: Yes.

Mr. Hughes: I think that the apology plaintiffs required has in fact been given.

Mr. Pollock: That is so.

His Lordship made an order in the terms agreed.

Claim for Damage by Explosion.

The Court of Appeal, composed of the Master of the Rolls and Lord Justices Atkin and Younger, on December 4 reserved judgment upon the appeal of the defendants in the case of the British Fish Guano Company, Ltd., v. the Rainham Chemical Works, Ltd., and Ind, Coope and Co. (1912), Ltd., v. the same defendants, from judgments of Lord Justice Scrutton sitting as an additional judge of the King's Bench Division. The plaintiffs in both actions claimed damages from the appellant, a private chemical company, for injury to their premises caused by an explosion at the appellant's works, and which catastrophe was caused by a quantity of dinitrophenol being exploded at the time of the explosion. Appellant's works were divided into two parts: One part was paid for by the Ministry of Munitions and was for the supply of explosives to the Government; and there was another separate part, which was used for supplying other persons with explosives, and that was not paid for or controlled by the Ministry.

Lord Justice Scrutton held that the defendant company were liable for the damages caused to the plaintiffs by the explosion, and from this decision the defendants now appealed.

Grays Chemical Works: Winding-up Petition Withdrawn.

The petition for an order to compulsorily wind up the Grays Chemical Works, Ltd., was finally disposed of on Tuesday in the Companies Winding-up Court.

Mr. Lavington said the petition was adjourned for a fortnight for the company to try to raise capital to pay their creditors, and an undertaking was given; but since then the company had passed a resolution to wind-up voluntarily.

His Lordship: That is unusual.

Mr. Lavington said the meeting was held on Monday, but probably under a misapprehension.

Mr. Vanneck, for the company, said that was so.

His Lordship said the directors called the meeting after having given the undertaking, and that was rather a serious thing. He thought the best thing to do would be to make a compulsory order. But he would wait until after the luncheon interval to see if the petitioner (a Mr. G. T. Morgan) was satisfied.

After the adjournment, Mr. Lavington said the petitioner had been satisfied.

The petition was therefore withdrawn.

Bisulphide of Soda Fumes.

The circumstances and cause of the death of David Hutton, aged 54, a colour-mixer's labourer at the Tottington Mill of the Calico Printer's Association, were the subject of inquiry by Mr. S. F. Butcher (district coroner), at Bury.

Nathan Hunt, foreman colour-mixer at Tottington Mill, said deceased was a colour-mixer's labourer at the Mill. He stayed off work about the 6th ult. He did not know why. Deceased was not sick at his work. About three weeks before the 6th witness told him to tap a barrel of bisulphide of soda. He did not make any complaint, but the next morning he told witness that he had had a restless night, and that he got a mouthful of bi-sulphide of soda from the cask he tapped the previous day. There had not been a great deal of sickness at these works. Asked by the Coroner if there had not been a good deal of blood poisoning among calico printers, witness said he could only speak of his own department, and there had not been there. Bi-sulphide of soda was used in the printing process, and it was mixed with the colours. There had not been to him a general complaint on the part of the printers that they were suffering through something in the colours, and he had not been informed by anyone that there was such a complaint existing.

Examined by Mr. Hird (the Factory Inspector), witness said: A short distance away from where the barrels were tapped there was an exhaust-fan—about ten feet away, and that fan tended to clear the room of any fumes. No other men had complained of the work. The effect of the sulphurous acid could be felt when it came off, but it soon went away. It usually affected the chest, and was worse when a new barrel was tapped. He had not noticed anything different lately in the casks. He had not known anyone permanently affected by the work, and he had had 21 years' experience.

Charles Burgess Davies, works manager, said there had not been any change in the character of the materials they used within the last six months, and it was the same chemical compound they had used for the last 25 years. It was regularly analysed, and they had never had any adverse reports upon it. It was a surprise to hear about that case. They had had two printers with rash on their hands for a few days during the last nine months. He questioned them, and in both instances they said it was eczema. In neither case had they been using that compound. There had not been any complaints to him of men suffering from their hands. He had never heard of anyone being poisoned by opening a barrel of bi-sulphide of soda.

The inquiry was adjourned until Friday, December 19.

Compensation Claim.

In the King's Bench Division, on Saturday last, Mr. Justice Lush gave a considered judgment in an action brought by Mrs. Margarate Keene, widow, Llanelly, against Mr. A. John, contractor, carrying on business at Llanelly, and Messrs. Pearce and Sons, scrap-metal merchants, Sheffield, to recover for the loss of her husband, whose death, she said, was due to negligence and breach of duty on the part of the defendants.

The defendants denied negligence or breach of duty, and pleaded contributory negligence or the part of the deceased.

His Lordship said the plaintiff's husband was in the employ of the defendant John, and on November 6, 1918, he was engaged in breaking up old drums which had been purchased of Messrs. Pearce and Sons. One of the drums was air-tight, and the deceased knocked a hole in it with a pick. He then applied a jet flame of acetylene gas to the drum, with the result that there was an explosion, Keene not having waited for the hydrogen gas which had accumulated in the drum to escape. Keene received injuries from which he died in a few hours. The plaintiff alleged the defendant John was guilty of negligence in not making inquiries as to the contents of the drum, and that Messrs. Pearce and Sons were negligent in not warning the defendant John of the possible presence of gas in the drum. His Lordship was of opinion that there was no negligence on the part of the defendants, and no contributory negligence on the part of the deceased, and, accordingly, entered judgment for the defendants, with costs.

His Lordship assessed the compensation to which the plaintiff was entitled under the Workmen's Compensation Act, 1906, at £300., and directed that the defendant John should be paid his costs of the action out of the amount awarded the widow.

Phosphate for Munitions: Action in Prize Court Against Crown.

The President in the Prize Court on Wednesday concluded the hearing of the action in which the Svalfvelsyre Fabriks Aktiebolaget claimed damages from the Crown, or, alternatively, the fair value of a cargo of phosphate rock on the Consul Olsson, in respect of which the appraised value of £16,420. was paid into court by the Crown after the Government had requisitioned the cargo. The Crown had "released" the goods as innocent of enemy interest upon investigation.

Mr. Lillie, for the Crown, stated that the shippers, the National Zinc Company of New York, a firm of smelters, had as president a Mr. Leo Wreschner, and a Mr. Leo Wreschner was a partner of the well-known firm of Beer, Sondheimer and Co., of Frankfurt on Main, Germany, and an association between the two was at one time assumed, but the cargo appeared to have been sold to the claimants f.o.b. at Tampa, Florida. However, the Crown contended, on the score of damages, that there was reasonable ground for the seizure of the goods. The claimants asked for damages either for wrongful seizure and detention or in respect of under-appraisal of value, and the Crown's reply was that the seizure was *bona fide* and the appraisal binding on all parties.

His Lordship intimated that he had reserved his judgment, and if he came to the conclusion that the appraisal made for the Crown was not conclusive he would hear the parties further on the questions of valuation. He would decide the principle first.

Alleged Damage by Picric-acid Fumes.

Mr. Pollock, High Courts' Official Referee, on Wednesday continued the hearing of an action of considerable importance to chemical manufacturers which had already occupied four days at Leeds. The plaintiffs were Mr. Richard Kershaw, of Leamington, and Sarah Elizabeth Young, of Harrogate, the owners of property at Halifax, and the defendants the Brooks Chemical Company, of Lightcliff Works, Halifax. The plaintiffs claimed damages in respect of alleged injury done to an estate called "Crow's Nest," Halifax, by an injurious nuisance occasioned by the manufacture of picric acid. Plaintiffs also asked for an injunction.

In continuation of the defendants' case, Mr. Chas. Wm. Fennell, land agent and surveyor, of Wakefield, was called. He said that such damage as had been done to trees did not in his opinion depreciate the value of the property, and the fact that the house remained unlet was in his opinion due to its character rather than to any nuisance which existed. It was not, he said, a property that could be readily let, unless they came across a man with more money than brains, which was most unusual in Yorkshire.

In cross-examination by Mr. Waugh, K.C. (for plaintiffs), witness said he did not think any person deciding to purchase any of the property in question would take notice of the alleged nuisance from picric-acid fumes. He would get used to it just the same as he had got used to eating margarine.

Further evidence was given to show that the houses had no special value in the district as residential property, and the hearing was adjourned.

Perry, Mills and Co.

At the London Bankruptcy Court on Tuesday last before Mr. Registrar Mellor, the adjourned public examination was held of Joseph Algernon Hare Duke and Henry Slater, trading as Perry, Mills and Co., agents and merchants, at 29, Gracechurch Street, E.C. An amended statement of affairs filed by the debtors showed gross liabilities amounting to £37,783. 11s. 4d., of which £14,911. 15s. 7d. was expected to rank against the estate for dividend. The assets were returned at £2,492. 12s. 6d. The business was commenced in 1912, and was carried on for the purpose of exporting chemicals to the Continent, and the debtor Duke appears to have previously been concerned in the flotation of a margarine company, and had also been a director of Oil Refineries, Limited.

The Official Receiver said the debtors had amended the statement of affairs, which now appeared to be quite in order, and he had no further questions to put to them.

The examination was closed.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

(SPECIALLY CONTRIBUTED.)

Once the year is turned there can be little doubt now that operations in the coking and by-product industries of this district will be on a much fuller scale than has been the case for seven or eight months. The hematite pig-iron trade, it is believed, is only waiting the termination of the moulders' strike to burst into activity on a scale such as was witnessed when the Government released control in April last, and in that case, of course, additional furnaces would be put on to ordinary iron, and the full production of the coking plants would be absorbed. Meantime, there is every prospect of an awkward interval being bridged by the growing demand from the Continent for local coke. Contracts have now been fixed up for a tonnage to be delivered to the Continent, which represents the maximum capacity of the 380 ovens for at least three months to come. At the present moment trucks are lacking, and it is impossible to carry more than a few hundred tons weekly to the East Coast for shipment. The wagon shortage, however, is one that will become easier shortly, and the ovens will then be put into full swing. The by-product industry is distinguished by no special feature.

REPORTS OF COMPANIES.

Sulphide Corporation, Ltd.

The report for the year to June 30 last states that the net profit is £308,508.; £30,000. was paid in July as an interim dividend of 5 per cent. on the preference shares, leaving £278,508. The directors now recommend that, after placing £30,000. to reserve for contingencies, a further dividend of 10 per cent. be paid on the preference shares and a dividend of 15 per cent. on the ordinary shares, carrying forward £121,008. In consequence of the failure of coal supply, caused by the protracted maritime strike in Australia, and of the unsettled condition of labour which led to local strikes at Broken Hill, operations at the Central Mine were suspended for upwards of thirteen weeks, with the result that the extraction of ore fell off to the extent of 9,873 tons, the quantity of ore raised being 113,457 tons, as compared with 123,330 tons in the previous year. The suspension of work at all the Broken Hill Mines has continued since the financial year closed on June 30 up to the present date. The computation of ore reserves at the conclusion of the year shows that there was available for future extraction 1,506,950 tons, the quantity developed during the year being approximately 11,900 tons. The amount of ore treated in the concentrating mill was lower by 32,133 tons, with a corresponding reduction of 4,543 tons in the output of lead concentrates and 6,111 tons in that of zinc concentrates. Despite the industrial disturbances at Broken Hill, operations at the Cockle Creek works have been maintained throughout the year without intermission. The tonnage of bullion treated in the refinery amounted to 26,263 tons, and the recoveries have again been very satisfactory. The final products were: Gold, 17,599oz.; silver, 2,127,082oz.; soft lead, 22,935 tons; antimonial lead, 359 tons. The lead produced was, with the exception of about 3,000 tons, sold under the Ministry of Munitions contract, and the balance is now in the course of realisation. The producer (Mond) gas plant yielded 710 tons of sulphate of ammonia, together with 114,389gals. of tar, the latter, after distillation, providing 58,300gals. of fuel oil used for refinery purposes. The acid and superphosphate plants produced 15,524 tons and 25,448 tons respectively, as against 13,297 tons acid and 21,658 tons superphosphates in the previous year. Of the total tonnage of superphosphates for the year under review, 8,805 tons were produced on behalf of other manufacturers, owing to a general shortage of acid experienced by them. As a result of additions made to the copper leaching plant, all copper matte can now be converted into sulphate of copper or precipitate, according to requirement. The experiments in the treatment of slags for the recovery of zinc continue on satisfactory lines, and there are indications that a successful result will be ultimately attained. The zinc-distilling works at Seaton Carew were subject to the same disabilities as prevailed in the previous year, which were further intensified by increased labour difficulties. The tonnage treated in the distillers was 8,256 tons, as compared with 9,909 tons in the previous year, the resultant products being 2,484 tons spelter, 77 tons zinc-dust, and 10 tons metallic lead. The reduction in the quantity of ore treated and spelter produced has been due mainly to the impossibility of obtaining adequate supplies of zinc concentrates from Australia owing to the restrictions on shipping, while working costs have been greatly increased by the rise in the price of coal, labour, and materials, as well as by the reduced scale of operations. The works have remained under Government control, and the contract with the Ministry of Munitions for the sale of all spelter produced continued in force. The capital expenditure during the year amounted to £18,221., being a further contribution towards the extension of the works under agreement with the Ministry of Munitions.

Peruvian Corporation, Ltd.

The accounts to June 30 last show a profit for the year of £265,113., after deducting the usual charges and debenture interest at the reduced rate of 4 per cent. In the income brought into the corporation's revenue account there is a decrease of £84,974. as compared with the previous year. To the above-mentioned profit of £265,113. has to be added the sum brought forward from last year, and, after deducting the charges for amortisation of debentures, income-tax, and lake steamers' insurance, the net revenue shows a balance of £324,774. The directors will submit at the general meeting a resolution for the payment of a dividend of £1. per cent. on the preference stock, and will set aside and appropriate on a separate account at the bankers of the

Corporation the additional debenture interest of £2. per cent., making the interest £6. per cent. for the year. After providing for the additional £2. per cent. debenture interest with the amount of amortisation, together £108,000., and deducting the dividend proposed to be paid on the preference stock, amounting to £74,575., there will remain £142,198. to be carried forward.

Sapon Soaps, Ltd.

An extraordinary general meeting will be held in London on December 17 to authorise an increase in the capital to £300,000. by the creation of 500,000 new ordinary shares of 4s. each, ranking *pari passu* in all respects with the existing ordinary shares. It is proposed to offer the new shares in the proportion of five new shares for every two preference shares held, and one new share for every two of the existing ordinary shares held. The increased capital, it is stated, is absolutely essential for the requirements of the business and to increase its resources to an extent commensurate with the demands made upon its funds by the greatly increased cost of raw materials; also to provide additional buildings and installations of new machinery, which are required to meet the rapidly growing demand for the company's products. Negotiations are pending with a firm of soapmakers in Marseilles for the erection of a plant for the manufacture of soap under this company's patented process. If these negotiations are completely successful, all the capital will be found by the French company, and this company will receive a substantial interest in shares, ranking *pari passu* with the capital provided in France. This company has just announced a maiden dividend on the ordinary shares of 2½ per cent.

Weardale Lead Company, Ltd.

The ordinary general meeting was held last week in London, Mr. Edmund P. Deas (chairman of the company) presiding. The Chairman said the trading profit was £9,927., a decline of £13,901. 7s. 9d., due mainly to the low price of lead which ruled over the last eight months of the financial year. The big quantity of lead held by the British Government after the war was the direct cause of the market falling so low. Now that this stock had been reduced, and a real need for lead for manufactured products was being felt, the market price had risen to nearly £40. per ton again. It seemed quite certain that the price of lead must be maintained at a high standard—at least, until wages, freights, etc., came down to lower levels. Another factor was a reduced yield of metal from the ground worked at Boltshurn, their principal mine. Owing to various local conditions, the company's smelting operations had not been very satisfactory of late years, and they had concluded a contract for the sale of the ore on satisfactory terms. In all the circumstances, the board felt that the final dividend of 5 per cent., making 7½ per cent. for the year, free of income-tax, was satisfactory. The Chairman concluded by moving the adoption of the report and accounts.

Mr. H. S. Willis seconded the motion, which was adopted.

Anglo-Persian Oil Company, Ltd.

Presiding at the annual meeting in London, on Monday, Sir Charles Greenway, Bart., chairman, in the course of his address, said: As you are all aware, we have recently acquired a controlling interest in the Scottish Shale Oil Companies through the Scottish Oils, Ltd., and have thereby added considerably to our refining facilities in this country. The refineries of these companies have a combined capacity much in excess of the present output of shale oil, and our intention is to supply them with such additional quantities of natural crude oil from Persia or elsewhere as may be necessary to enable the refineries to be utilised to the full extent of their capacity. This will not only effect a substantial reduction in the present refinery costs of shale oil, but also, by combining the management of these concerns under one company, largely reduce the costs of administration. By these combined economies we hope to be able to keep alive a home industry—giving employment to many thousands of men—which otherwise was doomed to destruction. We have also under contemplation the erection of refineries in other parts of the world, it being a demonstrable fact that to such an extent as the products can be disposed of in such countries it is far more economical to refine the crude oil in the countries where the products are to be sold than in the countries where the crude is produced. This is a point regarding which there has been some difference of opinion in the past among oil producers, but which is now pretty generally accepted as an axiom.

Wall Paper Manufacturers, Ltd.

The accounts for the year to August 31 last show that the profit, after making reserves for excess-profits duty and postponed repairs, is £336,614., and £160,068. was brought in. After payment of interest on debenture stock and interim dividends to preference and ordinary shareholders, and interest to vendors in lieu of such interest and dividends, and income-tax, the amount available is £390,945. The directors propose a further dividend on the ordinary at 8 per cent., making 10 per cent. for the year, and a dividend on the deferred shares for the year at 5 per cent.; transfer £35,000. to a "contingencies fund," and carry forward £160,417.

Liverpool Nitrate Company, Ltd.

At the annual meeting in Liverpool on December 4, the Chairman (Sir Robert Harvey), in the course of his address, said: The present need for nitrate of soda is great and urgent, but, so far as the coming season is concerned, the available supply to meet the demand, will be very limited. The tonnage to carry it is confined to foreign-owned vessels, as British ships have to carry other produce, and are not granted licenses to load nitrate. The rate of freight for nitrate is therefore unduly high, and to the entire benefit of the foreign shipowner. I am credibly informed that if the present restrictions were removed, much lower freights for nitrate would be ruling, and the position of the British shipowner benefited. Germany requires an enormous amount of nitrate of soda; but owing to depreciation of the mark and the farmer having to sell his product at fixed maximum prices, it is impossible for him to use artificial fertilisers, which have to be imported. The adverse exchanges of France and Italy also tend to check the importation of fertilisers into these countries. The undoubted advantages of nitrate of soda for increasing the yield of crops have now become more widely recognised, and I hope that the experience of the war as to the necessity for intensive cultivation, coupled with the rise in the land values and agricultural wages, has not been lost on the farmers of this country.

Tyee Copper Company, Ltd.

The accounts for the year to April 30 last show an addition to the debit balance of profit and loss account of £558.

British Uralite Company (1908), Ltd.

The report and accounts for the year ended June 30, 1919, disclose a loss of £446. 9s. 8d. after allowing for depreciation. As forecasted in the previous report, the cessation of hostilities had the effect of terminating Government orders, and, coupled with the period of slackness and unrest through which the building trade has been passing, the sales of the company's products have been very adversely affected, the prices ruling at the same time also being exceptionally low. The outlook for the current year is more favourable, although the building trade still remains in a state of great uncertainty, and prices for nearly all classes of goods manufactured by the company remain at a low figure due to competition between manufacturers and the realisation of heavy stocks in the hands of the Government.

Courtaulds, Ltd.

An extraordinary general meeting will be held in London on December 15 to pass a resolution revising and extending the articles of association; while a further meeting will be held on December 30, when resolutions will be submitted for increasing the capital to £4,000,000. by the creation of 1,500,000 new shares of £1. each, all ranking *pari passu* with the existing shares, and that the sum of £1,999,993., to the credit of the general reserve account, be capitalised and applied to the paying up in full of the 999,993 shares of £1. each of the company, to be distributed amongst holders of existing shares.

Power-Gas Corporation, Ltd.

The report for the year to September 30 last states that the results of the trading during the year have been satisfactory. The fully paid shares in satisfaction of the purchase price of business and patents of Messrs. Lynn and Rambush have been issued during the year. The accounts show a profit of £33,561., and £16,797. was brought in, making £50,358. The directors have appropriated £6,700. to reserve,

and recommend a dividend at the rate of 6 per cent. per annum, less tax, carrying forward (subject to excess-profits duty) £26,309.

Cape Copper Company, Ltd.

The accounts for the year to August 31 show a loss of £171,006., while, after transferring £35,966. from income-tax provision account and £80,000. from the reserve fund, a debit balance of £51,501. was carried forward, as against a credit balance of £4,212. brought down.

Wetcarbonizing, Ltd.

In their report for 1918 the directors state that the factory at Dumfries has been completed during the current year, and is now working. Negotiations for the use of the company's process in foreign countries are at present in progress.

India Rubber, Gutta Percha, and Telegraph Works Company, Ltd.

The net profits for the year ended September 30 were £71,913., and £90,955. was brought forward. A final dividend of 15s. per share is proposed on the ordinary shares, making 10 per cent. for the twelve months, and carrying forward £100,368.

Bryant and May, Ltd.

An extraordinary general meeting was held on Wednesday in London for the purpose of submitting resolutions: (1) Increasing the capital of the company from £1,480,000. to £2,000,000. by the creation of 520,000 new shares of £1. each, 320,000 of these shares to be ordinary shares, and the remaining 200,000 partnership shares; and (2) altering the articles of association. The resolutions were carried unanimously.

DIVIDENDS.

UTAH COPPER COMPANY.—Dividend of \$1.50. per share.

CHINO COPPER COMPANY.—Dividend of 75 cents per share.

RAY CONSOLIDATED COPPER COMPANY.—Dividend of 50 cents per share.

THIRTY YEARS AGO.

From the "Chemical Trade Journal" of December 14, 1889.

Tyne Chemical Trade.—A war of prices seems likely to follow, in the chemical trade, the expiration of the Bleaching Powder Makers' Association. Bleaching powder as shown in our commercial column has fallen nearly £1. per ton in a month, and has been offered for delivery early next year at £5., and refused. In other words, the price now asked for next year is about 30 per cent. less than it was at the beginning of this quarter. In the war of prices the customer may benefit for a time, but the competitors suffer, and the chemical industry here may be further reduced.

Red Phosphorus.—Backed by the recommendations of the Academy of Medicine and the Hygienic Council, a bill is about to be introduced into the French Chamber to make the substitution of red for yellow phosphorus in the manufacture of lucifer matches compulsory. It is now four and forty years since Schrotter discovered red or amorphous phosphorus; and considering how long it is since its safety in match-making was recognised, the wonder is that its enforced use has been so long delayed. The red phosphorus cannot be dissolved in a draught; it is not poisonous; introduced into an animal, it is excreted as it entered; it undergoes no alteration by exposure to the air; it is not ignited by friction; it has to be heated to 260° in order to take fire; and when it alone is used in match factories, there can be no deadly phosphorus disease.

Petroleum-proof.—A new cement is described in the current *Monde de la Science* which is attacked by neither petroleum, benzene, turpentine oil, nor any similar liquids. It consists of a mixture of glycerine with gelatine or glue. The product is quite liquid when hot, and resembles caoutchouc when cold, alike in appearance as in its elastic properties. Applied hot to the interior of a barrel or any wooden vessel, the latter is thereby, according to the *Monde de la Science*, made safe for holding any of the above-mentioned substances.

EXPORTS OF CHEMICALS AND ALLIED PRODUCTS.

THE following returns, which are taken from the export statistics of the United Kingdom, give the amount and value of chemicals and allied products exported during the month ending Nov. 30th, 1919, as compared with Nov. 1918.

ARTICLES.	QUANTITIES.		VALUE.		ARTICLES.	QUANTITIES.		VALUE.	
	Month ended Nov. 30th.		Month ended Nov. 30th.			Month ended Nov. 30th.		Month ended Nov. 30th.	
	1919.	1918.	1919.	1918.		1919.	1918.	1919.	1918.
BLEACHING POWDER : To U.S.A. cwt.	—	—	£	£	MEDICINES, comprising DRUGS and MEDICINAL PREPARATIONS :			£	£
„ Other Countries ..	35,021	3,648	24,252	3,521	Opium, dried and powdered in the United Kingdom lbs.	2,016	11,998	2,436	46,461
Total	35,021	3,648	24,252	3,521	Quinine and Qui- nine Salts ozs.	193,329	15,126	38,103	2,966
COAL PRODUCTS, NOT DYES :					Other Sorts val. £	—	—	367,183	237,611
Aniline Oil and Toluidine lbs.	264,205	505,985	13,519	32,973	Total	—	—	407,722	287,038
Anthracene	71,700	—	343	—	MURIATE OF AMMONIA cwt.	8,375	2,867	24,353	8,638
Benzol and Toluol gals.	64,216	665,929	6,192	42,701	PAINTERS' COLOURS AND MATERIALS :				
Carbolic Acid .. cwt.	9,954	22,691	19,500	86,757	Barytes cwt.	1,698	2,400	1,241	1,609
Coal Tar, Crude ..	2,554	—	1,012	—	White Lead	14,365	434	43,286	1,180
Refined and Varnish gals.	333,519	76,476	14,594	2,647	Zinc Oxide	2,676	198	9,574	616
Naphtha	16,854	18,859	2,617	2,680	Unenumerated ..	118,290	36,512	477,727	124,437
Naphthalene .. cwt.	3,258	15,926	4,519	23,050	Total	137,029	39,544	531,828	127,842
Pitch	1,258,700	857,841	201,954	97,867	POTASH COMPOUNDS :				
Tar Oil, Creosote, etc. gals.	3,146,189	3,613	103,339	536	Saltpetre (Nitrate of Potash) British prepared cwt.	11,090	1,491	26,503	4,988
Other sorts cwt.	22,367	21,573	24,201	24,708	Chromate and Bi- chromate of Pot- ash	1,281	488	10,402	5,827
Total Value £	—	—	391,790	313,919	Other Sorts val. £	—	—	12,259	2,589
COPPER, Sulphate of tons	1,340	2,792	62,975	182,641	Total	—	—	49,164	13,404
DYE STUFFS :					SODA COMPOUNDS :				
Products of Coal					Soda Ash cwt.	261,944	459,572	90,921	148,023
Tar cwt.	10,552	8,635	182,860	129,103	„ Bicarbonate ..	47,868	29,162	26,740	13,887
Other Sorts	6,421	983	15,580	6,551	„ Caustic	89,153	52,289	96,358	86,866
Total	16,973	9,618	198,440	135,654	„ Chromate and Bichromate ..	3,774	3,884	9,847	12,117
GLYCERINE :					„ Crystals	14,431	213	4,335	113
Crude cwt.	1,459	1,390	7,098	8,323	„ Sulphate (Salt- cake)	124,408	68,204	21,805	11,237
Distilled	5,221	1,803	31,250	8,020	„ Other Sorts ..	57,104	48,331	58,336	74,053
Total	6,680	3,193	38,348	16,343	Total	598,682	661,655	303,342	346,286
MANURES :					SULPHURIC ACID cwt.	934	457	1,316	631
Sulphate of Ammonia :					TARTARIC ACID ..	800	62	13,032	1,208
To France..... tons	1,487	442	37,913	8,174	CHEMICALS, other sorts val. £	—	—	503,847	449,333
„ Spain and Canaries ..	383	—	11,967	—	SALT, Rock and White (except Table Salt) :				
„ Italy	—	500	—	16,375	To Belgium .. tons	1,005	35	3,415	167
„ Dutch East Indies	335	—	8,192	—	„ U.S.A.	800	—	4,464	—
„ Japan	5,808	—	127,831	—	„ British East Indies	10,625	—	31,225	—
„ U.S.A.	—	—	—	—	„ Australia....	1,101	—	3,539	—
„ British West India Islands (including Ba- hamas) and British Guiana ..	180	1,745	3,445	56,683	„ New Zealand ..	1,158	130	4,331	681
„ Other Countries ..	1,865	10	40,118	149	„ Canada	5,595	2,701	16,772	8,516
Total	10,058	2,697	229,466	81,381	„ Other Countries ..	13,861	8,104	60,685	26,347
Superphosphates ..	757	499	7,977	3,215	Total	34,145	10,970	124,431	35,711
Basic Slag.....	1,237	426	4,999	1,541	GREASE & UNREFINED TALLOW & ANIMAL FAT cwt.	53,315	1,948	221,102	5,507
Unenumerated..	4,915	3,524	67,935	44,222					
Total of Manures ..	16,967	7,146	310,377	130,359					

(To be concluded.)

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

December 1st to 6th (inclusive).

Lake Dye. Baddiley, J.; and British Dyestuffs Corporation. 30,461.
 Ferro-chrome. Ballantine, W. B. 30,108.
 Ferro Alloys. Ballantine, W. B. 30,472.
 Dyestuffs of the N-arylated Triphenylmethane Series. Barr, J.; Bentley, W. H.; and Clayton Aniline Co. 30,015.
 Aniline Blue. Barr, J.; Bentley, W. H.; and Clayton Aniline Co. 30,016.
 Oxide of Lead. Barton, L. V. 30,166.
 Mills for Pulverising or Grinding. Brackenbury, G. 30,003.
 Feeding Powdered or Granular Substances. Brackenbury, G. 30,004.
 Collection of Gases in Chambers. Carpenter, C. C. 30,243.
 Soap. Chadbourne, F. G. 29,973.
 Rubber. Davidson, S. C. 29,930.
 Products having Basis of Cellulose Derivatives. Dreyfus, H. 30,216, 30,217, 30,218.
 Plastic Masses. Dreyfus, H. 30,219.
 Organic Derivatives. Dreyfus, H. 30,486.
 Smelting Zinc. Durant, H. T.; and Vautin, C. 30,592.
 Treatment of Emulsions, Etc. Edser, E.; and Minerals Separation, Ltd. 30,341.
 Ferrous Alloys. Edwards, H. O. 30,401.
 Production of Oxides of Nitrogen and Catalyser Therefor. General Chemical Co. 30,090.
 Purifying Liquid Fuel. Giusti, T. 30,200.
 Decolorising and Purifying Sugar, Etc. Grant, D. 30,541.
 Refrigerating Apparatus. Griffiths, H. 29,992.
 Neutralising Mineral Oils Treated with Acid. Grisard, G. 30,379.
 Acid-proof and Insulating Materials. Harden, F. J. 30,382.
 Synthetic Production of Nitrogen Compounds. Haynes, T. H.; and Williams, W. M. 30,268.
 Extraction and Refining of Oil. Heyerdahl, P. M. 30,543.
 Manufacture of Catalytic Iron or Catalysts containing Catalytic Iron. Jenkins, H. C.; and Nitro-Fixation Synd. 30,587.
 Removal of Grease and Fatty Matter from Skins. Lamb, M. C. 30,201.
 Manufacture of Blue Water Gas in conjunction with Coal Gas. Lowe, J. 30,117.
 Separating Aqueous, Etc., Vapours from Fluids and Solids, and for Preparing Dilute Sulphuric Acid. Maass, O. 30,177.
 Cocks to Prevent Use of Gases, Vapours, or Liquids. Mitchell, F. A. 30,553.
 Cellulose Compounds. Müller, R. 29,959.
 Treatment of Sewage Sludge. Mumford, G. 30,579.
 Fixation of Nitrogen. Parkes, H. C.; and Pearson, R. 30,082.
 Grinding and Crushing Mills. Parkes, Ltd., Z.; and Sharpe, L. 30,307.
 Liquid Sulphurous Acid from Dilute Sulphurous Acid Gas. Pascal, P. 30,075.
 Silica Gels. Patrick, W. A. 30,611.
 Treatment of Wool-scouring, Etc., Liquors for Recovery of Potassium, Etc., Salts Therefrom. Radcliffe, A. H. 30,011.
 Preparation of Pure Alkaline Aluminates. Rochette Frères. 30,132.
 Substitute for Ebonite and Vulcanite. Schauerman, F. L. 30,469.
 Treatment of Hydrocarbon Minerals for Extraction and Purification of their Volatiles and Utilisation of their By-products. Shedlock, J. J. 30,240.
 Gasification of Volatile Hydrocarbons and Liquid and Liquefiable Fuel. Smith, T. B. 30,426.
 Treating Sulphide Ores by Dissolution and Selection through Medium of Neutral Solution of Ferric Chloride, Etc. Soc. Anon. Minerais et Métaux. 30,235.
 Oxidation of Ammonia. Toniolo, C. 29,982.
 Treatment of Petroleum, Etc. White, W. C. 30,070.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 6d. in stamps to the Comptroller, Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane, W.C.

The numbers in heavy type are those under which the Specifications will be printed and abridged and all subsequent proceedings will be taken.

1917.

Soap. Thibaud et Cie, P. 822. **106,085**
 Continuous Rectification of Alcohols. Barbet et Fils et Cie, E. 9,659. **107,975**

1918.

Continuous and Uniform Treatment of Hydrocarbons with Sulphurous Acid. Allgemeine Ges für Chemische Industrie. 6,067. **114,845**
 Concentrating Nitric Acid. Marks, E. C. R. (Du Pont de Nemours and Co., E. I.). 14,522. **135,535**
 Potassium Sulphate. Dutt, E. E.; and Dutt, P. C. 17,079. **135,545**
 Refrigerating. Apeldoorsche Machinefabriek en Metaalgieterij voorheen Loog Landaal. 19,084. **120,923**
 Freezing Media. Instone, A. J. 19,244. **135,567**
 Treatment of Coal, Water, or Other Gases, and the Removal of Substances Contained Therein. Pennington, A. J.; and Lamb, M. C. 19,386. **135,577**
 Treatment of Cellulose-containing Materials. Testrup, N.; and Wet-carbonising, Ltd. 19,589. **135,578**
 Filaments for Electric Lamps. Westinghouse Lamp Co. 19,595. **121,596**

1919.

Treatment of Residues Containing Carbohydrates. Effront, J.; and Boidin, A. 131. **122,405**
 Alloys of Copper, Zinc, and Lead. Arend, J. P. 2,495. **135,702**
 Recovery of Potassium in the Form of Nitrate from the Waste Gases of Cement Kilns and the Like. Fairbrother, H. (Chemical Construction Co.). 4,255. **135,713**

Recovering Potassium Compounds. Fairbrother, H. (Chemical Construction Co.). 4,563. **135,720**
 Material for Strengthening and Increasing the Luminosity of Incandescent Gas Mantles. Pope, H. 15,939. **135,797**
 Smokeless Powders. Blyth, E. H. 21,217. **135,813**

COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

1918.

Charging Material to Electro-osmotic Apparatus for Removing Liquids from Substances. Elektro-Osmose Akt.-Ges. (Graf Schwerin Ges.). 10,455. **135,815**
 Electrodes for Electro-osmotic Processes. Elektro-Osmose Akt.-Ges. (Graf Schwerin Ges.). 10,454. **135,816**
 Electro-osmotic Process for Removing Water from Materials. Elektro-Osmose Akt.-Ges. (Graf Schwerin Ges.). 10,455, 10,457, 10,458, and 10,459. **135,817-18-19-20**

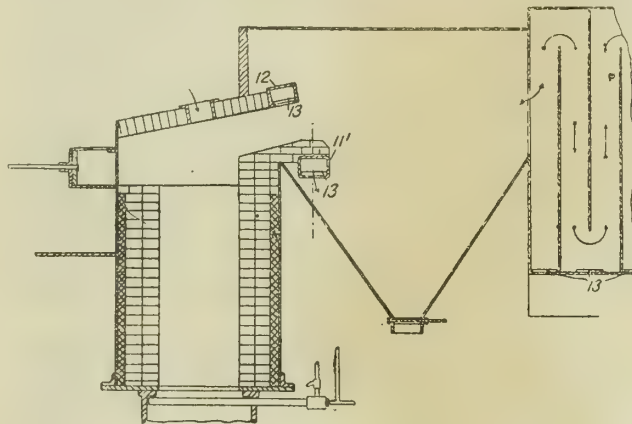
1919.

Soda. Nishigawa, T. 28,590. **135,831**
 Treatment of Fine Ores. Dorr Co. 29,302. **135,844**
 Granulating Calcareous Cyanamide to enable it to be Employed as an Ammonia-potassic Fertiliser. Saves, P. 29,378. **135,847**
 Conversion of Hydrocarbons. Fleming, R. 29,490. **135,854**
 Condensing and Treating Distillates. Fleming, R. 29,491. **135,855**
 Grinding or Like Machines. Arter, W. 29,492. **135,856**

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Lead Sulphate. S. B. Wilson and Purex, Ltd., Greenford, Middlesex. British Patent, 133,367, of 1918.

In a process of the kind in which galena is vaporised on a bed of fuel and burnt with an excess of air in a combustion chamber, the air inlets are of channel-iron and open downwards. In the apparatus shown, one inlet 12 is disposed in



the neck of the producer, and another 11¹ under the neck. Each is provided with a slide 13 to regulate the air admission. The top and front of the combustion-chamber are preferably water-cooled. The air inlets are preferably controlled from the top of the producer.

Concentrating Ores. E. C. R. Marks, London. (A communication from Luckenbach Processes Incorporated, San Francisco, U.S.A.) British Patent, 133,277, of 1918.

In the concentration of ores by flotation, rubber is used as a mineral-selective agent. The rubber is dissolved in a hydrocarbon or other solvent—for example, "near-turpentine,"—and may be used along with a frothing-agent, such as that obtained from greasewood as described in Specification 133,498, the two agents being added to the pulp separately or previously mixed. In some cases the rubber, instead of being first dissolved, may be cut into small pieces and mixed with a solvent, and used in that condition in the flotation process.

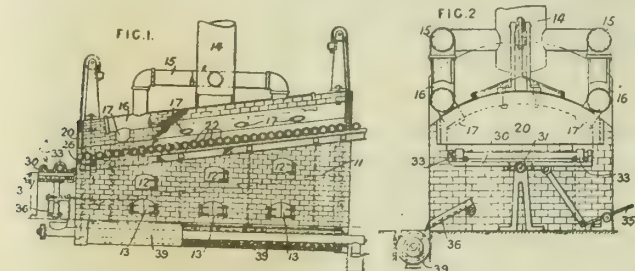
Titanium Compounds. H. Wrigley, H. Spence, and P. Spence and Sons, Manchester. British Patent, 133,336, of 1917.

Ilmenite is treated with sulphuric acid, with the employment of open steam, so that the strength and concentration of the solution can be regulated. The ilmenite may be greatly in excess, the undissolved residue being employed again. The solutions may be employed as such, or may be reduced by means of metallic iron, until the titanium dioxide is reduced

to sesquioxide. The hydrated ferrous sulphate is separated by crystallisation. A proportion of other suitable acids—for example, hydrochloric, hydrofluoric, or oxalic—may be added to the titanium sulphate; or salts may be obtained therefrom by double decomposition with suitable salts.

Furnaces. E. T. Goldthorpe, Chicago, U.S.A. British Patent, 133,236, of 1919.

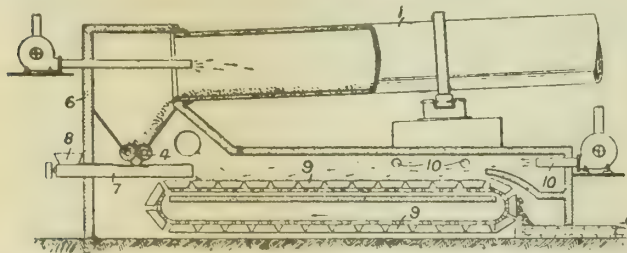
In connection with a roasting furnace having an inclined track, along which cylindrical ore containers roll, means are provided at the lower end of the track for receiving and discharging the containers. In the construction shown, the inclined track 18 for the containers 22 is mounted above an inclined grate 11, in connection with which are provided a number of fire-doors 12 and ash-doors 13. The products of combustion are exhausted to the stack 14 through openings 17 and branch flues 16, 15. Near the lower end of the track is a removable stop 26 which can be inserted in position to hold the whole of the containers, with the exception of the



lowermost, from moving when the door 20 is raised. The containers are received in turn on a tilting support 30, and are secured thereon by clamps 33. A removable end cap is then withdrawn, and the support 30 is tilted about the axis 31 by operation of a foot-lever 35, to discharge the contents of the container down a shoot 36 leading to a screw conveyer passing through a water jacket 39. In starting the furnace a temporary stop is used, and is gradually moved down the track as more containers are added. The furnace described is more particularly adapted for roasting yellow ochre for use as a body for black paint, which is prepared by mixing 50 parts of the ground material with 48 parts of linseed oil and 2 parts of turpentine.

Calcium Carbide. F. M. Becket, Niagara Falls, U.S.A. British Patent, 133,354, of 1918.

Aggregates for the manufacture of carbide are made by mixing lime with carbonaceous material, such as bituminous coal or peat, and transporting the mixture through a furnace, without agitation, during the coking. Preferably, the lime is produced by burning chalk as a preliminary part of the



process, and is added while still hot to the bituminous material. Lime from the rotary kiln 1 passes through crushing rollers 4 to the mixing-conveyer 7, and carbonaceous material in suitable proportion is supplied through the hopper 8. The mixture is transported in shallow receptacles 9 through a chamber 6, which is heated by burners 10.

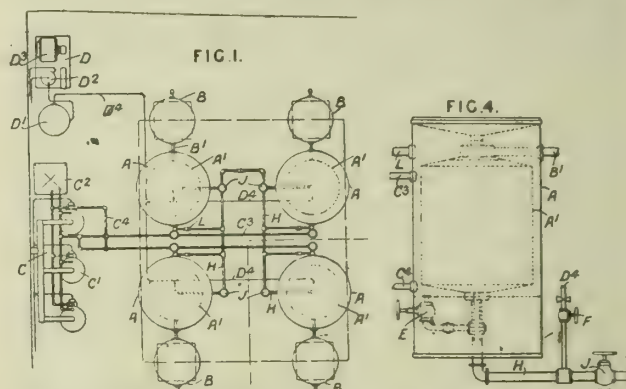
Cellulose Acetates. H. Dreyfus, London. British Patent, 133,353, of 1918.

Cellulose acetate compositions for use in making dopes, films, celluloid, artificial silk, etc., contain, as solvents or plastifying-agents, *o*-toluenemonoethylsulphonamide, or the liquid mixtures which are mainly *o*-toluene monomethyl or *o*-toluenemonoethylsulphonamides, but contain also some *p*-bodies, and are prepared from commercial toluene by ordinary methods, such as by treatment with chlorosulphonic

acid to obtain sulphochlorides, which are treated with amines or with ammonia, and afterwards methylated or ethylated. Triphenylphosphate, tricresylphosphate, and aliphatic derivatives of urea, such as are described in Specification 132,283, may be added.

Clarifying Lubricating Oils. M. J. Helmes, London. British Patent, 133,415, of 1918.

Used lubricating-oils are clarified by heating and agitating a mixture with water in a number of reclaiming-vessels A, any or all of which can be put into action at one time. The preferred apparatus comprises: (1) A compressed-air plant D consisting of a motor D², a pump D², and a reservoir D¹ with a delivery pipe D⁴ having branches connected through valves F to the impure-oil containers A¹ within the jacketing-vessels A; (2) a hot-water circulating system C consisting of gas-heated boilers C¹ and a tank C² with delivery and return pipes C³, C⁴ to and from the jackets A; (3) two or more pairs of reclaiming-vessels each consisting of an impure-oil container A¹ with a pipe connection B¹ to a clarified-oil reservoir B, and of a jacketing-vessel A having a valved connection E to its container A¹ and a drain H and a water overflow pipe L to the drain H. In practice, the oil in one pair of containers A¹ is heated by circulation of water in the jacket A, and water and



air are admitted by opening the valves E, F; after treatment has proceeded for a suitable time, the air and water are cut off, the liquid allowed to settle, and the oil layer forced through the pipe B¹ by admission of more water through the valve E. The impurities are run off through the drain H by opening valve J. The compressed-air and hot-water circulating systems are used continuously by treating oil in other pairs of containers when not required for any particular pair. The complete self-contained apparatus described may be built on a motor or trailer so as to be readily portable. The water-circulating system or the compressed-air apparatus described may be dispensed with in places where such apparatus is already available. Injected steam may be used to effect both heating and agitation; or the agitation may be by beaters and the heating by any convenient means, and a suitable coagulant or clarifier may be added to the liquid in the containers A¹.

Coating Metals With Lead. R. W. Thompson, Leith; and J. Morrison, Saltcoats, Ayr. British Patent, 133,179, of 1919.

In a process of coating metals with lead or its alloys, such as a lead-antimony alloy, the article, preferably heated, is coated with a flux consisting of salammuniac, hydrochloric acid, and zinc, and the molten lead, etc., is applied, for example, by dipping, pouring on, or casting, without tinning the surface of the article. The flux may be used as a solution, or it may be evaporated to dryness and used in a molten condition or in the form of sticks, blocks, or powder, or rendered fluid by mixing with hydrochloric acid and zinc.

TARRED ROADS DANGERS.—At the request of the Ministry of Transport, the County Surveyors' Society has appointed a committee to investigate the cause of the numerous complaints as to the slippery condition of certain roads surfaced with tar, tar compounds, and asphalt. Any suggestions which may be thought to be helpful to the committee are invited, and communications should be addressed to the Chief Engineer, Ministry of Transport (Roads Department), 6, Whitehall Gardens, London, S.W. 1.

CORRESPONDENCE.

** * We do not hold ourselves responsible for the opinions expressed by our correspondents.*

Patent Office Library.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—Will you kindly draw the attention of your readers to the accompanying copy of a petition asking the President of the Board of Trade to have the Patent Office Library kept open until 10 p.m. daily? The petition has the approval of a number of scientific and technical societies, and I shall be glad to forward sheets, for signature by any others who are interested, as also to hear from individuals who wish their names added but have not an opportunity of signing in person.—Yours, etc.,

CHAS. SALTER,

33, Park Hall Road, E. Finchley, N. 2.

December 3, 1919.

[COPY.]

London, December, 1919.

To the Right Honourable the President of the Board of Trade.

We, the undersigned, beg to ask that you will authorise the Patent Office Library to be reopened to the public until 10 p.m. daily, as was the practice for over twenty-five years before the war—viz., from about 1888 to 1914.

The Patent Office Library, which is maintained from national funds, is acknowledged to contain the most valuable collection of current and other technical literature in this country, if not in the world, and is consulted daily by a large number of readers. Unfortunately the hour for closing prevents the fullest use of the Library being made by many readers who are engaged during the day-time in chemical, engineering, and other technical works, in the outskirts; and these readers are therefore deprived of access to information that they cannot obtain elsewhere.

We are aware that it has now been decided to open the Library until 8 p.m. from the 1st instant, but we believe that, in making this proposal, the authorities of the Patent Office have not fully appreciated the position of the aforesaid readers, who cannot reach the Library until a comparatively late hour. Moreover, these readers belong to a class that should be specially encouraged at the present time, when there is great need for improvement in the technical condition of our industries; and to exclude them from the sources of information contained in the Patent Office Library is, therefore, adverse to the national interest.

Consequently, we venture to hope that you will recognise our request as reasonable and well founded, and will take the necessary action to give it effect.

Waste-heat Boilers.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—Referring to the article in your issue of November 29 by Mr. Harald Nielsen on "Heat Economy in Chemical Plants," we cannot but consider that due justice has not been paid to the virtues of the exhaust-heat boiler.

In the first place, Mr. Nielsen is unduly pessimistic in his statement that, unless the gas engine is of at least 500B.H.P., it does not pay to instal a boiler. If we take an engine of half this power, say 250B.H.P., it will be found that the total amount of steam which can be generated by a suitable boiler on a basis of 2,350 hours per annum is 1,175,000lb., representing, say, 65 tons of coal, the value of which can be taken as £117—more than 50 per cent. of the capital expense incurred in installing the boiler.

In many plants there is a need for a comparatively small volume of steam for producer work and for auxiliary purposes, and when a separate boiler has to be put down, in addition to the cost of fuel, we have to add the cost of firemen, which is not required in the case of the exhaust-heat boiler. This, we consider, clearly shows that on 250B.H.P. considerable economy can be effected by the installation of one of these boilers; in fact, we recommend them down to as low as 100B.H.P.

Mr. Nielsen rightly points out that excessive corrosion may be expected if the exhaust gases are cooled down in the boiler to 120° C., but it is very seldom in actual practice that the temperature of the gases at the outlet end of the boiler is below 170° C., which figure is perfectly safe.

Many of this type of boiler manufactured by us have been working for a number of years without any trouble whatsoever.—Yours, etc.,

RUSTON & HORNSBY, LTD.

Lincoln, Dec. 9, 1919.

NEW COMPANIES.

British Cottonseed Products, Ltd.—Capital £250,000., £1. shares. Registered office: Dashwood House, New Broad street, E.C.

Petroleum Oil Trust, Ltd.—Capital £100., 10s. shares. Registered office: 17, Farringdon Avenue, E.C.

Petroleum Power Investment Corporation, Ltd.—Capital £1,000,000., in 999,800 ordinary and 200 management shares of £1. each. Object: To establish or finance oil and other undertakings, etc. Solicitors: Parker, Garrett and Co., St. Michael's Rectory, Cornhill, E.C.

Santa Maria Consolidated Oil Fields, Ltd.—Capital £500,000., 8s. shares. Registered office: Winchester House, E.C.

Dopshine, Ltd.—Private company. Capital £50,000., in 25,000 preference shares of £1. each and 50,000 ordinary shares of 1s. each. Object: To carry on the business of manufacturers, agents for and dealers in all kinds of liquid and solid colours, dyes, paints, varnish, etc. Registered office: 42, Danes Inn House, 265, Strand, W.C. 2.

Granville Perfumery Company, Ltd.—Private company. Capital £1,000., £1. shares. Solicitors: Judge and Priestley, 3, Liverpool Street, E.C.

Honduras Trust, Ltd.—Private company. Capital £43,000., in 40,000 shares of £1. each and 60,000 shares of 1s. each. Object: To acquire, work, and turn to account any petroleum, asphalt, naphthalene, coal or oil-bearing lands, etc. Solicitors: Francis and Johnson, 19, Gt. Winchester Street, E.C.

Sunbeam Products, Ltd.—Private company. Capital £5,000., £1. shares. Manufacturing chemists, manufacturers of metal, boot, furniture, floor, and motor-body polishes, etc. Office: Arcturus Works, Queen's Road, Battersea, S.W. 8.

Tyneside Pure Products Company, Ltd.—Private company. Capital £300,000., £1. shares. Produce manufacturers and manufacturing chemists. Office: 26, Mosley Street, Newcastle-on-Tyne.

Western Counties Clay Company, Ltd.—Private company. Capital £30,000., £1. shares. Producers or manufacturers of and dealers in china clay, china stone, etc. Registered office: Masonic Buildings, South Street, St. Austell.

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 4, Queen Anne's Gate Buildings, London, S.W.1, whence, unless otherwise stated, further information may be obtained:—

British India.

H.M. Trade Commissioner in India reports that a Calcutta firm, trading solely in Ceylon, are anxious to secure the representation of a British manufacturer of small refrigerating plants suitable for operation on up-country estates. (Reference No. 1142.)

Belgium.

A Belgian inquirer at Liège desires to represent United Kingdom firms manufacturing soap and perfumes. (Reference No. 1159.)

Italy.

An Italian firm, resident in Milan, desire to represent manufacturers in the United Kingdom for the sale of dyes and colours, leather, paints, varnishes and oils. (Reference No. 1163.)

Netherlands.

H.M. Consul-General at Rotterdam reports the receipt of the following inquiry: A Dutch merchant in Amsterdam desires to secure the representation of United Kingdom firms dealing in metals, including copper, tin, zinc, aluminium in finished forms, and galvanised steel sheets. (Reference No. 1165.)

Palestine.

A commission agent in Jaffa desires to obtain the representation of British manufacturers and exporters of paint and varnish. (Reference No. 1171.)

Brazil.

An Italian firm, well recommended by H.M. Consular Officer in Porto Alegre and the British Chamber of Commerce of Sao Paulo, are desirous of being placed in touch with British manufacturers of paints. The firm are also desirous of obtaining raw material for their metallurgical factory, such as sheets and wire of white metal, yellow metal, copper, zinc, etc., with a view to direct importation. (Reference No. 1174.)

H.M. Consul at Porto Alegre reports that a Brazilian commission agent of good standing wishes to represent, on a commission basis, British manufacturers of tinplates, drugs, and chemicals. (Reference No. 1175.)

GAZETTE NEWS.**MORTGAGES AND CHARGES.**

Besglos Polish Company, Ltd., Burnley.—Registered November 6, £500. mort., to Borough Land and Building Society Ltd, Burnley; charged on land in Roebuck Street, Burnley, and hall, buildings and fixtures thereon.

Consolidated Mines of Cornwall, Ltd., London, E.C.—Reg. November 17, £34,000. debts.; general charge.

Sozon Oil Company, Ltd., Manchester.—Registered November 20, £500. 1st mort. deb., to J. G. Grogan, 102, Alexandra Road, Manchester; general charge.

Welsh Silica Company, Ltd., Connahs Quay.—Registered November 18, £4,500. debts. (filed under sec. 93 (3) of the Companies (Consolidation) Act, 1908), present issue £1,750; general charge. May 15, 1918.

Wessex Rubber Company, Ltd., London, E.C.—Registered November 20, £1,000. debts. part of £10,000.; general charge.

LIMITED COMPANIES.—Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions, Orders, and Official and Other Notices.

Bissee Tin Smelting and Arsenic Company, Ltd.—Claims to R. B. Petre, 11, Ironmonger Lane, E.C., C.A., liqr., by January 9.

Casper Oil and Exploration Company, Ltd.—Resolved November 3, confirmed November 27:—That the company be wound up. A. E. Orbell, 151, North Street, Brighton, liqr. Meeting of creditors at liqr.'s, December 15, at 3 p.m. (The notice of meeting is issued to comply with the requirements of the Companies Acts.)

Oxygen Trading Company, Ltd.—Resolved November 6:—That the company be wound up. J. H. Clarke, liqr.

United Gas Mantle Company, Ltd.—Resolved November 6:—That the company be wound up. A. W. Griffiths, 52, Queen Victoria Street, E.C., liqr. Meeting of creditors, 286, Salisbury House, London Wall, E.C., December 6.

Wohlfahrt Lead Mines, Ltd., London, S.W.—Resolved November 3, confirmed November 20: That the company be wound up. P. A. Strachley and J. D. A. Norris, two of the directors, joint liqrs.

DISSOLUTIONS OF PARTNERSHIP.

(Note.—When two dates are given in the following announcements, the first is the date of the dissolution. The date in parentheses is that of the official advertisement.)

Pratt and King (Adrian Ernest Pratt and Jno. Herbert King), 48, Colton Street, Leicester, oil merchants and composition manufacturers, October 31. Debts by J. H. King. (November 28.)

MARKET REPORTS.**TAR AND AMMONIA PRODUCTS.****WEDNESDAY.**

Benzole: London, 90%, 2s. to 2s. 1d.; North, 1s. 11d. to 2s.; 50%, 1s. 10d. to 1s. 11d.; North, 1s. 9d. to 1s. 10d., naked; pure, 3s., naked at works. **Carbolic acid,** crude, 60%, East and West Coast, nominally 2s. 3d. to 2s. 4d.; crystals, 39-40%, 10d., f.o.b. **Crude tar,** London, 50s. to 55s.; Midlands, 50s., North, 50s. per ton, ex works. **Refined tar** 35s. per barrel. **Pitch,** 87s. to 90s.; East Coast, 77s. 6d. to 80s.; f.o.b.; West Coast, 72s. 6d. to 75s. f.a.s. **Solvent naphtha,** naked, London, 90-190%, 2s. 5d.; North, 2s. 3d. to 2s. 4d.; 95-160%, naked, London, 2s. 9d. to 2s. 10d.; North, 2s. 8d. to 2s. 9d. **Crude naphtha,** naked, 30%, 9d.; North, 8d. to 8½d. **Refined naphthaline,** £18. to £22.; salts, £6. to £7. **Toluol,** naked, London, 2s. 6d.; North, 2s. 5d. **Creosote,** naked, London, 6½d.; North, 6d. to 6½d.; heavy oil, 6½d. **Anthracene,** 40-45%, 7d. per unit. **Cresylic acid,** 95%, 2s. 5d. to 2s. 6d.; 97-99%, 2s. 7d. to 2s. 8d., ex works, London, and f.o.b. other ports. **Sulphate of ammonia:** home trade, December, £21., basis 24½%. **Nitrate of soda,** £22. 10s. to £22. 15s.

FERTILISER MATERIALS. LIVERPOOL, THURSDAY.

Nitrate of soda is firmer, and the quotation on spot for 95-96% quality has been advanced to £20. 17s. 6d. per ton, net cash, f.o.r., prompt delivery. **East Indian bone meal** for shipment is without alteration, the quotation for January-March shipment being £15. per ton, net cash, ex ship Liverpool, for 4½% ammonia and 52% phosphates. **Mineral Phosphates:** There is no change in this material, and values at present are only nominal. **Dried blood** continues scarce, and full prices are being paid for any parcels offering, the value being about 35s. per unit of ammonia per ton, net cash.

TURPENTINE MARKET REPORT.

Messrs. James Watt and Son, Ltd., of 101, Leadenhall Street, London, E.C. 3, report that the stocks of turpentine on December 6 were: American, 27,407 barrels, compared with 2,701 barrels at the corresponding date of 1918; French, 704 barrels (1,284 barrels); and Spanish, 297 barrels (1,000 barrels). Deliveries during the week ended December 6 were 1,866 barrels, against 343 barrels last year, and since January 1, 71,367 barrels, compared with 24,432 barrels in 1918. The price on Saturday last was 128s. 6d. per cwt., compared with 105s. at the corresponding date of last year. January-April (1920) was quoted at 131s., and May-August, 118s.

LONDON METAL MARKET.**THURSDAY.**

Copper: Standard brands, £101. to £101. 5s., cash; £102. 10s. to £102. 15s., three months; electrolytic, £110. to £112. **Tin:** Standard, £306. 10s. to £306. 15s., cash; £308. to £308. 5s., three months; Straits, £306. 15s.; English, £304. to £305. **Lead:** Soft foreign, £40. 5s.; English, £41. 10s. **Spelter,** £53.; hard, £37. to £39. **Antimony** English regulus, 90%, £47. 10s. **Aluminium,** £150. **Nickel,** £215., ex warehouse. **Quicksilver,** £24. **Bismuth,** 12s. 6d. **Platinum,** 502s. per oz. **Wolfram,** 32s. 6d. per unit.

SWANSEA MARKET REPORT.**THURSDAY.**

Prices of tinplates steady, on the basis of 46s. 3d. per standard box, f.o.b. **Copper** active, with advance in prices; prompt, £101. 10s., and three months, £103. 2s. 6d. **Tin,** £304. 5s. prompt, and £305. 10s. three months. **Lead** selling well: Spanish, £40. 10s. per ton, over next month; English, £41. 10s. **Spelter,** £53. 7s. 6d. **Zinc** sheets firm, with English at £72. per ton, including delivery; American, £60., f.o.b., New York. **Antimony:** English regulus, £47. 10s.; Chinese, £44. 10s. **Quicksilver,** £25. 10s. per bottle. **Silver,** 75d. per ounce. **Aluminium,** £150. **Nickel,** £215., f.o.b. **Sulphate** of copper small export trade at £41. per ton, f.o.b. **Sulphate** of ammonia very steady at £21. to £22. per ton, over next six months. **Nitrate of soda** firm; ordinary to refined, 21s. to 22s. per cwt., in bags. **Turpentine,** £6. 10s. 6d. per cwt. net. **Arsenic** in improved demand, with white powdered at £63. 5s. per ton, in bags. **Oxalic acid** quiet, at 1s. 2½d. per lb. **Pitch** scarce and dearer at 72s. 6d. per ton.

MANCHESTER CHEMICAL MARKET.**THURSDAY.**

There is continued strong activity in all branches of the chemical trade, and makers are well engaged with orders. Prices generally have an upward tendency owing to increasing costs of labour and raw material, and there is not much disposition to book forward business. **Resale** parcels of caustic soda, bicarbonate of soda, and 58% alkali are very scarce owing to strong export demand, and prices are being offered much in excess of current values for home buyers. **Bleaching** powder unchanged, at £17., softwoods, on rail; and £15. 15s., delivered, for January-June contracts. **Chlorates** are quiet at recent rates. **Saltcake** unchanged at 70s. per ton, carriage paid. **Caustic soda ash,** 48%, higher at £12. per ton.

Recovered rock sulphur, bulk, £17. per ton. There is no sign of improvement in copper sulphate, and price remains nominal at £41., f.o.b. Phosphate of soda has advanced to £32. per ton, delivered. Concentrated sodium sulphide, casks, £25. 10s. per ton. Nitrite of soda, £62. per ton. White powdered arsenic in better supply, but price firm at £65. per ton. Yellow prussiate of potash unchanged at 2s. 1d. and soda 1s. 0½d. per lb. Acetic acid has an upward tendency. Acetate of soda higher, at £50. per ton. Lead salts are firm: English white acetate, at £84.; brown, £67.; and nitrate, £56. per ton. English brown acetate of lime firm at £15. per ton; grey higher, at £25. per ton. Acetone, in quantity, £90. per ton. Miscible wood naphtha, 10s. 6d. per gallon. Oxalic acid steady, at 1s. 5d. per lb., but only small business doing.

LIVERPOOL CHEMICAL MARKET.**THURSDAY.**

Inquiries for chemicals have again been made very freely and have maintained an agreeable degree of activity in the chemical market. More inquiries have come from the export branch of the trade, and in the home branch much business has been done on 1920 account. Stocks at local works, over and above what is wanted for running contracts, are reported to be very limited.

Bleaching powder has again been in good request, but in small supply, for early deliveries on fresh buyings or contracts; quotations are £17. per ton, free on rail or conveyance, in buyers' packages, for the home trade, and £15. to £18. per ton for export. Chloride of calcium has been quieter; prices are from £8. to £11. per ton, in casks, f.o.r. Caustic soda has had a rather brisk inquiry, and is £24. per ton for 76%; £22. per ton for 70—72%; and £21. per ton for 60%. Nitrate of soda has been in fair request, and the price is easier; it is £21. to £22. per ton. Saltcake has sold more freely, and is £7. 15s. per ton, in casks, f.o.b. Soda crystals have been more inquired for, and are £5. 10s. per ton, in 2cwt. bags, f.o.r. at works. Bicarbonate of soda has been in good request, and is £8. 5s. to £10. per ton, according to terms of delivery. Borax has been in very fair demand; prices are £39. per ton for ordinary, and £40. per ton for powdered, in bags, less 3%, for lots of not less than 50 tons. Ammonia alkali has been freely inquired for, and is still in limited supply at works; prices are £6. 10s. to £6. 15s. per ton, f.o.r. Hyposulphite has received more attention; it is £18. 10s. per ton for ordinary, and £22. per ton for pea crystals, in 1cwt. kegs. Sulphite of sodium has been but little in request; it is £11. per ton for ordinary, and £16. to £18. per ton for pea crystals, in 1cwt. kegs. Sulphide of sodium has been quieter, and is £22. per ton, in barrels, and £23. 10s. per ton, in drums. Prussiate of soda has again been quiet, and is 1s. to 1s. 0½d. per lb. Bichromate of soda has had a moderate sale, and is 10d. per lb. Phosphate of soda has been in quietly steady demand, and is £30. per ton. Chlorate of potash has had a limited sale, and is 1s. to 1s. 1d. per lb. Permanganate has been quiet, and is 3s. 6d. per lb. Sulphate of potash has moved but slowly, and is £25. per ton. Carbonate of potash has sold more freely, and is £95. to £100. per ton, for 80—85%. Caustic potash has had a rather brisk inquiry, and is £120. per ton. Nitrate of potash has been more in request, and is £60. to £62. per ton for refined, and £40. per ton for ordinary. Canadian potashes have been very quiet; Montreal first quality are £200. to £220. per ton, and second quality £190. to £210. per ton. Bichromate of potash has been but little in demand, and is 1s. 6d. to

1s. 7d. per lb. Yellow prussiate of potash has been steadily called for, and is 1s. 10d. to 2s. 2d. per lb. Sal ammoniac has been in very fair demand, and is £95. per ton for first quality, lump; £90. per ton for second quality, and £5. per ton extra for crushed. Sulphate of ammonia has been more inquired for, and stocks available for early deliveries are still small; prices are, for December, £21. per ton; for January, 1920, £21. 7s. 6d. per ton; for February, £21. 15s., and for March to May, 1920, £22. per ton. Carbonate of ammonia has moved more freely, and is 7½d. per lb. Muriate has been inactive, and is £45. to £50. per ton, according to grade. Magnesia has been rather more in demand. Carbonate is £2. 5s. per cwt., and sulphate £11. to £16. per ton, according to grade. Alum has been in moderately active demand, but supplies available for early deliveries have been very limited; for home trade uses £18. 10s. per ton is asked, and for export £18. 10s. to £19. 10s. per ton. Aluminoferric has been but little called for, and is £8. 10s. to £12. per ton. Sulphate of alumina has been quiet, and is £12. to £17. per ton, according to grade. Sulphur continues to be well inquired for; English flowers are £32 per ton; roll is £28. per ton; and rock £22. per ton, in bags, f.o.r. In Sicilian, flowers are £28. per ton; roll is £22. 10s. per ton, and rock £17. 15s. per ton. Cream of tartar has been in very fair request, and is £12. 10s. to £13. per cwt., according to test. Tartaric acid has been in quietly steady demand, and is 3s. 2d. to 3s. 3d. per lb. Boracic acid has been steadily called for, and is £72. per ton for crystals, £74. per ton for powdered, and £2. to £3. more in casks. Oxalic acid has met with a fair inquiry, and is 1s. 3d. per lb. Citric acid has sold more readily, and is 4s. 3d. per lb. White acetate of lead has been inactive, and is £84. to £85. per ton. Arsenic has sold rather more freely, and is £65. per ton for white powdered. Sulphate of copper has been but little in request, and prices have shown a tendency to ease. For the home trade £41. is being quoted, and for export £41. to £42. per ton, less 5%, in casks, f.o.b., at Liverpool.

TYNE CHEMICAL REPORT.**TUESDAY.**

The demand on the part of both home and export is active, and prices continue very firm, caustic soda and bleaching powder being in good inquiry. Soda crystals are still scarce and firm at £5. 10s. per ton, 2cwt. bags, locally. Recovered sulphur firm at £23. to £24. per ton.

The following prices are per ton, net: Bleaching powder, softs and hards, £17.; caustic soda, 76-77%, £26.; do., 74-76%, £25.; do., 70%, £23.; do., 60%, £21.; recovered sulphur, 2cwt. bags, £24.; hyposulphite of soda, 5-7cwt. casks, £19.; do., 1cwt. kegs, £25.; sulphite of soda, 5-7cwt. casks, £12.; do., 1cwt. kegs, £20.; silicate of soda, 75° Tw., £9. 12s. 6d.; do., 100° Tw., £10.; do., 140° Tw., £10. 10s.; soda crystals, 2cwt. bags, £5. 10s.; sulphate of soda (salt-cake), in bulk, £4. 10s.; pure white sulphate of alumina, £19. 10s.; blanc fixe, £22.; sulphide of sodium, crystals, £18.; do., refined concentrated solid, 60-62%, £25.; hydrate of barium, crystals, £56.

COALS.—Market is exceptionally firm and the pressure for supplies is keen and business far in excess of probable output. To-day's quotations for export: Best Northumbrian steam, 95s. to 100s. per ton; do., second qualities, 90s. to 94s.; Northumberland small coal, 75s. to 80s.; do., seconds, 70s. to 72s. 6d.; best Durham gas coals, 80s. to 85s.; do., seconds, 70s. to 75s.; Durham bunker coal, 70s. to 80s.; do., seconds, 60s. to 65s.; foundry coke, 100s.; gas coke, 95s.

IMPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LIST OF CONTRACTIONS USED IN THE IMPORT AND EXPORT LIST.

Blns.	Balloons.	Cbys.	Carboys.	Gals., Gl.	Qty.	Quantity (otherwise undeclared).	qr.	Quarters.
Bls.	Bales.	Css. or Cs.	Cases.	or Glus.			lb.	Pounds.
Brls.	Barrels.	Cks.	Casks.	Hf. pps.	Half pipes.			
Bgs.	Bags.	Chts.	Chests.	Hds.	Hogsheads.	Rnls.	Runlets.	
Btls.	Bottles.	Cylds.	Cylinders.	Kgs.	Kegs.	Sks.	Sacks.	Note.—There is no information available as to the net weights of the various items, nor do we recognise in them any standard.
Bdis.	Bundles.	Dms. Drs.	Drums.	Ozs.	Ounces.	Slbs.	Slabs.	
Bskts.	Baskets.	Djns.	Demijohns.	Pks.	Packages.	Tcs.	Tierces.	
Bxs.	Boxes.	Frkns.	Firkins.	Pns. Puns.	Punchcons.	t. c.	Tons. Cwts.	

BRISTOL.

Publication of Official Returns
Suspended.

GLASGOW.

Week ending December 6.

CALCIUM SILICATE—
Rouen, 500 drms.

CARBON BLACK—

Boston, 3 cs.

DYESTUFFS—

Myrobalans
Bombay, 4,928 brls.

LITHOPONE—

New York, 500 brls.

MAGNESITE—

Montreal, 400 bgs.

PARAFFIN SCALE—

New York, 1,704 brls.

PITCH—
New York, 490 brls.
SOAP—
New York, 200 cs.
TARTARIC ACID—
Marseilles, 10 cs.
WAX—
New York, 156 brls.

GOOLE.

Week ending December 6.

SALT—
Hamburg, 294 t.

GRANGEMOUTH

Week ending December 6.

FERRO SILICON—
Christiania, 2 blks.

MAGNESITE—
Christiania, 102 bgs.

GRIMSBY.

Week ending December 6.
NIL.

HULL.

Week ending December 6.

ARSENIC—
Rotterdam, 40 cks.

DYESTUFFS—
Aniline Colours
Antwerp, 14 cs., 230 cks.
Myrobalans
Bombay, 13,919 bgs.

FATTY ACIDS—
Antwerp, 147 brls.

LITHOPONE—
Rotterdam, 170 cks.

MANGANESE ORE—
Bombay, 3,100 t.

POTASH SALTS—
Rotterdam, 782 bgs.

ROSIN—
London, 25 cks.

TAR—
Gothenburg, 5 brls.

TAR (WOOD)—
Stockholm, 150 brls.

WOOD PRESERVATIVE—
Rotterdam, 1 ck.

LEITH.

Week ending December 6.
NIL.

LIVERPOOL.

Week ending December 6.

BEEES WAX—
Beyrout, 16 bgs.

CANDELLILLA WAX—
Galveston, 99 sks.; New York, 125 bgs.

CHEMICALS (otherwise undescribed)
Havre, 4 cs.

COAL PRODUCTS—
Carbolacene
New York, 1 brl.

DEXTRINE—
New York, 1,880 bgs.

DYESTUFFS—
Bark Extract
Baltimore, 100 bxs.

Dyewood Extract
Philadelphia, 981 bxs.

Gambler
Singapore, 1,043 cs.

Logwood Extract
New York, 50 brls.

Myrobalans
Calcutta, 5,680 pkgs., 12,811 pkgs.

Quebracho Extract
Buenos Ayres, 60,000 bgs.

Tanning Extract
New York, 20 brls.

GELATINE—
Philadelphia, 61 brls.

GLUE—
Boston, 21 brls.; New York, 75 brls.

GLUE FISH—
Boston, 15 brls.

LITHOPONE—
Philadelphia, 1,120 brls.

MINERAL WAX—
New York, 32 bgs.

OXALIC ACID—
Rotterdam, 23 brls.

PARAFFIN SCALE—
New York, 152 brls.

PARAFFIN WAX—
Calcutta, 1,334 bgs.; New York, 171 cs.; Philadelphia, 226 bgs., 1,202 brls.

SOAP—
Campana, 1 cs.

SPERMACEETI WAX—
New York, 250 bxs.

SULPHUR ORE—
Seville, 2,100 t.

TALLOW—
New Orleans, 5 brls.

WAX—
New York, 200 brls.

WHITE LEAD—
Rotterdam, 162 cks., 25 brls.

WOLFRAM ORE—
Singapore, 1,126 bgs.

WOOD OIL—
Hong Kong, 500 cs.; Shanghai, 303 cks.

ZINC ASH—
Calcutta, 1 cs.

ZINC OXIDE—
Philadelphia, 2,330 brls.; Rotterdam, 25 cks.

LONDON.

Week ending December 6.

ARSENIC—
Holland, 9 t. 7 c.; Portugal, 126 t.; Victoria, 10 t.

BARYTES—
Belgium, 50 bgs.; Holland, 100 cks.

BEEES WAX—
Portugal, 23 bgs.

CITRATE OF LIME—
B.W.I., £2,350.

COBALT OXIDE—
Canada, 21 brls.

CREAM OF TARTAR—
Italy, 40 kgs.; Spain, 4 brls.

DYESTUFFS—
Aniline Dye
Switzerland, 51 pkgs., 4 cks.

Argols
France, 488 bgs.; Italy, 184 bgs.; Portugal, 434 bgs.; Spain, 1,282 bgs.

Cutch
Brit. India, 500 bxs.

Myrobalans
Brit. India, 3,395 pkts.

Sumac
Ceylon, 100 bgs.

Tanner's Bark
Natal, 134 t.

Tanning Extract
Egypt, 114 bgs.

Turmeric
Brit. India, 505 bgs.

FISH OIL—
Japan, 500 cs.; Norway, 5 brls.

FULLER'S EARTH—
Japan, £50.

GELATINE—
Belgium, £2,788.; France, £355.; Holland, £112.

GLUE—
France, £618.; Italy, £370.; Sweden, £130.; U.S.A., £1,707.

HYDROQUINONE—
France, £350.; U.S.A., £462.

LITHOPONE—
Holland, 140 cks.

PARAFFIN WAX—
Brit. India, 150 t.; U.S.A., 315 t. 17 c.

PHOSPHORUS—
Norway, £118.

PITCH—
Holland, 27 brls.

PLUMBAGO—
Japan, 120 cks.

POTASSIUM BROMIDE—
U.S.A., £1,134.

POTASSIUM IODIDE—
Japan, 10 cs.

RED LEAD—
France, 55 brls.

ROSIN—
China, 103 cs.; France, 100 cks.; Portugal, 300 brls., 362 cks.

SOAP—
Belgium, £80.; France, £90.; U.S.A., £5,395.

SODA—
U.S.A., 1 t.

SPERMACEETI WAX—
Japan, 660 cs.

SULPHUR—
Italy, 51 t. 4 c.

TALLOW—
Japan, 49 t. 19 c.; N.Z., 145 t., £8.; N.S.W., 235 t. 3 c.; Tasmania, 21 t. 10 c.; U.S.A. 85 t. 10 c.

WHITE LEAD—
Belgium, 57 cks.; U.S.A., 235 cks.

MANCHESTER.

Week ending December 6.

DEXTRINE—
New York, 500 bgs.

DYESTUFFS—
Bark Extract
Baltimore, 40 bxs.

Dyewood Extract
New York, 20 brls.

FORMALDEHYDE—
New York, 123 bxs.

LITHOPONE—
Rotterdam, 120 cks.

MAGNESIUM CHLORIDE—
Rotterdam, 56 cks.

OXALIC ACID—
Christiania, 3 cks.

PARAFFIN SCALE—
New York, 550 brls.

PARAFFIN WAX—
Baltimore, 2,075 bgs.

SODIUM BICHROMATE—
New York, 41 cks.

ULTRAMARINE—
Rotterdam, 2 cs.

WAX—
Baltimore, 188 brls.

WAX SCALE—
Philadelphia, 200 brls.

MIDDLESBROUGH.

Week ending December 6.

NIL.

NEWCASTLE-ON-TYNE

Week ending December 6.

CARBIDE—
Bergen, 80 drms.

MINERAL WHITE—
Bergen, 200 bgs.

SWANSEA.

Week ending December 6.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

BRISTOL.

Publication of Official Returns
Suspended.

GLASGOW.

Week ending December 6.

AMMONIUM FLUORIDE—
Durban, 3 drms., £28.

BEEES WAX—
Antwerp, 4 c.

BITUMASTIC SOLUTION—
Singapore, £59.

CHEMICALS (otherwise undescribed)
Adelaide, 23 pkgs.; Antwerp, 160 pkgs.; Brisbane, 20 pkgs.; Kobe, 120 pkgs.; Melbourne, 159 pkgs.; Penang, 168 pkgs.; Shanghai, 420 pkgs.; Singapore, 380 pkgs.

CHLOROFORM—
Natal, £76.

COAL PRODUCTS (otherwise undes.)
Antwerp, £23.; Bombay, £145.; Monte Video, £614.; Philadelphia, £520.; Singapore, £214.; Sydney, £28.

COAL PRODUCTS—
Carbolic Acid
Sydney, 500 gals.

DISINFECTANTS (otherwise undes.)
Hong Kong, £50.
Penang, £125.

DYESTUFFS (otherwise undescribed)
Sydney, £242.

DYESTUFFS—
Quebracho Extract
Adelaide, £408.; Melbourne, £331.; Sydney, £411.

LEAD NITRATE—
Bordeaux, 20 t.

MAGNESITE (CALCINED)—
New York, 24 t. 2 c.

MAGNESIUM OXIDE—
Rangoon, 15 c.

MINERAL PITCH—
New York, 51 t. 2 c.

PARAFFIN WAX—
Antwerp, 70 t.

ROSIN—
Monte Video, 4 t. 19 c.

SALT—
Rangoon, 1 t. 10 c.

SHEEP DIP—
Brisbane, £2,100.
Sydney, £150.

SOAP—
Antwerp, 40 bxs.; Hong Kong, 1 bx.; Rangoon, 20 bxs.; Shanghai, 53 bxs.

SODIUM BICHROMATE—
Antwerp, 10 t.; Bombay, 2 t. 12 c.; Melbourne, 41 cks.; Singapore, 19 c.

SODIUM CHROMATE—
Sydney, 6 cks.

STOCKHOLM PITCH—
Bombay, 3 t. 5 c.

SULPHURIC ACID—
Rangoon, £202.

GOOLE.

Week ending December 6.

NIL.

GRANGEMOUTH.

Week ending December 6.

ALUMINA—
Christiania, 200 t.

AMMONIUM CARBONATE—
Stockholm, 1 t.

BORAX—
Stockholm, 10 c.

BORIC ACID—
Stockholm, 1 t.

CALCIUM PHOSPHATE—
Christiania, 19½ c.

CHROME ORE—
Rotterdam, 48 t.

COAL PRODUCTS—
Naphtha
Christiania, 1,312 gals.

CHRE—
Rotterdam, 2 t.

PITCH—
Algiers, 420 t.

ROSIN OIL—
Rotterdam, 10 brls.

SOAP—
Christiania, 4 t. 12 c.

TAR—
Stockholm, 11,500 gals.

HULL.

Week ending December 2.

ACETO SALICYLIC ACID—
Gothenburg, 25 cs.

BASIC SLAG—
Lisbon, 1,015 bgs.

CHEMICALS (otherwise undescribed)
Calais, 302 bgs.; Gothenburg, 6 cks.; Genoa, 57 brls., 75 cks., 230 bgs., 155 drms., 340 kgs.; Lisbon, 4 cks.; Rotterdam, 6 drms.

COAL PRODUCTS—
Creosote
Dunkirk, 50 cks.
Tar
Pt. Said, 400 cks.

COBALT OXIDE—
Lisbon, 1 cs.

DISINFECTANTS (otherwise undes.)
Gothenburg, 300 drms.; Lisbon, 2,000 drms.

DYESTUFFS (otherwise undescribed)
Gothenburg, 4 cks.

GLUE—
Lisbon, 2 drms.

MINERAL WHITE—
Amsterdam, 100 bgs.

PITCH—
Antwerp, 922 t.; Helsingfors, 60 brls.

SALT—
Lisbon, 37 cs.

SOAP—
Gothenburg, 2 cs.
Genoa, 1,956 cs.
Leghorn, 1,570 cs.

STEARINE—
Wyburg, 21 pkgs.

TALLOW—
Genoa, 13 cks.

TAR—
Amsterdam, 25 brls.; Wyburg, 3 brls., 5 cks.

LEITH.

Week ending December 6.

POTASSIUM BICHROMATE—
Rotterdam, 10 t. 5 c., £1,321.

SODIUM BICHROMATE—
Rotterdam, 5 t. 3 c., £508.

LIVERPOOL.

Week ending December 4.

ACETIC ACID—
Constantinople, 3 t., £180.;
Demerara, 1 c., £3.; Oporto, 5 c., £27.; Penang, 3 t. 17 c., £406.

ACETIC ANHYDRIDE—
Basle, 2 t.

ALUM—
Arequipa, 1 c., £2.; Callao, 2 t. 17 c., £52.; Natal, 5 c., £6.;
Piraeus, 17 t. 8 c., £346.; Porto Alegre, 4 t. 18 c., £106.; Rio de Janeiro, 9 t. 10 c., £202.; Rio Grande do Sul, 2 t., £44.;
Salonika, 18 t. 1 c., £327.

ALUMINA CHLORIDE—
Brussels, 3 c., £32.

ALUMINA HYDRATE—
Gothenburg, 4 c., £8.; Oporto, 4 c., £10.

ALUMINA SULPHATE—
Calcutta, 9 t. 15 c., £176.;
Christiania, 20 t. 2 c., £240.;
Sydney, 10 t., £120.

AMMONIA (ANHYDROUS)—
Calabar, 2 c., £23.; Nantes, 1 c., £15.; Salonika, 10 c., £124.

AMMONIUM CARBONATE—
Monte Video, 1 t., £61.

AMMONIUM MURIATE—
Melbourne, 2 c., £6.; New York 2 t. 5 c., £181.; Patras, 3 t., £153.

AMMONIUM NITRATE—
Anby, 10 t. 4 c. £3,500.

BENZONAPHTHOL—
Constantinople 2 lbs., £5.

BLEACHING POWDER—
Antwerp, 19 c., £14.; Alexandria 1 c., £1.; Bilbao, 5 t. 6 c., £71.;
Gibraltar, 2 c., £4.; Lisbon, 90 t. 13 c., £1,176.; Monte Video, 11 t. 19 c., £152.; Nantes, 8 t. 17 c., £120.; Oporto, 53 t. 11 c., £713.; Patras, 1 t. 2 c., £18.;
Rio de Janeiro, 5 t., £83.;
Rouen, 34 t. 19 c., £439.;
Shanghai, 101 t. 12 c., £1,862.;
Smyrna, 4 t. 12 c., £116.;
Valparaiso, 20 t. 2 c., £326.

BORAX—
Antwerp, 5 t., £250.; Adelaide, 1 t., £43.; Basle, 30 t., £1,320.;
Coban, 1 c., £8.; Calcutta, 5 t., £210.; Fremantle, 1 t., £43.;
Oporto, 2 t., £94.; Piraeus, 10 c., £23.; Pt. of Spain, 1 qr., £1.

BORIC ACID—
Fremantle, 4 t., £15.; Sapele, 2 c., £7.; Wellington, 3 c., £12.

CALCIUM CARBIDE—
Lagos, 1 c., £4.

CALCIUM CHLORIDE—
Bombay, 3 t. 3 c., £24.; Genoa, 30 t. 2 c., £230.; Singapore, 5 t. 6 c., £37.; Shanghai, 10 t., £653.; Suez, 5 t. 7 c., £41.;
Trieste, 13 t. 5 c., £91.

CALCIUM PHOSPHATE—
Cape Town, 2 t., £60.

CAUSTIC SODA—
Amsterdam, 203 drms.; Bombay, 18 drms.; Bordeaux, 50 drms.; Buenos Ayres, 36 drms.;
Cape Town, 15 drms.; Christiania 5 brls.; Constantinople, 303 drms.; Hong Kong, 100 drms.;
Leghorn, 33 drms.; Melbourne, 30 drms.; Oporto, 20 drms.;
Pernambuco, 70 drms.; Piraeus, 67 drms.; Pto. Alegre, 3,820 drms.; Stockholm, 56 drms.;
Suez, 150 drms.

CHEMICALS (otherwise undescribed)
Amsterdam, 5 t., £200.; Alicante, 2 t. 19 c., £115.; Bombay, 10 c., £163.; Barcelona, 10 t., £390.;
Christiania, 11 t. 14 c., £451.;
Rotterdam, 4 t. 19 c., £197.;
Secondee, 16 c., £81.

CHINA CLAY—
Calcutta, 96 pkgs.; Haiphong, 1 t.

COAL PRODUCTS—
Carbolacene
Antwerp, 11 c., £13.; Braso, 1 c., £2.; Cartagena, 2 gr., £4.;
Perth, 1 t. 16 c., £30.; Secondee, 4 c., £8.; Valparaiso, 4 t. 13 c., £144.; Warri, 2 c., £3.

Carbolic Acid
Kobe, 51 t. 10 c., £4,060.;
Kingston, 1 c., £3.; Malta, 8 c., £20.; Piraeus, 18 c., £25.;
Yokohama, 5 t. 2 c., £356.

COAL PRODUCTS—

Creolina
Bahia, 6 t. 17 c., £624.; Maracaibo, 5 c., £21.; Porto Alegre, 6 t. 16 c., £705.; Rio de Janeiro, 2 t. 10 c., £209.; Santos, 14 t. 15 c., £1,719.; Sao Paulo, 12 c., £49.

Creosote
Buenos Ayres, 23 t. 4 c., £436.;
Monte Video, 9 t. 19 c., £214.;
Oporto, 11 t. 19 c., £1,020.;
Secondee, 1 t. 2 c., £10.

Naphthalene
Lagos, 8 t. 14 c., £196.

Tar
Antwerp, 9 c., £3.; Accra, 6 t. 15 c., £96.; Ciudad Bolivar, 1 c., £2.; Duala, 1 t. 14 c., £16.;
Kin Matadi, 4 c., £2.; Lagos, 2 t., £24.; Porto Nevo, 12 c., £9.;
Secondee, 8 c., £6.; Sierra Leone 1 t. 3 c., £25.; Sapele, 3 t., £28.;
Winnebuh, 1 t. 4 c., £19.

COPPER SULPHATE—
Algiers, 114 t. 6 c., £4,318.;
Antwerp, 4 t. 19 c., £190.;
Bordeaux, 292 t. 5 c., £14,600.;
Monte Video, 3 t. 19 c., £155.;
Nantes, 20 t., £780.; Rio de Janeiro, 4 t. 18 c., £204.;
Salonika, 5 t., £205.; Volo, 5 t., £205.

CREAM OF TARTAR—
Adelaide, 1 t. 5 c., £298.

DISINFECTANTS (otherwise undes.)
Alexandria, 2 t., £32.; Auckland, 14 c., £35.; Bombay, 9 c., £20.;
Belawan, 6 t. 8 c., £335.; Bucharest, 1 t. 18 c., £238.; Cape Town, 4 t. 9 c., £125.; Calcutta, 1 t. 6 c., £62.; Demerara, 1 qt., £3.;
Durban, 13 c., £28.; Duala, 1 c., £16.; Kano, 1 c., £4.; Kingston, 20 qts., 2 c., £9.; Laurenc Marques, 3 c., £23.; Malaga, 2 c., £5.; Natal, 2 c., £5.; Opobo, 2 t. 4 c., £45.; Rio de Janeiro, 7 c., £43.; Santos, 3 c., £26.;
Secondee, 6 c., £15.; Singapore, 2 c., £18.; Shanghai, 1 t. 17 c., £81.; Wellington, 6 c., £48.

DYESTUFFS (otherwise undes.)—
Amsterdam, 5 t. 6 c., £630.;
Bombay, 43 t. 10 c., £25,920.;
Barcelona, 66 lbs., £39.; Genoa, 1 t. 2 c., £449.; Hong Kong, 6 c., £264.; Rio de Janeiro, 2 t. 17 c., £400.; Shanghai, 36 t. 1 c., £13,635.; Smyrna, 10 c., £80.;
Volo, 1 t., £131.; Wellington, 15 c., £179.; Yokohama, 8 c., £413.

DYESTUFFS—
Aniline Dye
Kobe, 57 t. 5 c., £9,271.; Lagos, 1 c., £36.

FERRO MANGANESE—
Baltimore, 757 t.; Montreal, 25 t.; Philadelphia, 430 t.

GLUE—
Kobe, 200 pkgs.

GLUE, SIZE, AND GELATINE—
Antwerp, 2) pkgs.; Barcelona, 3 pkgs.; Buenos Ayres, 2 pkgs.;
Boston, 8 pkgs.; Calcutta, 1 pkg.; Lagos, 56 pkgs.; Lisbon, 4 pkgs.; Montreal, 10 pkgs.;
Rangoon, 20 pkgs.; Rotterdam, 100 pkgs.; San Salvador, 10 pkgs.; Shanghai, 221 pkgs.

HYDROFLUORIC ACID—
Bahia, 3 c., £36.

HYDROGEN PEROXIDE—
Santos, 5 c., £45.

IODELITE—
Lome, 11 c., £15.; Singapore, 2 t. 14 c., £67.

LEAD ACETATE—
Lisbon, 1 t., £86.

LEAD NITRATE—
Antwerp, 1 t. 3 c., £63.

MAGNESIA—
Havana, 20 pkgs.

MAGNESIUM CHLORIDE—
Bombay, 16 t. 11 c., £564.

MAGNESIUM SULPHATE—
Antwerp, 5 t., £52.; Arequipa, 1 c., £2.; Bahia, 10 c., £120.;
Ghent, 5 t., £53.; Porto Alegre, 3 t. 4 c., £47.; Pt. Harcourt, 1 c., £5.; Secondee, 2 c., £4.;

MAGNESIUM SULPHATE—
St. John's, N.F., 4 c., £9.

MURIATIC ACID—
Barranquilla, 2 c., £19.; Cerro Azul, 3 c., £10.

PITCH—
Monrovia, 10 c., £7.; Madrid, 19 c., £32.

PLUMBAGO—
Para, 1 ck.

POTASH—
Ibicuy, 4 c., £7.; Lisbon, 2 qt., £8.

POTASSIUM BICARBONATE—
Athens, 14 c., £113.; Piraeus, 10 c., £76.

POTASSIUM BICHROMATE—
Bahia, 2 c., £17.

POTASSIUM CHLORIDE—
Cape Town, 1 t., £65.; Demerara, 1 t., £82.; Lisbon, 11 c., £30.;
Piraeus, 1 c., £7.; Paranagua, 9 t. 16 c., £643.; Rio de Janeiro, 17 t. 14 c., £1,158.; Santos, 7 t. 17 c., £515.; Sao Paulo, 2 t. 19 c., £252.

POTASSIUM IODIDE—
Accra, 16 lbs., £18.; Pt. Harcourt, 84 lbs., £88.; Rio de Janeiro, 2 c., £95.

POTASSIUM SULPHATE—
Constantinople, 1 c., £8.

SALAMMONIAC—
Belgrade, 1 t. 10 c., £108.;
Christiania, 2 c., £9.; Constantinople, 1 t. 1 c., £74.; Famagusta, 6 c., £24.; Piraeus, 1 t., £73.;
Pt. of Spain, 1 qt., £1.; Rouen, 5 t. 10 c., £380.; Rangoon, 15 c., £53.; Salonika, 1 t. 10 c., £108.;
Smyrna, 1 t. 13 c., £127.;
Valdivia, 1 c., £4.; Valparaiso, 1 c., £4.

SALICYLIC ACID—
Basle, 10 t., £760.

SALT—
Calcutta, 4,947.; Halifax, 46 t.;
Lagos, 1,034 t.; Landana, 74 t.;
Malmo, 200 t.; Manaois, 135 t.;
Mauritius, 625 t.; Montreal, 983 t.; New York, 175 t.; Pt. Harcourt, 46 t.

SALTPETRE—
Funchal, 2 c., £8.; Lisbon, 15 c., £31.; Maranham, 10 c., £29.;
Stanley, 2 c., £3.; Sierra Leone, 1 c., £5.

SHEEP DIP—
Belize, 26 t. 10 c., £76.; Buenos Ayres, 33 t. 12 c., £1,400.;
Corral, 2 t. 10 c., £150.; Monte Video, 16 t. 10 c., £415.; Punta Arenas, 13 t. 9 c., £525.

SOAP—
Abonema, 300 bxs.; Alexandria, 824 bxs., 3 cs.; Accra, 1,264 bxs.;
Antwerp, 2,150 bxs., 2,420 cs.;
Barbados, 12 bxs.; Bergen, 36 bxs.; Bengazi, 30 cs.;
Bombay, 5,196 bxs., 1,555 cs.;
Bordeaux, 1,250 bxs.; Buenos Ayres, 179 bxs.; Burutu, 20 drms.; Calcutta, 1,162 bxs.;
Colon, 3 bxs.; Dominica, 200 bxs.; Dongalla, 100 bxs.; Durban, 245 bxs.; Elmina, 5 bxs.;
Galatz, 8 bxs.; Genoa, 350 bxs.;
Hong Kong, 1,298 bxs.; Karachi, 61 cs., 1,705 bxs.; Kilindini, 57 cs., £3.; Kingston, 2,586 bxs.;
Koko, 53 pkgs.; Kuala Lumpur, 20 cs.; Lagos, 75 cs., 1,899 bxs.;
La Guayra, 5 pkgs.; Las Palmas, 224 bxs.; Lome, 1 cs., 4 pkgs.; Lytleton, 13 bxs.;
Madras, 147 bxs.; Martinique, 800 bxs.; Manaois, 5 bxs.;
Melbourne, 2 bxs.; Mersyna, 487 pkgs.; Messina, 132 pkgs.;
New York, 12 cs., 12 kgs.;
Onitsha, 948 bxs.; Oretava, 227 bxs.; Paramaribo, 1 bx.;
Pt. Harcourt, 12 bxs.; Pt. au Prince, 50 bxs.; Rangoon, 2,874 bxs.; Sabang, 380 bxs.; Samarinda, 100 bxs.; Santos, 1 bx.;
San Fernando, 560 bxs.; Siboga, 30 pkgs.; Sierra Leone, 80 bxs.;
Tangiers, 100 bxs.; Teneriffe, 312 bxs.; Ternate, 100 bxs.; Tetuan, 388 bxs.; Timor Dilly, 50 bxs.;
Timor Keepong, 100 cs.; Tripoli, 95 cs.

SOAP—

Valparaiso, 33 bxs.
Wellington, 12 c.

SODA ASH

Amsterdam, 50 pkgs.; Christiania
150 bgs.; Kobe, 2,867 bgs.;
Mojil, 1,082 pkgs.; Oporto, 57
pkgs.; Piraeus, 1,000 pkgs.;
Wellington, 107 pkgs.

SODA CRYSTALS—

Alexandria, 20 pkgs.; Genoa,
254 pkgs.; Piraeus, 50 pkgs.

SODIUM BICARBONATE—

Alexandria, 70 pkgs.; Amster-
dam, 325 pkgs.; Blenheim,
20 pkgs.; Genoa, 320 pkgs.;
Hamburg, 206 pkgs.; Kobe,
646 bgs.; Leghorn, 557 pkgs.;
Lisbon, 60 pkgs.; Mojil, 431 pkgs.;
Naples, 300 pkgs.; Rio de
Janeiro, 40 pkgs.; Rotterdam,
90 pkgs.; Stavanger, 50 pkgs.;
Wellington, 51 pkgs.; Wiborg,
60 pkgs.

SODIUM PHOSPHATE—

Rio de Janeiro, 2 c., £5.

SODIUM SALICYLATE—

Lisbon, 1 c., £23.

SODIUM SILICATE—

Adelaide, 115 brls.; Alexandria,
32 pkgs.; Buenos Ayres, 80
pkgs.; Lisbon, 1,000 pkgs.;
Messina, 38 brls.; Para, 15 pkgs.;
Rio de Janeiro, 161 brls.

SODIUM SULPHATE—

Lagos, 1 t., £13.

SODIUM SULPHIDE—

Bombay, 20 pkgs.; Brisbane,
9 pkgs.; Waitara, 88 pkgs.

SULPHUR—

Cerro Azul, 1 qt., £4.; Singapore,
6 t., £130.

SULPHUR (FLOWERS)—

Accra, 12 c., £18.

SULPHURIC ACID—

Oporto, 11 c., £12.; Secondee,
15 c., £27.

TALLOW—

Marseilles, 81 brls.

TAR (WOOD)—

Cindad Beliva, 1 c., £3.; Val-
paraiso, 3 t. 10 c., £166.

TARTAR (EMETIC)—

Rio de Janeiro, 10 c., £202.

TARTARIC ACID—

Hiogo, 3 t.

WOOD PRESERVATIVE AND**DISINFECTANT**—

Kingston, 2 t. 4 c., £47.

ZINC CHLORIDE—

Calcutta, 17 c., £47.; Trieste,
13 t. 5 c., £91.

ZINC SULPHATE—

Cape Town, 4 c., £7.; Montreal,
2 t., £33.

LONDON.

Week ending December 3.

ACETIC ACID—

Barbados, 1 ck., £9.; Calicut,
50 cbys., £218.; Marseilles,
2 cks., £5.; Montreal, 2 cks., £7.;
Shanghai, 1 ck. (pt.), £5.

ACETONE—

Antwerp, 6 drms., £212.; Dur-
ban (F.), 2 drms., £13.; Paris,
7 drms., £210.; Switzerland,
8 drms., £237.

ACETO SALICYLIC ACID—

Batoum, 4 kgs., £101.; Durban,
1 c., £11.; Monte Video, 1 c.
(pt.), £6.; Nov rossisk, 5 cs., £56;
Odessa, 1 c., £414.

ALUM—

Jeddah, 5 c., £7.

AMMONIA—

Alexandria, 9 pkgs., £28.; Bou-
logne, 28 drs., £250.; Bombay,
2 c., £5.; Brussels, 8 cs., £16.;
Colombo, 2 cs., £34.; Delagoa
Bay, 4 cs., £7.; Durban, 32 cs.,
£60.; Hong Kong, 3 cs., £5.;
Karachi, 12 cs., £24.; Lourenco
Marques, 10 cs., £18.; Madras,
3 cs., £18.; New York, 56 cylds.,
£404.; Piraeus, 4 cs., £8.

AMMONIA—

Pt. Elizabeth, 25 cs., £47.; Rio
de Janeiro, 4 cs., £9.; Shanghai,
25 pkgs., £58.; Singapore, 10 cs.,
£20.; Trinidad, 4 cs., £8.;
Valparaiso, 10 drms., £28.;
Zanzibar, 10 cs. (pt.), £10.

AMMONIA (ANHYDROUS)—

Aden, 8 cylds., £71.; Buenos
Ayres, 40 cylds., £200.; Hong
Kong, 5 cs., £86.; Lisbon, 27
cylds., £238.; Penang, 10 cylds.,
£85.; Rangoon, 8 cs., £58.

AMMONIUM BROMIDE—

Bombay, 1 cs. (pt.), £10.

AMMONIUM CARBONATE—

Alexandria, 1 t., £60.; Bahia,
1 t. 14 c., £179.; Belawan Deli,
1 t. 7 c., £110.; Calcutta, 1 c., £7.;
Demerara, 5 c., £23.; Kobe,
10 t., £600.; Penang, 18 c., £73.;
Pto. Alegre, 8 c., £46.; Trinidad,
2 c., £15.; Wellington, 2 c., £7.;
Yokohama, 5 t., £300.

AMMONIUM CHLOROHYDRATE—

Rio de Janeiro, 1 cs., £7.

AMMONIUM CHLORIDE—

Calcutta, 1 cs. (pt.), £9.

AMMONIUM NITRATE—

Cochin, 10 t., £360.; Pointe-a-
Pitre, 116 t. 3 c., £3,500.

AMMONIUM SULPHATE—

Channel Islands, 21 t., £431.;
Dunkirk, 340 t., £7,820.

AMYL ACETATE—

Boulogne, 2 drms., £320.; Paris,
10 drms., £685.; Rotterdam,
17 drms., £1,770.

ANTIMONY REGULUS—

Calcutta, 1 t.; Gothenburg,
1 t. 10 c.; Rotterdam, 50 t.

ANTIMONY SULPHIDE—

Antwerp, 8 cks., £158.; Lisbon,
1 ck., £10.

ANTIMONY TARTRATE—

Bombay, 1 cs. (pt.), £8.

ARSENIC—

Lisbon, 12 c., £39.; Rio de
Janeiro, 4 c., £18.; Valencia,
5 t. 8 c., £300.

ARSENIC SULPHIDE—

New York, 10 kgs., £44.

BARIUM HYDRATE—

Boulogne, 47 cks., £314.

BASIC SLAG—

Channel Islands, 35 t., £117.

BENZOIC ACID—

Pelotas (F.), 1 cs. (pt.), £8.

BISMUTH—

Gothenburg, 5 cs., £505.

BISMUTH SUBNITRATE—

Karachi, 13 cs., £958.; Monte
Video, 1 cs. (pt.), £23.; Novoro-
ssisk, 2 cs., £153.

BLEACHING POWDER—

Paris, 10 t. 9 c., £130.

BORAX—

Abo, 1 t. 5 c., £75.; Amsterdam,
6 t. 6 c., £252.; Switzerland,
via Antwerp, 7 t. 8 c., £298.;
Cologne, 1 t. 15 c., £78.; Delagoa
Bay, 2 c., £8.; Fremantle, 5 t.,
£508.; Gothenburg, 1 t., £40.;
Hamburg, 23 t. 19 c., £1,040.;
Passages, 5 t., £205.; Rotterdam,
7 t., £309.; Salonika, 5 t., £360.;
Tangier, 2 c., £5.; Sydney,
10 t. 1 c., £392.

BORIC ACID—

Abo, 6 c., £25.; Amoy, 2 c., £8.;
Amsterdam, 5 c. (F.), £18.;
Bahia, 2 c., £7.; Beyrout,
10 c. (F.), £13.; Bombay, 5 c.,
£20.; Buenos Ayres, 1 c., £7.;
Calcutta, 14 c., £62.; Demerara,
2 c., £8.; Durban, 3 c., £12.;
Danzig, 2 c., £9.; Gothenburg,
1 t. (F.), £72.; Gothenburg,
1 t., £78.; Jamaica, 2 c., £9.;
Hamburg, 2 c. (F.), £7.; Penang,
12 c., £47.; Parangagua, 1 c., £5.;
Rio de Janeiro, 4 c., £20.;
Smyrna, 2 c., £9.

BORIC PRESERVATIVE—

Brisbane, 3 t., £285.; Sydney,
1 t., £95.

CALCIUM CARBIDE—

Beyrout (F.), 1 c., £5.; Constanza
4 c., £6.; Ipoh, 10 c., £16.

CALCIUM CARBONATE—

Melbourne, 14 bgs., £18.

CALCIUM GLYCEROPHOSPHATE

Genoa, 1 cs., £50.

CALCIUM HYPOPHOSPHITE—

Barcelona, 2 cs., £66.; Genoa,
3 cs., £17.

CARNAUBA WAX—

Paris, 1 t.

CAUSTIC POTASH—

Hong Kong, 2 drms., £7.

CAUSTIC SODA—

Malmö, 12 c., £20.; Rotterdam,
5 t. 1 c., £150.

CERESINE WAX—

Abo, 2 t.; Barcelona, 14 c.

CHEMICALS (otherwise undescribed)

Bangkok, 1 ck., £21.; Beyrout,
1 cs., £7.; Bombay, 7 pkgs. (pt.),
£96.; Brussels, 7 pkgs., £67.;
Calcutta, 12 pkgs., £153.; Can-
ton, 3 kgs., £8.; Cape Town,
8 cs. (pt.), £74.; Constantinople,
4 pkgs., £62.; Copenhagen, 3 cs.,
£114.; Cyprus 1 cs., £9.;
Durban, 1 cs. (pt.), (F.), £79.
Durban, 1 cs. (pt.), £16.; East
London, 6 cs. (pt.), £78.; Fre-
mantle, 16 cs., £167.; Lytleton,
3 brls., £38.; Melbourne, 3 cs.,
£22.; New York, 3 cs., £172.;
Osaka, 6 cs., £205.; Penang,
6 cs., £42.; Pt. Swettenham,
1 cs., £9.; Salonika, 1 cs., £6.;
Shanghai, 2 pkgs., £74.; Swatow,
2 cks., £63.; Trinidad, 1 cs., £18.

CHLORAL HYDRATE—

Pelotas (F.), 1 cs. (pt.), £6.

CITRIC ACID—

Alexandria, 3 c., £72.; Anto-
fagasta, 1 c., £30.; Amsterdam,
10 c., £219.; Djibouti, 1 cs. (F.),
£6.; Durban, 3 c., £68.; Kobe,
2 t., £847.; Monte Video, 2 c.,
£56.; Montreal, 4 t., £1,766.;
Novorossisk, 1 t., £476.; Penang,
6 c., £146.; Rio de Janeiro,
4 c., £95.

COAL PRODUCTS—

Alizarine
Bombay, 13 cks., £384.; New
York, 3 cks., £131.

Aniline Colour

Hong Kong, 1 cs., £45.; Penang,
1 cs., £13.; Pt. Elizabeth, 1 cs.,
£77.; Singapore, 1 cs., £40.

Aniline Dye

Bombay, 95 cks., £3,727.; Brus-
sels, 2 kgs., £40.; Christiania,
2 kgs., £70.; Kobe, 45 pkgs.,
£2,335.; Shanghai, 1 cs., £26.

Bitumen

Bombay, 102 cks., £567.; [Rotter-
dam, 28 bgs., £112.

Carbolic Acid

Amoy, 5 cs., £15.; Karachi, 4 cs.,
£6.; Kobe, 264 drms., £2,918.;
Rotterdam, 32 cks., £307.;
Schiedam, 4 cs., £5.; Samarang,
1 cs., £7.; Shanghai, 1 cs. (pt.),
£5.; Yokohama, 768 drms.,
£1,570.

Cresosote

Demerara, 10 cks., £45.; Pelotas,
1 cs. (pt.), £9.

Cresosote Oil

Calais, 504 brls., £950.

Dyes

Barcelona, 5 kgs., £98.; New
York, 6 pkgs., £406.; Paris,
4 kgs., £48.

Naphthalene

Cape Town, 46 drms., £186.;
Colombo, 5 cks., £15.; Karachi,
1 kg., £5.; Lagos, 65 cks., £123.;
Mombasa, 1 cs., £4.; Rangoon,
4 cs., £17.; St. John, N.B.,
9 cks., £46.; Shanghai, 100 cs.,
£188.

Nigrosine

Alexandria, 1 cs., £23.

Paranitraniline

Barcelona, 3 cks., £130.

Pitch

Alexandria, 536 pkgs., £513.;
Antwerp, 475 t., £1,937.; Bou-
logne, 145 t., £634.; Calais,
930 t., £3,276.; Dunkirk, 300 t.,
£975.; Nantes, 1,300 t., £3,900.;
St. Servan, 720 t., £2,880.

COAL PRODUCTS—**Tar**

Dakar, 6 drms., £9.; Mombasa,
12 cks., £21.; Zanzibar, 13 cks.,
£23.

Tar Oil

Dunkirk, 1,011 cks., £1,820.;
Hong Kong, 5 drms., £7.; Tre-
port, 1,770 cks., £3,289.

COPPERAS—

Barcelona, 8 cks., £10.

COPPER SULPHATE—

Oran, 2 t. 10 c., £95.; Paris (F.),
5 c., £13.; Rio de Janeiro, 2 c.,
£6.

CREAM OF TARTAR—

Bombay, 1 c. (F.), £13.; Delagoa
Bay, 2 c. (F.), £35.; Demerara,
1 c., £13.; Durban, 3 c. (F.),
£52.; Gothenburg, 15 c. (F.),
£200.; Karachi, 1 cs. (F.), £6.;
Monte Video, 1 cs. (pt.), £6.;
St. John's, N.F., 1 c. (F.), £21.;
Townsville, 10 c. (F.), £156.;
Adelaide (transit), 1 t. (F.), £180.;
Brisbane (transit), 7 t. 12 c. (F.),
£2,160.; Launceston (transit),
10 c. (F.), £90.; Melbourne,
4 t. 10 c. (F.), £810.; Sydney,
2 t. (F.), £360.

DISINFECTANTS (otherwise undes.)

Accra, 1 c., £10.; Antwerp,
1 t. 6 c., £109.; Amoy, 1 t. 17 c.,
£60.; Auckland, 1 c., £6.;
Bangkok, 5 c., £37.; Barbados,
4 c., £8.; Belawan, 9 c., £83.;
Buenos Ayres, 6 t. 4 c., £266.;
Brussels, 6 c., £32.; Calcutta,
17 t. 5 c., £816.; Dakar, 16 c.,
£33.; Durban, 1 t. 14 c., £82.;
East London, 4 t. 5 c., £191.;
Hankow, 3 t., £109.; Hong Kong
2 t. 13 c., £117.; Karachi, 3 c.,
£24.; Kilindini, 6 c., £15.;
Lytleton, 2 c., £16.; Malta,
3 c., £7.; Marseilles, 1 t. 5 c.,
£23.; New York, 2 c., £17.;
Penang, 1 t. 5 c., £56.; Rangoon,
18 t. 6 c., £731.; Singapore,
17 c., £38.; Shanghai, 8 c., £10.;
Smyrna, 4 c., £6.; Toronto,
1 c., £16.; Trinidad, 10 c., £61.

DYESTUFFS—**Logwood Extract**

Nantes, 10 c.

ETHER—

Madras, 1 cs., £6.

ETHER (SULPHURIC)—

Alexandria, 2 cs., £9.

ETHYL CHLORIDE—

Durban, 1 cs., £16.

FATTY ACID—

Nantes, 5 t.

FULLER'S EARTH—

Philadelphia, 70 t.; Sydney,
10 t.

GLUE—

Osaka, 1 t.; Rotterdam, 1 t.

GLUE, SIZE, AND GELATINE—

Antwerp, 24 t. 4 c.; Adelaide,
3 c.; Alexandria, 3 c.; Bombay,
9 c.; Barbados, 3 c.; Brisbane,
1 t.; Bilbao, 1 t. 4 c.; Cape
Town, 15 c.; Calcutta, 8 c.;
Colombo, 2 c.; Canary Islands,
1 c.; Chiande, 1 c.; Durban,
2 t. 10 c.; Cyprus, 10 c.;
Dominica, 1 c.; East London,
4 c.; Hong Kong, 2 c.; Karachi,
19 c.; Megador, 1 c.; Rotter-
dam, 3 t. 5 c.

GLYCERINE—

Antwerp, 1 t., £119.; Anto-
fagasta, 1 c., £9.; Barcelona,
10 c., £60.; Beyrout, 1 c., £13.;
Brussels, 15 c., £98.; Danzig,
6 c., £46.; Djibouti, 2 c., £20.;
Karachi, 3 c., £38.; Rio de
Janeiro, 10 c., £89.; Tokio,
1 c., £14.

GYPSPUM—

Melbourne, 20 cks., £14.; Syd-
ney, 24 cks., £41.

HYDROCHLORIC ACID—

Rangoon, 1 c., £7.

HYDROFLUORIC ACID—

Brussels, 22 cs., £123.

HYDROGEN PEROXIDE—

Alexandria, 10 cs., £21.; Ant-
werp, 2 cks., £28.; Bordeaux,
2 cs., £7.

- HYPOPHOSPHITE OF LIME**—
Brussels, 2 cs., £41.
- IODINE**—
Genoa, 2 cs., £202.; Shanghai, 1 cs. (pt.), £25.
- IODINE (RESUBLIMED)**—
Genoa, 2 cs., £230.
- IRON AND AMMONIUM CITRATE**—
Durban, 1 cs. (pt.), £6.; Rotterdam, 4 cs., £266.
- IRON SULPHITE**—
Palma, 1 ck., £1.
- LEAD ACETATE**—
Bombay, 20 kgs., £69.; Demerara, 1 cs., £11.
- LITHIUM CARBONATE**—
Genoa, 1 cs., £90.
- MAGNESIA**—
Bombay, 3 cs., £21.
- MAGNESIA (CALCINED)**—
Porto Alegre 1 cs. (pt.), £5.; Santander, 2 cs., £52.
- MAGNESIUM CARBONATE**—
Bombay, 1 cs., £7.; Dunedin, 2 cs., £9.; Monte Video, 2 cs., £17.; Porto Alegre, 1 cs., £6.; Rio de Janeiro, 2 cs., £8.; Santos, 12 cs., £102.
- MAGNESIUM CITRATE**—
Adelaide, 5 cs., £51.
- MAGNESIUM SULPHATE**—
Bombay, 6 c., £16.; Brisbane, 2 t. 8 c., £94.; Colon, 3 c., £7.; Cyprus, 2 c., £6.; Durban, 15 c., £29.; Delagoa Bay, 4 c., £9.; Jamaica, 4 c., £11.; Karachi, 2 c., £5.; Melbourne, 2 t. 12 c., £99.; Monte Video, 1 t., £27.; Panama, 16 c., £38.; Paranaqua, 2 t., £48.; Pt. Elizabeth, 2 t. 12 c., £119.; Porto Alegre, 4 c., £11.; Rio Grande do Sul, 6 c., £15.; Rockhampton, 2 t. 2 c., £78.
- MANGANESE BORATE**—
Gothenburg, 1 ck., £32.
- METHYL ALCOHOL**—
Rotterdam, 13,680 g.
- MERCURY BICHLORIDE**—
Novorossisk, 10 cs., £616.; Shanghai, 2 cs. (pt.), £17.
- MERCURY OXIDE**—
Bombay, 1 cs., £47.; Dunkirk, 1 cs., £72.; Stockholm, 1 cs., £75.
- METHYL SALICYLATE**—
Brussels, 1 cs., £20.; Pelotas, (F.), 1 cs. (pt.), £8.
- MURIATE OF LIME**—
Pelotas, 3 drms., £12.
- MURIATIC ACID**—
Trinidad, 1 t., £40.
- NITRIC ACID**—
Pelotas, 1 c., £9.; Rio de Janeiro, 13 c., £77.; Shanghai, 1 c., £5.
- OXALIC ACID**—
Hong Kong, 2 cks., £60.
- PARAFFIN WAX**—
Cologne, 5 t.; Rotterdam, 10 t.
- PHOSPHORIC ACID**—
Paris, 47 crbys., £620.; Saigon, 1 cs., £12.
- POTASSIUM ACETATE**—
Shanghai, 1 cs. (pt.), £7.
- POTASSIUM BICARBONATE**—
Bangkok, 3 cs. (pt.), 1 kg., £117.
- POTASSIUM BICHRIMATE**—
Pt. Elizabeth, 2 kgs., £18.
- POTASSIUM BROMIDE**—
Calcutta, 1 cs., £25.; Demerara (F.), 1 cs., £28.; Monte Video, 1 cs. (pt.), £11.
- POTASSIUM CARBONATE**—
East London, 1 cs., £11.; Shanghai, 2 cs., £25.
- POTASSIUM CHLORATE**—
Alexandria, 1 c., £15.; Bangalore, 1 cs., £7.; Calcutta, 1 c. (pt.), £6.; Delagoa Bay (F.), 4 t., £392.
- POTASSIUM CITRATE**—
Shanghai, 2 cs. (pt.), £8.
- POTASSIUM CYANIDE**—
Calais, 4 cs., £88.; Pelotas, 1 cs., £18.; Santos, 1 ck. (pt.), £7.
- POTASSIUM FLUORIDE**—
Sydney, 3 cs., £67.
- POTASSIUM HYDRATE**—
Shanghai, 1 cs. (pt.), £9.
- POTASSIUM HYPOPHOSPHITE**—
New York, 4 cs., £127.
- POTASSIUM IODIDE**—
Bangkok, 2 cs. (pt.), £50.; Batoum, 2 cs., £185.; Christiania, 2 cs., £420.; Monte Video, 1 cs. (pt.), £11.; Rio de Janeiro, 2 cs., £200.; Shanghai, 2 cs. (pt.), £28.
- POTASSIUM METABISULPHITE**—
Cape Town, 2 cks., £133.
- POTASSIUM PERMANGANATE**—
Brisbane, 2 cs., £40.; Melbourne, 1 kg., £18.; Paris, 1 cs., £11.; Shanghai, 2 cs. (pt.), £15.
- POTASSIUM PRUSSIAN**—
Alexandria, 4 c., £43.
- POTASSIUM SULPHOGUAIA-COLATE**—
Cape Town (F.), 5 cs., £1,013.; Calcutta (F.), 1 cs., £8.
- POTASSIUM TARTRATE**—
Shanghai, 2 cs. (pt.), £8.
- PYROGALLIC ACID**—
Osaka, 1 cs. (pt.), £6.
- QUININE**—
Bombay, 1,000 ozs.; Buenos Ayres, 107 ozs.; Cape Town, 307 ozs.
- SALAMMONIAC**—
Buenos Ayres, 6 c., £29.; Constantinople, 4 t. 13 c., £416.; Novorossisk, 1 t., £105.; Rio de Janeiro, 3 c., £14.; Sydney, 1 t., £65.
- SALICYLIC ACID**—
Singapore, 2 cs., £24.
- SALT**—
Bombay, 4 t. 4 c.; Delagoa Bay, 9 c.; Durban, 1 t.; Karachi, 3 t.; Madras, 25 t.; Pernambuco, 16 c.
- SALTCAKE**—
Antwerp, 100 t., £450.
- SALTPETRE**—
Alicante, 1 t., £55.; Bilbao, 4 t., £208.; Barcelona, 3 t., £162.; Delagoa Bay, 2 c., £7.; Gothenburg, 2 t., £120.; Kilindini, 2 c., £6.; Lagos, 2 c., £8.; Rio de Janeiro, 6 t. 17 c., £405.; Santos, 20 t., £1,200.
- SHEEP DIP**—
Durban, 3 c., £10.; Wellington, 8 c., £24.
- SILVER NITRATE**—
Buenos Ayres, 1 cs., £83.; Meppel, 1 cs., £316.; Pelotas, 1 cs. (pt.), £15.; Shanghai, 1 cs. (pt.), £26.
- SOAP**—
Accra, 1 c.; Aden, 13 c.; Adelaide, 2 c.; Alexandria, 1 t.; Amsterdam, 11 t. 9 c.; Antofagasta, £3.; Amoy, 6 c.; Antwerp, 328 t. 13 c.; Auckland, 1 t. 6 c.; Bangkok, 9 c.; Beyrout, 13 c.; Bilbao, 1 t. 12 c.; Bombay, 18 c.; Bordeaux, 20 t.; Boulogne, 1 c.; Buenos Ayres, 1 t. 11 c.; Calcut, 11 c.; Calcutta, 1 t. 2 c.; Casablanca, 6 c.; Channel Islands, 16 c.; Christiania, 4 t. 8 c.; Cologne, 16 t. 8 c.; Colombo, 5 c.; Constantinople, 2 t. 13 c.; Cyprus, 1 t. 4 c.; Danzig, 22 t. 10 c.; Demerara, 4 c.; Dunedin, 1 t. 17 c.; Durban, 18 c.; Dares-Salaam, 1 c.; Genoa, 1 t. 3 c.; Ghent, 1 t. 3 c.; Gibraltar, 14 c.; Gothenburg, 2 t. 9 c.; Hong Kong, 1 t.; Helsingfors, 4 c.; Iddo, 1 c.; Invercargill, 1 c.; Lisbon, 7 c.; Madagascar, 7 c.; Madras, 3 c.; Marseilles, 3 t. 16 c.; Melbourne, 2 c.; New York, 1 t. 3 c.; Ostend, 1 c.; Paris, 2 t.; Perth, 1 c.; Penang, 6 c.; Piraeus, 8 t. 16 c.; Pt. Elizabeth, 1 c.; Pt. Sudan, 17 c.; Pt. Swettenham, 3 c.;
- SOAP**—
Rio de Janeiro, 17 c.; Rotterdam, 26 t. 4 c.; St. John, N.B., 6 c.; St. John's, N.F., 1 c.; St. Kitts, 4 c.; Santos, 5 c.; Secondee, 5 c.; Singapore, 16 c.; Smyrna, 2 c.; Stavanger, 2 c.; Sydney, 6 c.; Trepot, 2 c.; Trieste, 15 t.; Trinidad, 2 t.; Trondhjem, 72 lb.; Valparaiso, 6 c.; Wellington, £104.
- SODA**—
Genoa, 9 c., £40.
- SODA ASH**—
Genoa, 30 t., £262.
- SODIUM & POTASSIUM TARTRATE**—
Alexandria, 1 cs., £33.
- SODIUM BENZOATE**—
Calcutta, 2 cs. (pt.), £18.
- SODIUM BICARBONATE**—
Congo, via Antwerp, 2 c., £16.; Alexandria, 1 t. 17 c., £104.; Antofagasta, 16 c., £29.; Beira, 3 c., £5.; Brussels, 10 c., £20.; Calcutta, 6 c., £18.; Colombo, 3 c., £7.; Cologne, 5 t., £58.; Cyprus, 5 c., £8.; Danzig, 2 t. 10 c., £65.; Delagoa Bay, 4 c., £8.; Durban, 4 c., £8.; Santos, 10 c., £10.
- SODIUM BICHRIMATE**—
Pt. Elizabeth, 2 kgs., £24.
- SODIUM BISULPHITE**—
Antwerp, 7 t., £210.; Bordeaux, 5 t., £150.; Valencia, 11 c., £10.
- SODIUM CARBONATE**—
Bombay, 4 c., £21.; Constantinople, 9 c., £26.; Cape Town, 5 c., £9.; Osaka, 5 c., £8.; Piraeus, 14 t. 10 c., £160.
- SODIUM HYDROSULPHITE**—
Calais, 5 c., £102.; Gothenburg, 1 t., £392.; Rotterdam, 1 c., £30.
- SODIUM HYPOPHOSPHITE**—
Barcelona, 2 c., £48.; Brussels, 1 cs., £22.; Genoa, 1 cs., £25.
- SODIUM HYPOSULPHITE**—
Bombay, 4 t. 9 c., £116.; Brussels, 2 t. 10 c., £59.; Cape Town, 2 t., £69.; East London, 1 t., £28.; Salonika, 10 c., £15.
- SODIUM NITRATE**—
Genoa, 7 t. 5 c., £435.
- SODIUM PHOSPHATE**—
Paris, 6 cks., £71.; Sydney, 1 t., £57.
- SODIUM PYROPHOSPHATE**—
Sydney, 1 t., £85.
- SODIUM SALICYLATE**—
Calcutta 11 cs. (pt.), £5.; Cape Town, 1 cs. (pt.), £6.; Fremantle, 1 cs., £18.; Melbourne, 2 cs., £45.
- SODIUM SULPHATE**—
Barbados, 1 t. 5 c., £18.; Hong Kong, 7 t., £60.
- SODIUM SULPHITE**—
Antwerp, 2 t., £40.; Buenos Ayres, 8 c., £23.; Constantinople, 6 c., £24.; Cape Town, 5 c., £11.; East London, 4 c., £5.; Osaka, 6 c., £12.
- SODIUM TARTRATE**—
Calcutta, 1 c., £5.; Sydney, 10 cks., 5 c., £83.
- SULPHUR**—
Helsingfors (F.), 2 t. 10 c., £75.; Lagos, 10 c., £13.; New York, 2 t. 16 c., £295.; Novorossisk (F.), 5 t., £135.; Paris, 13 t. 6 c., £288.
- SULPHURIC ACID**—
Brussels, 1 t. 5 c., £46.; Cyprus, 1 c., £3.; Pt. Swettenham, 1 t. 5 c., £30.; Rio de Janeiro, 2 t., £70.; Trinidad, 2 t. 10 c., £49.
- TALLOW**—
Accra, 3 c.
- TAR (STOCKHOLM)**—
Bombay, £488.
- TARTARIC ACID**—
Durban, 4 c. (F.), £91.; Durban, 6 c., £109.; Karachi, 6 c., £101.; Malta, 1 c., £18.; Novorossisk, 5 c. (F.), £86.; Pt. Sudan, 1 c. (F.), £20.; Rio de Janeiro, 1 c., £18.; St. John, N.B., 1 t. 10 c., £466.; Sydney, 1 t. 6 c., £389.
- WAX**—
Gothenburg, 1 t. 2 c.
- WHITE LEAD**—
Amsterdam, £662.; Antwerp, £70.; Christchurch, £315.; Calcutta, £199.; Colombo, £960.; East London, £401.; Malta, £192.; Marseilles, £14.; Melbourne, £611.; New York, £420.; Pt. Elizabeth, £124.; Pt. Swettenham, £5.; Rangoon, £379.
- ZINC SULPHATE**—
Havre, 10 bgs., £22.

MANCHESTER.

Week ending December 3.

AMMONIUM CARBONATE

Tunis, 5 cks.

CAUSTIC SODA

Alexandria, 274 drms.; Tunis, 105 drms.

LEAD ACETATE

Antwerp, 4 cks.

PARAFFIN WAX

Jaffa, 10 brls.

POTASSIUM BICHRIMATE

Alexandria, 6 cks.; Cairo, 8 cks.

RED LEAD

Beyrout, 6 brls.

SALAMMONIAC

Alexandria, 10 cks.

SOAP

Alexandria, 48 cs.; Famagusta, 3 cs.; Jerusalem, 2 cs.; Malta, 100 cs.; Papho, 4 cs.; Tunis, 123 cs.

SODIUM BICARBONATE

Alexandria, 3 cks.

MIDDLESBROUGH.

Week ending December 6.

AMMONIA

Antwerp, 23 t., £450.

AMMONIUM SULPHATE

Kobe, 788 t., £16,648.; Yokohama, 106 t., £10,309.

CAUSTIC SODA

Kobe, 50 t., £770.; Yokohama, 50 t., £770.

CHEMICALS (otherwise undescribed)

Calcutta, 7 t., £107.

COAL PRODUCTS

Benzole

Rotterdam, 25,865 gals., £6,548.

Carbolic Acid

Antwerp, 6 t., £446.

Naphthalene

Rouen, 22,000 gals., £2,152.

PITCH

Antwerp, 585 t., £1,902.; Rouen, 55 t., £2,201.

SALT

Beira, 3 c., £8.; Durban, 7 t., £338.; Straits, 20 t., £55.; Sumatra, 10 t., £34.

SODIUM BISULPHITE

Belawan, 3 t., £42.

WOOD PRESERVATIVE

Calcut, 10 c., £16.

NEWCASTLE-ON-TYNE

Week ending December 6.

RED LEAD

Bergen, 2 t. 10 c.

N. & S. SHIELDS.

Week ending December 6.

NIL.

SWANSEA.

Week ending December 6.

COPPER SULPHATE

Almeria, 20 t. 19 c., £900.

ZINC OXIDE

Bahia, 5 t. 7 c., £1,780.; Lisbon, 10 c., £43.

ZINC WHITE

Bahia, 4 t. 2 c., £209.

PRICES CURRENT.

THURSDAY, Dec 11, 1919

PREPARED BY MESSRS. HIGGINBOTTOM AND CO, 21, SPRING GARDENS, MANCHESTER.

The values stated are F.O.R. at makers' works, or at usual ports of shipment in U.K., unless otherwise specified
The prices in different localities may vary.

Acids:—		£ s. d.	
*Acetic 40% and 60%	... per cwt.	31/- & 46/-	
* " Glacial	... per ton	85 0 0	
Arsenic, S.G. 2,000°	... per ton	80 0 0	
Boric Crystals	... "	72 0 0	
*Fluoric	... per lb.	0 0 7	
*Muriatic (Tower Salts), 28° Tw.	... per carboy	0 7 0	
*Nitric, 80° Tw.	... per ton	32 0 0	
Oxalic	... per lb.	0 1 5	
Phosphoric, 1,750°	... "	0 1 9	
*Sulphuric (fuming, 70%)	... per ton	—	
* " (Pyrites, 168°)	... "	7 18 9	
* " (" 140°)	... "	4 10 0	
* " (free from arsenic, 144°)	... "	5 7 4	
Tannic (commercial)	... per lb.	0 2 6	
Tartaric (crystals)	... "	0 3 1	
*Acetone	... per ton	90 0 0	
*Alum, loose lump (delivered)	... "	16 10 0	
Alumina Sulphate (pure)	... "	16 10 0	
Aluminoferic (in slabs)	... "	8 10 0	
Aluminium (Ingot Metal, 98/99%)	... per ton	150 0 0	
*Ammonia, Anhydrous	... per lb.	0 2 0	
* " 880	... per ton	33 0 0	
* " 920	... per ton	20 0 0	
" Carbonate	... per lb.	0 0 7½	
" Muriate (grey)	... per ton	47 0 0	
" (salammoniac) 1st & 2nd,	per cwt.	80/- & 75/-	
" Nitrate	... per ton	60 0 0	
" Phosphate	... "	110 0 0	
" Sulphate (grey), London, net	...	—	
" " " Hull	...	—	
" " " Manchester	...	—	
*Aniline Oil (pure)	... per lb.	0 1 6	
Aniline Salt	... "	0 1 6	
Antimony	... per ton	45 0 0	
" (tartar emetic), 43/44%	... per lb.	0 3 1	
" (golden sulphide)	... "	0 1 3	
Arsenic, white powdered	... per ton	65 0 0	
Barium Chloride (in casks)	... "	22 10 0	
" Carbonate (native), 92/94%	... "	10 10 0	
" Sulphate (native levigated)	... "	£7 to £14	
Baryta Chlorate	... per lb.	0 1 1	
*Bisulphide of Carbon	... per ton	55 0 0	
*Bleaching Powder, 35%	... "	17 0 0	
* " Liquor, 7%	... "	8 0 0	
Casein (commercial)	... "	90 0 0	
Chromium Acetate (crystals)	... per lb.	0 1 0	
Calcium Chloride	... per ton	8 0 0	
China Clay (at Runcorn), in bulk	... "	70/- to 90/-	

Coal-tar Products and Dyes:—

Alizarine (artificial), 20%	... per lb.	0 2 0
Magenta	... "	18/- to 35/-
Anthracene, 40/50% A, f.o.b., L'don, per unit,	...	0 0 7
Benzol, 90's (naked)	... per gal.	0 2 0½
" 50/90's	... "	0 1 10½
Carbolic Acid (crude, 60°)	... "	0 2 3½
" (crystallised, 40°)	... per lb.	0 0 10
" Acid (pale liquid, 97/98%)	... per gal.	0 2 9
*Creosote (ordinary), naked	... "	0 0 6½
*Crude Naphtha, 30% at 120°C.	... "	0 0 9
*Grease Oils, 18° Tw. (naked)	... per ton	6 10 0
Pitch, f.o.b., Liverpool or Garston	... "	3 12 6
*Solvent Naphtha, 90% at 160°	... per gal.	0 2 9½
Copper	... per ton	101 0 0
" Sulphate	... "	40 0 0
Dross Salts	... "	39 0 0
*Glycerine (crude), 80%	... "	72 0 0
" (industrial, S.G. 1,260)	... "	110 0 0
*Iodine	... per oz.	0 1 0
*Iron Nitrate, 80° Tw.	... per ton	12 0 0
" Sulphate (copporas), delivered	... "	4 5 0
" Sulphide	... "	9 0 0
Lead: Foreign Pig	... "	40 10 0
" Litharge Flake	... "	51 0 0
" Acetate (white)	... "	84 0 0
" (brown)	... "	67 0 0
Lead, Carbonate (White lead), pure	... per ton	54 0 0
" Nitrate	... "	56 0 0

Lime, Acetate (brown)	... per ton	15 0 0
" (grey), 80%	... "	25 0 0
Magnesium Chloride	... "	15 10 0
" Carbonate (light)	... per cwt.	2 7 6
" Calcined (heavy)	... per ton	36 0 0
" Sulphate (Epsom Salts) (coml.)	... "	12 0 0
" (druggists)	... "	16 0 0
Magnesite Calcined	... "	22 0 0
Manganese, Sulphate	... "	75 0 0
" Borate	... "	110 0 0
*Methylated Spirit, 64° (industrial)	... per gal.	0 5 7
*Naphtha (Wood), Solvent	... "	0 10 0
" " Miscible, 60° p.	... "	0 10 6

Oils:—

*Cottonseed	... per ton	95 0 0
*Linseed, Raw	... "	98 0 0
Stearine, 115-120° M.P.	... "	105 0 0
Potassium, Bichromate	... per lb.	0 1 6
" Carbonate, 85%	... per ton	105 0 0
" Chlorate	... per lb.	0 1 0
" Hydrate (Caus. Pot.) 88/100%	per ton	105 0 0
" " 75/80%	"	95 0 0
" Potash Hydrate Liquid, 50° B ₃	"	65 0 0
" Nitrate (refined)	... "	55 0 0
" Permanganate (commercial)	per lb.	0 3 3
" Prussiate (yellow)	... "	0 2 1
" (red)	... "	0 5 6
" Sulphate, 90% (ex ship)	... per ton	25 0 0
" Muriate, 80%	... "	25 0 0
Silver (metal)	... per oz.	0 6 3½
Sodium (metal)	... per lb.	0 1 3
" Acetate	... per ton	50 0 0
" Arseniate, 45%	... "	45 0 0
" Borate (Borax), Crystals	... "	39 0 0
" Bicarbonate (2 cwt. bags)	... "	8 5 0
" Bichromate	... per lb.	0 0 11
" Carb. (Caustic Soda-ash), 48%	per ton	16 0 0
" (Alkali), 58% (bags)	... f.o.r.	6 10 0
" (Soda Crystals), (bags) car. pd.	... wks.	5 10 6
" Chlorate	... per lb.	0 0 6
" Cyanide (100% basis) for export	... "	0 0 11
" Hydrate (76% C. Soda) (f.o.r.)	... per ton	24 0 0
" (74% C. Soda)	... "	23 5 0
" (70% C. Soda)	... "	22 0 0
" (60% C. Soda)	... "	21 0 0
" (pure liquid, 90° Tw.)	... "	10 2 6
" 77/78% Powdered (99%) Hydrate	... "	24 10 0
" Hyposulphite (commercial)	... "	19 0 0
" Manganate, 25%	... "	65 0 0
" Nitrate, 96%, retd., f.o.r., L'pool	... "	21 0 0
" Nitrite, 100%	... "	61 0 0
" Phosphate	... "	32 10 0
" Prussiate	... per lb.	0 1 0½
" Silicate (glass) Alkaline	... per ton	12 5 0
" (liquid, 100° Tw.)	... "	9 10 0
" Sulphate (Saltcake), delivered	... "	3 10 0
" (Glauber's Salt)	... "	4 0 0
" Sulphide (conc.), 60/65% casks	... "	25 0 0
" Sulphite	... "	12 10 0
Sulphocyanide, Ammonium, 95%	... per lb.	0 2 0
" Barium, 95%	... "	0 1 4
" Potassium	... "	0 2 4
" Alumina	... "	0 0 9
Sulphur, (Flowers)	... Sicilian per ton	23 0 0
" (Roll Brimstone)	... "	22 10 0
" Brimstone (best thirds)	... "	13 10 0
" (ex ship)	... "	13 10 0
Tallow	... "	105 0 0
Tin Crystals	... per lb.	0 2 2
" English Ingots	... per ton	307 0 0
Titanium, Potass. Oxalate	... per lb.	0 1 6
Titanous Chloride	... per cwt.	4 0 0
Zinc (Spelter)	... per ton	53 10 0
" Powder, 88/92%	... "	75 0 0
* " Chloride (solution, 102° Tw.)	... "	23 0 0
" Sulphate, Crystal	... "	21 0 0

* Packages extra or returnable; otherwise, prices usually include packages.

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CURRENT TOPICS.

WHITLEY COUNCILS.

IN the turmoil of the many industrial disputes of late, not much has been heard of the Whitley Councils. Yet it is a little incongruous to remember that Whitley Councils were brought into existence for the specific object of preventing industrial disputes. A considerable sum of money has been spent on propaganda work, and with a view to obviating overlapping, the Industrial Reconstruction Council has amalgamated with the Industrial League, both bodies carrying out more or less similar work. It is, perhaps, to underrate the work of Whitley Councils to suggest that there has been a period of greatest activity as regards labour unrest since they first came into existence, and we would not by any means suggest that this is cause and effect. The contrary might legitimately be claimed to be the case, for there is little doubt that Whitley Councils have, in many industries, been the means of composing disputes between employers and employees in an amicable manner. It is stated that there are now 53 industries in which Whitley Councils are operating, and admittedly their work has been all to the good. The weakness of them, however, as we have already said in connection with the Industrial Courts Act, is that they are entirely voluntary bodies, with no power to enforce their decisions. It is curious that public attention should only have been drawn to this feature within the last week or so, but the Whitley Councils themselves have recognised the fact long ago, and the employers, at any rate, have not hesitated to express their dissatisfaction at that state of affairs. It lies with the parties, of course, to agree to make their decisions binding so far as they are concerned, but even that is not so easy as it might at first sight appear, unless the whole of a trade—both employers and workpeople—are represented on the committee. That is not often the case; and suppose, for example, a dozen employers are not represented in the trade association, although employing men who are members of the trade union represented on the Whitley Council, how can the Whitley Council enforce its decisions on these employers? Ironical though it is, the only way would be for the men to strike, and for a strike to be the medium for enforcing the decision of a body constituted primarily to promote industrial peace would, we fancy, be a state of affairs hardly to be found even in a Gilbert and Sullivan opera. Therefore it is clear that if Whitley Councils are to be effective some means must be found for making

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their decisions binding. We do not think the suggestion that if 75 per cent. of a trade—both employers and employees—agree, the remaining 25 per cent. should be compelled by legislative enactment, will meet the case. Coercion will never be popular, no matter where it is tried, and as things stand it appears that the first step to be taken is to give full effect to the motto of the late Industrial Reconstruction Council, "Every employer in his trade association; every workman in his union." Given this state of affairs, then it would become an easy matter to make the decisions of a Whitley Council binding, although, even so, no penalty could legally be imposed for infringement. However, that would be an appreciable step forward and might lead the way to some form of legality being given to such decisions.

THE WORK OF THE GOVERNMENT LABORATORY.

THE report of Sir James J. Dobbie on the work of the Government Laboratory for the year ended March 31, 1919, has just been issued. The total number of samples examined in the course of the year, including those dealt with at the outport chemical stations, was 289,180, as compared with 269,118 in the preceding year—an increase of 20,062. The number of samples of beer and brewing materials tested for arsenic was 1,249. Of these eight were found to contain arsenic in excess of the limits suggested by the Royal Commission on Arsenical Poisoning—namely, the equivalent of one hundredth of a grain of arsenious oxide per pound in the case of solids, or per gallon in the case of liquids. Of 205 samples of malt and sugar tested, none contained arsenic in excess of the limits. 966 samples of beer and wort examined were also free from arsenic. The samples in which excess of arsenic was found consisted of salts and solutions proposed to be used for treating brewing waters, but in no case was arsenic in excess of the Royal Commission limits found in samples of beer made with water so treated. Samples of wood naphtha and of mineral naphtha, intended for use in the preparation of methylated spirit, to the number of 765 were examined. The naphtha represented by 743 of these samples was approved as fit for methylating purposes, whilst that represented by the other 22 samples was found to be unsuitable. The number of samples examined again shows a decrease as compared with those of last year, which numbered 877. The decrease is largely due to the current high prices and the consequent falling off in the quantity of "mineralised methylated spirit" used for heating and other purposes. In connection with the use of pure and specially denatured alcohol in manufacturing operations, 192 samples of petroleum, ether, and other denaturing substances have been examined, as well as 22 samples of pure alcohol and 36 samples of specially denatured alcohol. With the object of preventing the illegal use of methylated spirit in making tinctures, essences, perfumes, and medicinal preparations, 25 samples taken from manufacturers and retailers were examined, in addition to those taken under the Export Tincture Regulations. For the purpose of controlling the use of duty-free methylated and other denatured spirit in connection with manufacturing operations, 515 samples of recovered spirit, residues from stills, articles manufactured with industrial spirit, and preparations containing such spirit were examined. More than one thousand papers were dealt with relating to applications received by the Commissioners of Customs and Excise, either (1) in respect of claims for rebate on alcohol used in making medicinal preparations, or (2) in connection with per-

mission to receive methylated spirit and other forms of duty-free alcohol for use in manufactures, tuition, and research. In the former instances advice was required as to whether the claims in question were such as could properly be allowed under Section 4 of the Finance Act, 1918. The other references were sent chiefly for advice as to whether the purposes to which it was proposed to put the alcohol were, from the chemical point of view, such as to justify the granting of the particular indulgence asked for. The imports of matches in 1918-19 though larger than in the previous year, were still much below pre-war level, and only three samples were submitted under the "White Phosphorus Matches Prohibition Act, 1908," in none of which was any evidence of the presence of white phosphorus discovered. Twenty-six samples of sheep dips were received for examination in connection with applications by manufacturers for inclusion of their preparations in the official "Schedule of efficient dips." Before the Board of Agriculture give their approval to any dip they must be satisfied that the formula provides for a sufficient quantity of a recognised active ingredient and that the dip has been made in accordance with the formula. In 15 cases the samples were found to agree with the formulæ, and were of effective strength at the proposed dilution; six were deficient in active ingredients at the dilution submitted by the makers; in the remaining five cases the formulæ required modification to ensure an efficient dip. Four samples of approved dips obtained in different parts of the country were also examined with the object of ascertaining whether the dips as sold or used correspond in composition with the samples which had received the Board's approval. The analyses showed that one of these had not been prepared according to the formulæ previously submitted and approved. In the course of the year numerous matters were submitted by the Board of Agriculture for report. Many of these related to the value of materials supplied as feeding-stuffs, and to the supply of potash and phosphatic manures. The official method for the determination of potash in fertilisers has been revised and a new method drawn up for use in the case of flue dust. The samples taken by the Customs under the Exportation and Importation Prohibition Regulations were of great variety, and included such materials as soap, disinfectants, printing ink, ceramic colours and glazes, lubricants, pitches, rubber solutions, metals, paints, varnishes and ships' compositions, polishes and stains, coal tar oils, metallic capsules, soldering fluxes, waxes, and medicinal preparations and drugs. Most of these were examined to ascertain whether the conditions of the licence for export were complied with. For example, when glycerine was so urgently required for munitions the proportion of glycerine in soap was not allowed to exceed a certain limit, and similarly the proportion of pure carbolic acid or phenol in disinfectants was confined within certain limits. Many of the materials exported had to be examined for one or more constituents, the exportation of which it was desired to restrict, and it was frequently necessary to devise new processes for their determination. The samples under the Fertilisers and Feeding Stuffs Act were submitted by the Board of Agriculture and Fisheries in connection with applications by local authorities for the consent of the Board to proceedings against the sellers. The number of samples received was 11, consisting of five fertilisers and six feeding stuffs, against 20 in the previous year. The fertilisers consisted of superphosphate, basic slag, and sulphate of ammonia.

ELECTROLYTIC FORMATION OF PERCHLORATE FROM CHLORATE.*

By J. GUILFOYLE WILLIAMS, B.Sc. (LOND.), A.I.C.

IN order to convert sodium chlorate into perchlorate electrolytically, the following conditions are laid down by Winteler (*Chem. Zeit.*, 1898, 22, 89): (1) Low temperature at anode (artificial cooling). (2) Acid solution at anode. (3) Current density of 4—12 amps. per dm². (4) High concentration of chlorate. This is given by Allmand as being applied industrially by electrolysing a 60-70 per cent. chlorate solution between an iron cathode and a smooth platinum anode at a temperature of 10° C., this being maintained by cooling coils. The voltage per bath is given as 6.5—7.0 volts, and current density 8amps. per dm². Good liquor circulation is necessary, and the chlorate liquor charged is slightly acid. The resultant current efficiency is about

iron cathode, smooth platinum anode, cooling coil, and efficient liquor mixing arrangements. The current was measured by the ammeter to the series, and the voltages were measured on each bath.

(1) Four baths were filled with chlorate liquor and hourly readings taken of the temperature and amperage. Voltages were taken between the anode and cathode contacts at different periods of the electrolysis. The amount of perchlorate produced was estimated by the fall in chlorate concentration. To eliminate errors due to evaporation the baths were kept filled to a standard level by the addition of distilled water. One ampere is taken as converting 1.986 grammes NaClO₃ to NaClO₄.

The results are given in the following table:—

AMPERES THROUGH BATH.	BATH LIQUOR.					BATH LIQUOR.					BATH LIQUOR.					BATH LIQUOR.				
	Av. Temp. C.	NaCl. g/l.	NaClO ₃ g/l.	% EFF.		Av. Temp. C.	NaCl. g/l.	NaClO ₃ g/l.	% EFF.		Av. Temp. C.	NaCl. g/l.	NaClO ₃ g/l.	% EFF.		Av. Temp. C.	NaCl. g/l.	NaClO ₃ g/l.	% EFF.	
—	—	3.3	627	—	—	—	3.2	625	—	—	—	3.4	620	—	—	—	3.4	622	—	—
13070	35.5°	2.4	512	104.8*	—	44.5°	2.7	515	100.0	—	49.5°	3.2	510	100	—	57.5°	3.5	528	85.7	—
13040	33.5°	2.3	402	100.2	—	41.5°	2.8	405	100.0	—	51.0°	3.6	410	91.2	—	58.5°	3.6	420	98.5	—
25220	31.0°	2.3	190	101.0	—	41.5°	2.8	202	95.6	—	50.0°	3.8	222	88.7	—	59.5°	4.6	230	89.5	—
10500	31.0°	2.1	108	92.7	—	40.5°	2.6	118	95.0	—	50.0°	4.0	153	78.0	—	60.0°	4.8	134	108.6*	—
10400	31.0°	2.3	37	81.0	—	41.0°	2.5	37	92.4	—	50.0°	3.8	60	106*	—	60.0°	4.4	62	82.1	—
9430	—	0.76	1.3	—	—	40.0°	1.5	3.8	42.6	—	50.0°	2.3	6.1	69.0	—	58.5°	3.9	18.6	55.6	—
3550	—	0.60	1.3	—	—	41.5°	1.06	1.05	—	—	51.0°	2.24	1.9	—	—	59.0°	3.6	5.4	44.2	—
81640	—	—	—	—	—	41.5°	—	—	90.4	—	50.0°	—	—	89.4	—	59.0°	—	—	86.0	—
AV. VOLTS ACROSS BATH = 6.4						AV. VOLTS ACROSS BATH = 6.1					AV. VOLTS ACROSS BATH = 5.6					AV. VOLTS ACROSS BATH = 5.1				

*DUE TO ANALYTICAL ERROR.

100 per cent. at first, but it slowly falls, and the average current efficiency is about 85 per cent. For the production of one kilo of perchlorate 3.5K.W.H. is consumed. The oxygen evolved during the later stages of the reaction contains much ozone.

My experience of present-day practice shows that this description requires modification. The temperature of the electrolysis is initially about 30° C., and the current density about 45—50amps. per sq. dm². The solution used is about 600—700 grammes per litre NaClO₃. As the chlorate content falls below about 100 g/l NaClO₃ the resistance of the series of baths increases considerably, and at 50 g/l the current density is about 30amps. per dm² and the liquor temperature about 45°—50° C. Ozone is not given off in appreciable quantities until the chlorate concentration is below 10 g/l; as the chlorate content gets below 5 g/l the smell of the ozone is almost overpowering, and, if breathed much, produces pains and continuous coughing. The liquor charged should certainly not be alkaline to any appreciable degree, but no advantage is served by acidifying the liquor. This will clearly be seen from experimental work below. The current efficiency given by Allmand is a very low one considering the lowness of temperature of his electrolysis. Under normal conditions of electrolysis, as given above, the average efficiency is 85 per cent., or even above.

Experimental.—These experiments were carried out on an industrial type of bath of about 250 litres capacity,

The results given in brackets in the fourth line down represent the chloride values after about another 12,000amps. had passed. The analyses were all routine factory determinations, and so not of abnormal accuracy.

On examination the following facts are evident:—

(a) Up to 60° C. the current efficiency of perchlorate electrolysis does not fall off rapidly. The figure of 85 per cent. for 10° C. given by Allmand is obviously very poor practice. It has been stated that the conversion practically stops at 80° C.; this has not been tested, but the above results do not seem to confirm this.

(b) The factory average for production of 1 kilo of perchlorate was about 3.6K.W.H. Allmand gives 3.5K.W.H. On the above figures it is 3.4K.W.H. at 41.5° C., and 3.0K.W.H. at 59° C. Electrolysis at higher temperatures than at present used gives higher production per unit of energy.

(c) The chloride content of the bath tends towards an equilibrium dependent on the temperature. This is roughly:—

- 2.3 g/l NaCl for 31° C.
- 2.8 g/l NaCl for 41.5° C.
- 3.8 g/l NaCl for 50° C.
- 4.7 g/l NaCl for 59° C.

This probably represents an equilibrium between decomposition of chloric acid at the anode with formation of chloride ions, and elimination of these by this discharge to form hypochlorite ions. The discharge of chloride ions wastes current, and also causes the trouble given below.

*A paper read before the Faraday Society London, on Monday.

(2) Neutral or acid chlorate liquor charged to a bath very quickly becomes alkaline to phenolphthalein. The alkalinity is of the order of 1.0 g/l; it is due to hypochlorite produced by chloride ion discharge and, as will be seen from the above conclusions, it is an inevitable part of the process. The effect of adding acid was tried.

(a) Acid was added to baths—50c.cs. of concentrated acid diluted with water—once a day. Any increase in efficiency would have been detected by the more rapid fall in chlorate content compared with a normal bath. No increase in efficiency was noticeable, and after about two hours the bath again becomes alkaline.

(b) Frequent addition of acid was now tried. Baths at 30° C. and 60° C. were taken, and 10c.cs. of acid (diluted to 100c.cs. with water) added. Below are given the liquor analyses at different periods of the electrolysis:

	Bath Temp.	NaClO ₃ .	NaClO ₃ .	NaClO ₃ .
Acid.....	30	562	23	—
No Acid.....	30	565	26	—
Acid.....	60	567	82	46
No Acid.....	60	565	97	65

At 30° C. the addition of acid seems to have no effect. But at 60° the efficiency was increased by 4.6 per cent.

Conclusion.—The production of perchlorate by electrolysis is considerably improved if a higher temperature of liquor is maintained, and the frequent addition of acid improves still more this efficiency. During electrolysis chloride is produced, and there is an equilibrium value for each temperature.

THE THICKENING OF LINSEED OIL

AN interesting paper on "The Effect of Heating Linseed Oil under Pressure and its Bearing on 'Litho' Oils" was read by Mr. S. Coffey, B.Sc., at a meeting of the Nottingham Section of the Society of Chemical Industry, held at University College, Nottingham, last week.

The author said that the probability that linseed oil polymerises on heating has been shown by Fahrion (*Z. angew. Chem.*, 5, 171, 1892) and Fokin (*Augsb.-Seifens-Ztg.*, 34, 821). Ingle (*J. Soc. Chem. Ind.*, 30, 344, 1911) noted an increase in the density, and a decrease in the hexabromide value and iodine absorption. Morrell showed the presence of a portion insoluble in acetone in oil which had been thickened from 260° to 280° C. Further, Krumbhaar (*Chem. Zeit.*, 40, 937, 1916), who heated the oil for shorter times to higher temperatures, noted increases in viscosities and acid values, but constancy of the saponification value. Friend (*J. Chem. Soc.*, 111, 162, 1917) has also studied some physical constants of oil which had been thickened at various temperatures by Morrell.

The author of the present paper used a somewhat different method of thickening the oil. The samples were heated in a sand bath in sealed tubes, and therefore under pressure for varying periods up to 42 hours. In contradistinction to the results in open vessels, the colour grew lighter instead of darker, and the acrid odour of acrolein did not develop. The drying qualities of the oil were unaltered. The density increases to nearly 0.99 after 42 hours' heating, and the viscosity, as determined by Poiseuille's method, to about 50 times the initial value. The free acid reaches a limit at about 2½ times

the initial value, instead of increasing to 40 times and apparently without limit, as in the open-tube experiments of Krumbhaar. There is a marked increase in the rate of increase of these constants after about 21 hours' heating. After the same time a small portion becomes insoluble in acetone, and this portion rapidly increases on further heating. The unsaturation, as shown by the iodine absorption, diminishes continuously.

The theoretical interpretation of these results is based on the hydrolysis of a portion of the oil by the small amount of water unavoidably present in commercially pure raw oil direct from the presses. The explanation also requires a progressive polymerisation of the acids present in the glycerides, with formation of less saturated di-acids, etc. The differences mentioned above will, on the whole, be those which distinguish the "thin" and "strong" varnishes of the "litho" oil and varnish industries.

THE GOVERNMENT'S NITRATE PLANT.

SPEAKING at the annual dinner of the Association of Managers of Sewage Disposal Works, on Thursday (December 11), Dr. S. Rideal said the Ministry of Munitions Inventions Department had succeeded during the war in obtaining a grant of £4,000,000. from the Treasury to put up a plant for the manufacture of nitrates from the air. A site had been secured, engineers employed to design a plant, and some hundreds of thousands of pounds had been spent on this particular work. Before the expenditure had been sanctioned there had been an understanding that the money would be spent upon works which would be useful not only in war-time but after the war, because there was a shortage of fertilisers for growing our foodstuffs in this country. He was sorry to say, however, that the Government were now advertising what remained of these works for sale; it was really a great shame and a shocking waste of public money. It was being developed on a gigantic scale, and had been thought out by a lot of young chemists, engineers, and the inventive staff of the Ministry of Munitions, trying to imitate the Germans, who relied entirely on this artificial nitrate during the war, because no nitrate could come from Chili, and the Germans did not make any nitrate from sewage. At the time of the French Revolution, 100 years ago, nitrate was made in Paris from sewage and used for explosives purposes. If it could be done 100 years ago it could be done now, but, at any rate, there had been this large wasted expenditure upon the attempt to make nitrates from the atmosphere, which had been abandoned in the manner he had mentioned.

PATENT LAW.—At the annual general meeting of the Inventors' Union in London on Monday, it was decided to ask the Government to consider the creation of an All Empire Patent to replace the present system, which entails an initial outlay of several hundred pounds to secure protection in Great Britain and the Colonies. The following resolution was also passed: "That this Union strenuously opposes the whole of Clause 8 of the Patents and Designs Bill, as from the actual experience of their members the evasion of paying the first inventor and patentee royalties for any invention secretly submitted to or tried by any Government Department is open to the greatest abuse and danger of corruption; and if this clause is passed as drawn, the Union will have to advise all inventors to avoid in future submitting any of their inventions to the Government at all."

THE TRANSPORT AND DISTRIBUTION OF LIQUIDS IN CHEMICAL WORKS.

THE Chemical Engineering Group of the Society of Chemical Industry held its second Conference at Armstrong College, Newcastle-on-Tyne, on Monday, the subject being "The Transport and Distribution of Liquids in Chemical Works." A number of papers were read and discussed.

Professor Henry Louis, D.Sc., who presided at the afternoon session, said his first duty was to welcome the Conference to Newcastle in general and to Armstrong College in particular. He did not need to remind them that Newcastle had been the pioneer of not a few chemical industries in the past, and was still holding its own with most other parts of the country. When the much-needed expansion of the College took place, as he hoped it soon would, he was very anxious that a home should be found for Chemical Engineering, or whatever term they might give the subject. He did not doubt but what the authorities were giving serious attention to the matter. He regretted to say that a telegram had been received from Professor T. W. Hinchley, chairman of the Chemical Engineering Group, stating that it was impossible for him to attend owing to illness, but he wished the gathering every success. The subject selected for the Conference, continued Professor Louis, was one of the greatest importance to everyone connected with chemical engineering. The problem of elevating liquids was one of the oldest the engineers had had to solve. The simple problem of water pumping might be said to have been fairly well solved by mechanical engineers. Chemical engineers, however, had a more difficult problem before them. He was beginning to appreciate that mechanical methods must be introduced into chemical works, which had grown chiefly by the work of chemists themselves, but in some instances—especially in that district—engineering had been conspicuous by its absence. The cost and the scarcity of labour were making it necessary for the chemical engineer and industry generally to employ more and more mechanical methods of doing work, and abandoning what a shipbuilding friend called "man power and profanity." (Laughter.) For the special subject being dealt with by the Conference the need was remarkably conspicuous. The problem had occupied some of the best brains in the country, and the way in which it had been attacked and the measure of success achieved were indicated by the specimens of chemical engineering before them, and would be further elucidated by the papers to be read during the Conference.

The first paper was by Mr. J. Arthur Reavell, M.I.Mech.E., on

"THE ELEVATION OF ACIDS BY THE KESTNER AUTOMATIC ELEVATOR."

Mr. Reavell said the object of the paper was to describe the principles upon which the two standard types of Kestner patent elevators worked. The first consisted of an elevator which worked intermittently. As soon as the elevator body was filled with acid the acid was discharged by means of compressed air. The admission of the compressed air was automatic and was controlled by a patent valve arrangement. The moment the body was filled with acid compressed air was admitted through the valve in the valve box and the acid dis-

charged through the delivery pipe. Immediately the elevator was empty the air inlet valve was closed and the exhaust valve opened, and atmospheric pressure was at once restored. That allowed a further charge of acid to enter the vessel. That type of elevator could be obtained in potware, cast iron, regulus, or, in fact, any material to suit the type of acid to be pumped. The object of the apparatus was to replace the ordinary hand-operated egg.

The other type was the Kestner patent continuous elevator, which delivered a continuous supply of acid against a given head—say, for instance, for the delivery of acid through jets or sprays. That was accomplished by means of a duplex body, each body filling and emptying alternately. The control of the air to the one body and the exhausting of the air from the other was effected by means of a simple device consisting of a rotary valve. The rotary valve was made in potware, and was so arranged that as soon as one body was full of acid compressed air was admitted, so that it immediately commenced discharging and, at the same moment, the other body ceased discharging acid and commenced to refill ready to come into operation.

The automatic elevators, said Mr. Reavell, should not be confused in any way with Kestner pumps either of the plunger or centrifugal type.

Captain C. J. Goodwin, in the course of the discussion, said he would like to ask why, in presenting the paper, Mr. Reavell had not given more useful information as to the actual working results; that was to say, the amount of air used to the cost of the operation. That was a matter of the utmost importance. They were not so much interested in the description of the elevator as they were in the results obtained. He would like to ask Mr. Reavell whether he had tried or whether experiments had been made in using compressed air expansively. He (Captain Goodwin) considered that when it was required to raise only 15ft. or 20ft., and, as was usual, 60ft. or so was the standard pressure, the air supply was not being used economically. Was it not possible to arrange a device on the elevator to use only part of the air, allowing it to act expansively, and so save air? It seemed to him that in the Kestner elevator there would always be a loss at the finish of the blowing period. He would like figures as to the percentages of air lost in that way. He thought that some figures as to cost in £. s. d. of pumping liquids by an acid elevator would be very useful. He was also interested to know how the acid elevator compared with the air-lift in actual practice. His own experience was that air-lifts were very reliable, even though there was a little to give in regard to efficiency.

Mr. Reavell replied that the difficulty in giving the information as to cost would be realised by those dealing with acid works. One could not get the average acid manufacturer to allow tests to be made. The figures in one's own laboratory did not help in the matter. The trouble was that the greatest difficulty was experienced in getting the piping put up right. If the pipes were put up right they would probably get a very high standard of efficiency with the use of compressed air. When the pipes were put up horizontally one was certain to get a loss of air. Regarding the differences of pressure required and available, one started at zero, and when the balance pressure was reached the pressure slightly increased by about 10 per cent. Because there was 80 per cent. available to come on to the valve, 80 per cent. was not delivered, but just sufficient according to the rate pumped. A reducing valve was not needed in his opinion. The acid elevator should not be filled slowly, but quickly, to get quick motion. In any type tried, one would get a certain loss of air.

Captain Goodwin asked if that was why they liked to pre-heat the air.

Mr. Reavell replied that that was so. With regard to the air-lift and the acid elevator, as one of the first to introduce

the Bacon air-lift from America, he thought there was no comparison in efficiency. That was his experience.

Mr. S. J. Tungay said that a difficulty had always been in the fact that the engineering side did not meet the demands of the chemists. Twenty or thirty years ago it would have been impossible to get such articles manufactured as were seen there that day. As a matter of interest, he added that 15 years ago he had seen centrifugal pumps made of stone. Despite the criticism of the old methods of pumping acid, he thought there was still a great deal to be said for them. He had not adopted the Kestner or similar types. One reason was that whatever the men were in other parts of the country, his experience was that to-day they were not willing to do the work of replacing the various parts. The plumbers objected to coming out specially to a job, and insisted that plumbers should be kept on the place at all times.

Mr. Reavell said that they had a simple arrangement which ensured that there was absolutely no waste by splashing. With regard to the question as to whether the delivery pipe was exhausted every time, he replied that when the pipes were put in right there was no trouble whatever. Regarding the ability of the plumber to deal with the valve, he really thought it was not asking too much even of the modern plumber. (Laughter.)

Mr. R. A. Pelmore, B.Sc., then read a paper describing

"THE AVAMORE 'SQUEEGEE' PUMP."

The subject of the brief paper, said the author, is the invention of Mr. N. G. Beckwith, to whom credit is due for an original idea of great utility and one which cannot fail to be appreciated in our great chemical industries. Most particularly is this the case owing to the essential simplicity of construction, which is so important for dealing with a wide range of chemicals when it is not always possible to provide metals free from corrosion and suitable for sound and practical machine construction.

The outstanding requirements for pumping chemicals, in addition to the usual desired features of good efficiency and high speed, are (1) reliability, (2) rock-bottom simplicity for rapid overhaul, (3) easily replaceable parts, (4) minimum corrosion and leakage, (5) positive action without priming. The general operation of the pump was briefly described.

A rotor, consisting of a disc loosely mounted on an eccentric on the shaft, rolls round the inside of the pump casing. No sliding takes place between the casing and the rotor, but rolling motion is imparted to the rotor, which turns round the eccentric, the latter acting as a bearing. At the top of the casing a metal piece, usually with some spring tension behind, works up and down in a slot, keeping contact at all times with the rim of the disc. Inlet and outlet ports are immediately to right and to left of this metal piece or valve. "Squeeggee" action drives the liquid round in front of the rotor, which, being sealed from the suction side by the valve piece, is driven through the delivery port, while at the same time liquid follows behind the rotor through the suction port. This is the whole action of the pump.

The constructional simplicity and the restriction of the principal wearing surfaces to the bearings, as well as the absence of valves, without sacrificing the positive action or the ability to run without priming, make a pump of extraordinary reliability. The pump in question has been sold for ammoniacal liquor, petrol, tar, creosote, linseed oil, sugar molasses, chlorine water, etc. For strong acids and other highly-corrosive liquids the pump involves an upkeep in money, and, what is usually more important, time, less than any other positive pump known.

Mr. J. A. Reavell said the paper appealed to him, as he had done a certain amount of experimenting on apparatus

very largely on the same principle. The trouble was then a question of lubrication. He would like to hear Mr. Pelmore's remarks on that point for his pump under normal conditions.

Mr. Pelmore said that in the ordinary way the lubrication was ordinary water lubrication. They had had one running six months, and the wear was imperceptible. They had used them for pumping petrol, and, although less lubricating than water, it lubricated itself. It ran at 1,000 revs. per minute, or 1,000 gals. per hour. They had run it at 1,800, and the water film had been quite sufficient. For sea-water, they had successfully used a special metal for preventing galvanising action.

Mr. F. R. Lowe asked what was the clearance between the rotor. Many people had to deal with large quantities of liquid in which they were not certain that small bodies would not be in suspension. His experience was that under such circumstances pumps would not work on the "squeeggee" principle.

Mr. Pelmore said that they had run the pump on sandy water, and the tests were done without rubbers. He thought the rubber would deal with the sediment. It would not matter if there was a negative clearance.

Mr. Lowe: Then you are going to have excessive wear.

Mr. Pelmore replied that if one kept on getting a good deal of matter in suspension it might affect the life of the rubber, and all that would mean was that one could get it retired. If constantly dealing with sandy materials it would be wise to provide spare rotors, and if one showed wear after a year or so it could be sent away to be re-rubbered and the spare put on. The fixing of the spare was a very simple operation. If they brought up the question as to whether with highly corrosive as well as sedimentary liquids it would wear so well, he would be inclined to reserve his answer until experiments had been made with corrosive sediments in liquid.

Mr. F. Cunliffe said he had had experience with rotary pumps, and found that whilst the pump might work well with hot liquids it lost when working with cold liquids.

Mr. Pelmore suggested that in such a case the adjustment should be made to the highest temperature they expected to get. The effect would be a slight diminution in efficiency in running on cold liquor and the maximum on hot.

Captain Goodwin said at the risk of repetition he would like to express the hope that there would be an addendum to the paper on the figures of efficiency.

Mr. Pelmore said that, regarding efficiency, the small pump worked out at 55 per cent., but he believed that efficiency would be increased by a small motor running on high speed. The pressure on the glands affected the power so much that the readings were not within reasonable accuracy to give out the real efficiency. As the pump was increased in size, that factor would become almost negligible.

Mr. R. A. Stewart asked whether the pump was adapted to the pumping of gas. There was a great need for rotary machinery for gas such as SO_2 , and he did not think there was anything yet to fill the bill. If the "squeeggee" pump would pump chlorine or SO_2 there was a great future for it.

Mr. Pelmore said that he hoped the idea would be developed, but obviously for success in that direction lubrication was the key to the situation. Until that problem was scientifically solved he should say the machine was not suitable for gas. He thought the principle so simple and ideal that it would be a great pity if sufficient ingenuity could not be found to solve the problem of lubrication.

Mr. H. Jackson asked what was the greatest head used in the pump.

Mr. Pelmore replied that he thought 183 ft. was the highest they had used, though they did not confine themselves to that. As it went beyond a certain point there was a certain amount of leakage, as in every pump.

Mr. S. J. Tungay read the following paper on

"CENTRIFUGAL PUMPS FOR SULPHURIC AND NITRIC ACIDS."

Of all methods of lifting sulphuric acid, said the author, perhaps none has received greater attention, during the last few years, than the adaptation of centrifugal pumps. This is doubtless accounted for as a result of the difficulties encountered in the case of pumps of other types, mainly through valve troubles. It is a well recognised fact also that a small centrifugal pump will deal with very large quantities of liquid, whereas for handling the same quantity of liquid by

means of a plunger or piston type of pump, a machine of very much larger bulk would be required.

The Haughton Co. have, for some years past, greatly improved the design of regulus metal pumps and Ironac metal pumps for the lifting of acids to considerable heights, and for the feeding of Glover and Gay-Lussac towers in sulphuric acid works. One of the more modern types of double-stage regulus centrifugal acid pumps is designed for lifting sulphuric acid to a maximum height of 100 feet. There is only one gland, and this being on the suction side, there is no fear of leakage of acid at the gland whilst the pump is at work. The pump shaft is fitted with two ring oiling bearings, and is also fitted with ball thrust bearing, so as to take the thrust due to the weight of the head of acid. The incorporation of suitable thrust bearings is a point which many of the earlier designers overlooked when designing pumps for pumping acids to a considerable height, with the result that considerable friction occurred on the pump shaft when working at full speed and heating up of the bearing often resulted. On the pressure side in this pump there is no gland, but simply an enclosed bearing which is maintained full of lubricant from a grease cup. This pump, when lifting sulphuric acid to a head of 75 feet, consumes 1.9h.p., and works at 2,460 revs. per minute.

A centrifugal pump which has been remarkably successful for pumping nitric acid is constructed entirely of "Ironac" acid-resisting iron, with the exception of the bed plate, and possesses some rather unusual points. I believe it to be one of the only pumps, apart from earthenware or pottery pumps, in use for nitric acid and nitro bodies. Arranged with an end suction, the impeller and spindle are in one piece. A long stuffing box and sleeve are adopted, and oil grooves machined in the spindle and kept filled with ceresine wax lubricant prevent any trouble from leakage at the gland. The spindle is supported by two bearings, each of these being ball bearings and totally enclosed, enabling the pump to be run at comparatively high speeds with a minimum of friction or wear and tear. The use of this pump for nitric acid was early recognised by Mr. K. B. Quinan, who had some of them installed for lifting nitric acid at the Government explosives factories.

Some of these small pumps fitted at the Greetland Factory raised 85 per cent. nitric acid to a height of 60 feet continually at temperatures up to 125° F. Five pumps which were fitted pumped 22,000 tons of nitric acid without any expenditure for maintenance. Although the machine itself is of such small dimensions, these are lifting 240 tons of nitric acid per 24 hours in many works. During the war this pump was very widely installed both in this country and in the munition works of our Allies, where it has earned an excellent record for pumping nitric acid and liquors containing nitric acid.

Mr. H. Jackson said he would like to ask how the glands stood.

Mr. Tungay said they had many pumps working nitric acid with a head of 85 feet, and they had no trouble with leakage. With the grooves used the actual pressure reaching the glands was very slight. He found no difficulty with leakage when the pumps were lying idle.

Mr. Jackson said that his experience, though not with that particular pump, was just the reverse. He had always had considerable trouble with the glands.

Mr. Tungay said they had made special provision against that. With the old type of pumps considerable leakage occurred at the glands, but with the modern plant the glands were not subjected to the same pressure. There was no fear of leakage under modern conditions.

Mr. S. A. Wikner raised the question of pumping slurries. He remembered having to pump caustic soda in a process of causticisation. He had put it through a small centrifugal pump in which the space between the propeller blades was small and the particles choked it up. It was partially overcome by putting in a straining box. He did not see why the propellers should not always be wide.

Mr. Tungay thought there was no reason why they should not be quite wide and efficiency be attained. He had used the centrifugal pump for copper sulphate and other liquors with crystals and had no difficulty at all.

Mr. A. Rudge asked whether iron was suitable for the centrifugal pump.

Mr. Tungay replied that if he was referring to cast iron, it was a very ambiguous quantity nowadays.

Mr. Reavell remarked that just before the war Mr. Kestner had patented and developed a direct-action pump with a definite clearance, and it was a perfect success. The leakage was one or two drops per hour. He knew the metal was all right, as Mr. Tungay had made it. The pump was so successful that the Germans when occupying Lille took two truckloads of them to Germany, the whole of the patterns, and all the detailed drawings.

After an informal dinner at the Central Station Hotel the evening session was commenced under the presidency of Prof. P. P. Bedson, of Armstrong College.

A paper was read by Mr. R. A. Stewart describing

"THE 'MARCLEN' PUMP."

In view of the convenience, compactness, and small number of working parts of the centrifugal or rotary pump, it is not to be wondered at that it has been for some time past adapted for the purpose of elevating acids. Most of the well-known makes, however, have one common defect—namely, a gland. It was after a wearisome and costly experience with various makes of pumps in regulus and so-called acid-resisting bronze, and stoppages caused by the destruction of the packing and consequent leakage from stuffing boxes, that the "Marclen" pump was devised.

This pump possesses certain features in common with other centrifugal pumps, but differs from them in being glandless. Essentially, it consists of a casing and a rotor or impeller with a vertical spindle. This method of construction has been adopted in order that glands may be dispensed with, and this is a great desideratum. Delay, expense, and other inconveniences in connection with the packing of glands are avoided. Moreover, friction is obviated, and this in itself is a great advantage, especially in the case of pumps made in regulus or stone-ware.

The casing, in one of the more simple forms of the "Marclen" pump, is suspended by means of bolts from a strong cast-iron frame resting upon girders lying across the acid tank in which the pump is placed, the bolts being covered with lead to prevent contact with the acid. The vertical spindle, which is also lead-covered up to the underside of the bottom bearing, extends upwards and revolves in bearings fitted in a strongly made cast-iron frame resting upon cross girders lying upon the acid tank in which the pump body is placed. The two bearings maintain perfect rigidity in the spindle, and prevent any tendency to "whip," whilst the thrust ball bearing at the top, and the collar under the upper bearing, make any vertical movement impossible. When the pump is working the acid is drawn in at the vortex, which is formed both at the top and the bottom, and is expelled from the annular duct in the casing upwards into a delivery pipe. The outlet from the casing may be, and is sometimes, tangential.

There is no limit to the size of the tank in which the pump is immersed, but in practice it is convenient to

place the pump in a small tank connected with a larger storage tank, in which case, should the latter be deeper, or on a higher level than the pump tank, the supply of acid to the pump is regulated by means of an ordinary valve, or a valve controlled by a float.

These pumps have been working for over two years with various corrosive liquids, including concentrated and dilute sulphuric and phosphoric acids and hydrochloric acid; also very strongly alkaline liquors, at the boiling temperature, containing a heavy sediment mixed with ashes. The following are some of the uses for which the "Marclen" pump is well adapted: The elevation of hot saline solutions to crystallising vessels; the removal of salts deposited from solutions undergoing evaporation; the emptying of caustic soda or sulphide of sodium finishing pots; and mixing liquids and solids in dissolving tanks. Employed for the last purpose, either outside or immersed in the dissolver itself, the "Marclen" pump imparts a vigorous agitation to the contents of a relatively very large vessel.

Prof. Bedson then vacated the chair owing to having to attend another engagement, and Mr. George Sisson took his place.

Mr. Tungay opened the discussion on Mr. Stewart's paper, and said he wondered whether Mr. Stewart had experienced any difficulty owing to the large diameter of the valve seat which had to be secured at the top end of the float. He had described a certain amount of revolving motion by the float, and it appeared to be one of the weak points. He also thought that Dr. Lunge had described a similar sort of pump suspended vertically in a tank of acid.

Mr. Stewart said that the pump had not yet been made with the particular valve in question, but it was working quite successfully in its original form. He had not seen anything like the Marclen pump, but after Mr. Tungay's remarks he would certainly look it up. When the pump was first made there was certainly no difficulty in getting a patent.

Mr. Reavell said it seemed to him that, with the exception of the float, the pump was practically the same type as one already constructed. During the war Mr. Kestner had built a large number of pumps of that type, the difference being in the float. It might be that he did not quite understand it, but he was rather at a loss to know what the float was for.

Mr. Stewart said the thrust-bearing and collar under the bearing was simply to prevent the vertical movement. The float was to deal with a big head of acid, which might be so great as to give the pump too much to do. He was not aware, excepting from what he had heard that night, that there was any pump on the same lines in use in the chemical industry.

Mr. H. M. Ridge remarked that he had used something like the same sort of thing before the war for the circulation of weak acids which had certain particular difficulties about them.

Captain Goodwin thought that in the discussion they were not quite doing justice to the design of the Marclen pump. The mere fact that it was on the market as a commercial proposition was something. Certain pumps of a similar character had been used in South Africa and America, but they were not exactly the same design. He thought the fact that the patent had been granted was sufficient to get on with the job of making them. Regarding the question of mixing, it might be of interest to mention that he had made use of a centrifugal pump for neutralising the contents of a large vat by drawing the liquid from the bottom of the tank and distributing by a feed pipe. He reduced the time for neutralising the contents of the vat by one-quarter of the time taken by the ordinary stirring gear.

Mr. H. Jackson said the pump appealed to him as it had no glands. He had a great deal of trouble in pumping sulphuric acid, as the glands were always leaking. He confessed it would be a long time before he would be persuaded to use a centrifugal pump with glands.

Mr. Stewart said he would never be persuaded to use a pump with glands again. One or two of the pumps they had had were much simpler than anything he had described

there. If he could take them to his works they would be struck by the efficiency. When a supply of acid was wanted the belt was put on and that was an end of it.

The chairman remarked that he had derived great pleasure from the discussion which had followed the reading of the paper.

A paper was read by Mr. J. H. West, A.C.G.I., A.M.Inst.C.E., on

"GENERAL TYPES OF PUMPING MACHINERY USED IN CHEMICAL WORKS."

Mr. West explained that his contribution to the Conference was only to describe and illustrate by lantern slides some of the apparatus for moving liquids in chemical works. He hoped at a later date to enlarge upon the subject and provide a complete paper.

Mr. West then proceeded to describe the following apparatus: The Evans' patent "Cornish" direct-acting horizontal steam pump; the Evans' duplex horizontal bucket type pump; Evans' "Reliable" fly-wheel horizontal steam pump; the "Reliable" piston valve horizontal steam pump; the "Premier" horizontal air compressor, with fly-wheel motion; a handy form of vertical fly-wheel single-ram steam pump; a horizontal three-throw pump; a motor-driven horizontal treble-ram pump; a large quadruple-acting horizontal ram pump; a motor-driven acid pump constructed entirely of lead-antimony alloy; the Ferraris acid pump, of Italian origin and of the vertical plunger diaphragm type; the "Premier" diaphragm pump; and the Ogden automatic acid elevator.

Captain Goodwin said he hoped that the Humphrey pump would be studied as it deserved to be, and that it might be developed in one form or another. Another method was the use of the vacuum for moving liquids. On the face of it, it might seem rather irrational to use the vacuum, as it was more efficient to compress air. In certain cases, however, it gave advantages due to the absence of floats. In its simplest form, it would consist of a receiver and suction-pipe dipped into the tank, with a suitable non-return valve on the suction-pipe. The possible head was limited to 30ft. in the case of water or heavy liquid. The use of vacuum had considerable advantages in the moving of liquid from one vessel to another in the course of continuous processes. In connection with the distribution of liquids in chemical works, he would like to urge the necessity of paying more attention to the standardisation of pipe lines between corks and valves to facilitate replacements and reduce the number of spare parts to be kept in stock. Again, the pipe-lines ought to be painted in distinctive colours; in some Government plants that had been done. The great need was for a standard colour to be used in all works, otherwise men changing from one works to another might be liable to cause accidents. The capacity of storage vessels ought to be standardised, and the flange connections to the various pumps, so that when a pump gave out it would be an easy matter to replace it by a pump of another make about the works.

Mr. W. Hayhurst then read a paper on

"PUMPING ACIDS AND OTHER CORROSIVE LIQUIDS. WITH PARTICULAR REFERENCE TO THE ARMOURED CERATHERM CENTRIFUGAL PUMP."

Providing that it can be obtained in suitable forms, ceramic material offers the largest possibilities for the construction of pumps for the chemical trade. Ceramic material can be obtained which is quite insoluble in almost any corrosive liquid. The hard nature of the product also reduces wear due to erosion to the minimum.

The type of ceramic material chosen by the writer for his pump was a form of "Ceratherm." Ceratherm is a new acid-ware, which was prepared during the war for rapid condensation of large quantities of acid gas in the manufacture of explosives. It has useful properties

which make it suitable for this work in that small articles can be heated to a red heat and plunged into cold water without cracking and it conducts heat much more quickly than ordinary stoneware, thus enabling an equable temperature to be maintained throughout any apparatus in to which it is made. The type of Ceratherm used for the manufacture of pumps, however, was not the same as that used for the manufacture of Hart's nitric acid condensing plant, for instance, but a type was prepared with considerably increased tensile strength.

The pump shown is identical in many respects with the German type imported into this country shortly before the war with the exception of the fact that it is made of Ceratherm, and therefore is more suitable for hot liquids or variable temperatures—a condition which was likely to crack the German pump,—and the method of putting the impeller on to the shaft is quite different from the German.

I now refer to the Guthrie Ceratherm pump. The examples shown illustrate the method now in use in the manufacture of these pumps. Attention should be directed to the following points:—

1. The casings are made exceedingly thick and strong. They are set into the iron armourings by means of one of the cements manufactured by the same firm, which possesses remarkable acid-resisting properties.

2. The inlet and outlet of the pump are so constructed that coupling up can be accomplished without any fear of damaging the pump.

3. The acid or corrosive liquid is fed into the pump on the gland side. No trouble whatever is experienced in packing this gland, which is continually under suction, and a small quantity of wool soaked or not soaked, as may be desired, in paraffin wax and pressed home with the fingers provides all that is necessary. Heads of 200 or 300 feet can be attained without the slightest leak or trouble at the gland. These casings are found most efficient in use and will withstand many times the pressure to which they are normally required to be subjected.

The fixing of the impellers on to the steel shaft is a matter which requires very careful consideration, and after some experimenting the method adopted was to prepare a cementing material of very high acid resistance to fill the interior of the shaft of the impeller. This material receives a screw thread, and the shaft is then screwed into the impeller, which is ground and balanced on its own shaft. From being one of the weakest features of the old German type of pump, this method of connecting the ceramic portion to the steel shaft has now become one of the strongest and most satisfactory features of the pump. The Manx impeller, which is, so far as we are aware, entirely new in idea, is almost self-balancing so far as thrust is concerned and gives very little thrust along the shaft. The tendency at present is that in the Guthrie Ceratherm pump the Manx type of impeller is almost always supplied and special thrust bearings are not necessary.

In the neighbourhood of 40 feet head efficiencies of 60 per cent. have been attained. In the neighbourhood of 120 feet head efficiencies of the order of 40 per cent. have been obtained even with the diminished quantities required by the acid trade. If large quantities are required very high efficiencies could probably be attained at high heads, say in the neighbourhood of 70 per cent.

The experience referred to in this paper has been obtained on a practical scale in actual work, and the following liquids have been pumped with success: Sodium

peroxide, hot and cold solution; hydrochloric acid, both hot and cold; nitric acid of various strengths and different temperatures and containing various impurities; and solutions of metallic salts of acetic acid.

Mr. Ridge said the author had made some references to the heating of a vessel with a metal outside and lined with ceratherm. He would like some information as to whether the expansion of the ceratherm was identical with the cast iron or mild steel, whatever was used. Another point he would like to hear more about was the conductivity.

Mr. Hayhurst said that tensile strength figures were not easy to give, but, in his opinion, the proper way to get an idea of what ceratherm would stand was to run it until it burst, and they would get the tensile strength.

Mr. Reavell said there was the point that if that was done the thing would get out of balance sooner or later, and the thing might go off on account of vibration.

Mr. Hayhurst said he thought they were asking what would happen in practice, and in practice it would go out of balance. He had not succeeded in bursting one yet. He had given a figure of 3,000 revs. for the larger impellers, and that gave a safety factor at once of four or more. He did not think there was any other really reliable way of getting a figure. After all, the question was: How do they work, and how do they stand up in use? He could say that they had run impellers faster than they ought to, and they did not break. With regard to the heat transmission, he had not had space in the paper to go wholly into that question. The transmission of heat was based on figures from actual practice, using a lead coil. It was in use, and transmitting heat quite satisfactorily. He had not yet had an opportunity of taking accurate readings. So far as the question of linings being affected by different coefficients was concerned, the linings were fluted on, and they had never had one come off in use.

The Chairman said that they were all very grateful to the authors for the great deal of information they had received from the papers themselves and from the discussions which had followed. The problems were difficult ones, but he believed they were on the way to being solved. He asked them to join in a hearty vote of thanks to the speakers.

The Secretary (Mr. Talbot), in moving a vote of thanks to the Chairman, referred to the wire from Professor Hinchley, and added that they would all regret to hear that he was suffering from the effects of overwork and had been ordered to take a long holiday.

It was decided to send a telegram to Professor Hinchley sympathising with him in his illness and wishing him a speedy recovery.

Captain Goodwin moved a vote of thanks to Mr. Talbot for his work in making the Conference a success.

The Secretary, replying, said that anything he had done had been more than rewarded by the success of the Conference.

OUR BOOKSHELF.

PRACTICAL DRY CLEANER. 5th edition. Edited by J. B. Gray. London: Hodder and Stoughton; 15s. net.

In the 5th edition of this very successful work, all obsolete matter has been deleted. Rapid strides have been made in processes and plant employed in this growing industry, and as it is one which consumes considerable quantities of chemical products we have no hesitation in introducing it to the notice of our readers.

PRACTICAL LEATHER CHEMISTRY. By Arthur Harvey. London: Crosby Lockwood and Son; 15s. net.

A laboratory manual for the student in chemistry specialising in the leather industry, incorporating a very large number of new methods from various sources which hitherto have not reached existing text-books. A list of references is contained which will enable the student to go further into individual items.

INSTITUTE OF CHEMISTRY.

PROCEEDINGS OF THE COUNCIL.

THE following extracts are made from the Proceedings of the Institute of Chemistry for June-November, 1919 (Part IV.), just issued.

PATENTS AND DESIGNS BILL.

The Council have expressed their concurrence with the Report of the Patent Laws Committee of the Conjoint Board of Scientific Societies in advocating the following improvements in the British Patent Law:—

(1) The extension of the present period of provisional protection.

(2) The extension of the period of protection from 14 years to 17 years as in the United States.

(3) A reduction in the scale of fees. The present fee for the first four years should remain, and all renewal fees should be substantially reduced.

(4) The adoption of the "File Wrapper" system as employed in the United States.

The recommendations have been forwarded to the Board of Trade.

The Patent Laws Committee of the Conjoint Board consisted of Sir Robert Hadfield, Sir Dugald Clerk, Mr. Horatio Ballantyne (who has represented the Institute in the Conferences of Scientific and Technical Institutions concerned with this matter), and Dr. W. W. Watts (secretary of the Conjoint Board).

GLASS RESEARCH.

By arrangement with the Department of Scientific and Industrial Research, the researches proposed to be undertaken by the Vitreous Compounds Committee will be transferred to the British Scientific Instruments Research Association, of which Sir Herbert Jackson is the director. The Department has expressed its appreciation of the initiatory work of the Institute in this matter.

CHEMICAL GLASSWARE, FINE CHEMICALS, AND SPECIAL REAGENTS.

The Council have received a letter from the Department of Scientific and Industrial Research asking for an expression of their views with regard to present supplies and quality of British-made chemical glassware and of fine chemicals for research purposes. The Glass Research Committee of the Institute is inquiring into the first matter and invites the views of Fellows and Associates thereon. The Council understand that the question with regard to fine chemicals is under the consideration of the Federal Council for Pure and Applied Chemistry.

The Joint Committee of the Institute of Chemistry and the Society of Public Analysts, under whose direction a List of Reagents for Analytical Purposes was published in 1915, have under consideration the desirability of revising and extending the List referred to, provided a sufficient number of manufacturers are prepared to produce "A. R." chemicals according to the standards specified. It is probable that the Committee will proceed with the revision of the List, and they will be glad to receive suggestions from the Fellows and Associates in that matter.

MOND NICKEL COMPANY, LTD.—Interim dividend of 7 per cent. per annum on the cumulative and non-cumulative preference shares for the half-year to October 31, 1919, less income-tax, and 1s. per share on the ordinary shares on account of the year to April 30, 1920, free of income-tax.

MICRO-STRUCTURE OF CEMENT AND CONCRETE.

IN the course of his presidential address to the Concrete Institute, Mr. H. D. Searles-Wood stated that the Science Committee was considering the question of the investigation of cement by means of micro-sections, and in due course a report of this would be forwarded to the Research Department. It was generally known, he added, that a good cement, under favourable conditions, tended to increase in strength with age, and that the action of setting in such increase in strength was due to hydration. There appeared, however, to be but few data available as to the actual change in form of the various components of concrete from a microscopic standpoint, although it was understood that American and German scientists had already carried out some investigations. That chemical changes took place in the progress of setting was proved by chemical analysis, but the analyses remained to be properly co-ordinated with the micro-structure of the cement or compo during the process of hydration.

Mr. Searles-Wood also said that watertightness was one of the most important requirements of cement and concrete, more particularly in connection with reinforced concrete, and in connection also with their use either in the form of mass concrete or as reinforced concrete for tanks or vessels for containing or excluding liquids. Percolation tests on ordinary concrete had shown beyond question the fact that even with clean, filtered water all concrete tended in time to become less porous, provided the pieces under test were kept moist, thus proving that the chemical changes produced alterations in the micro-structure tending gradually to fill the small voids with crystalline growths. How these crystalline growths developed was a matter which it was desirable should be carefully investigated, and the only satisfactory method which presented itself at the present time was by examination of the micro-structure of cement and cement compo during development.

STORAGE OF COAL

A NOVEL method of storing coal in carbonic acid gas, which combines the advantages of the overhead bunker with the absolute safety of storage under water against spontaneous ignition, has been adopted in an installation described in the *Iron and Coal Trades Review* as having been recently erected at Dortmund, in Germany. It consists of three cylindrical bunkers—with semi-spherical tops and bottoms,—each bunker holding 2,500 tons of coal. There are three outlets in each bunker for withdrawing the coal and three holes at the top for receiving it; the lower outlets close gas-tight, whilst those on the top, though requiring a good fit, need not necessarily be gas-tight, since carbonic acid gas is nearly twice the weight of air, and does not, therefore, escape at the top. A simple structural steel tower unloads the coal by grab from a barge; the coal is then shot into a small hopper from which it is fed on to a push-plate conveyor, the path of which completely envelops the three bunkers in the vertical plane. It can, therefore, both feed and reclaim the coal. There is a slight leakage of carbonic acid gas during the withdrawal of the coal, but this is stated to be small, and can be easily replenished.

ADVICE TO THE OIL AND COLOUR CHEMIST.

At a meeting of the Oil and Colour Chemists' Association on December 11, Mr. A. M. Gibbon read a paper, entitled "The Principles of Application of Paints and Varnishes and How It Affects the Works Chemist." The author pointed out the importance of the paint and varnish works chemist studying the practical conditions under which paints and varnishes are applied. It was a common thing, for instance, for the bolts and rivets in structural painting to be very badly painted, and as this formed points at which corrosion could commence the manufacturer was often held to blame for supplying a paint which did not afford sufficient protection against corrosion. It was, therefore, to the advantage of the chemist and the products of which he was in charge to follow up what happened to them after they left the works.

A good enamel or paint put on by a poor workman often gave worse results than a poor enamel put on by a good workman. A point often overlooked was that it was the pressure of application which determined the degree of durability. Printing ink on posters, for instance, did not peel off because it was put on with considerable pressure, and the chief reason why the paint on a painting did not peel was that the artist applied it with an upward push of the brush which gave a fair amount of pressure and at the same time pushed the air out. Oil and colour chemists must study the conditions of the trade with which they were concerned, and not be carried away with the results of scientific experiment only. It was essential to meet the demands of the user; when that was done, improvement would go forward by leaps and bounds. What was really necessary was that the paint and varnish industry should be sub-divided in such a manner that there would be specialist chemists for particular branches. Something was done in this connection already, but not sufficient.

In connection with the application of paint, nothing had been found to supersede the brush in the hands of a good workman, but it was being displaced for reasons of speed and economy. At the same time, a mechanically applied paint was seldom so durable as the hand-applied. Spraying, however, was the method of the future, although it was by no means perfect at present. He did not mean that the apparatus did not fulfil its functions, but that the life of the paint so applied was not good. One reason was that compressed air was the force employed, and to spray a thin film of paint it was necessary to dilute the paint with air. In other words, a form of atomiser was used which broke up the paint into small globules. The result was a very fine spray with an excess of oxygen, which tended to destroy the paint, and although some inert gas, such as nitrogen, might be used, this would increase the cost. Nevertheless, he could not conceive that the present spraying apparatus was a perfect way of applying paint, as it involved a cloud of paint in the atmosphere and the necessity for the operator to wear a mask.

The Chairman (Mr. H. Morgan), whilst agreeing with the author that it was necessary for scientific workers to come to earth sometimes and see the actual problems they were up against, thought the best method to pursue was to make the best paint in the first instance, and then teach the users how to apply it.

Mr. E. Brand referred to a specification for iron which had to go to South America, one of the conditions of

which was that the metal was to be heated and dipped in linseed oil. The theory was that the linseed oil dried on the surface and prevented the iron from rusting. With regard to the present high cost of materials and labour, he urged that it was not economy to attempt to use cheap materials, as these involved more frequent painting, and the cost of labour to do this more than counter-balanced the saving in materials in the first place.

Mr. A. Molteni thought the practical conditions under which paints were used varied so much that it was practically impossible for the chemist to carry out research on the line suggested by the author. The conditions of rusting, for instance, were so many and so complex that it would be practically useless to produce a great number of paints with the idea of providing for all conditions. Therefore it was necessary to produce the best paint possible; there should then be no difficulty in finding the right conditions of application.

Mr. J. Lawrence, speaking with regard to spraying, said he had had spraying paints under observation for many years and had found their durability very good. The idea that air was blown into the paint, and thus enabled oxygen to reach the surface of the metal, was slightly overdone. Driers were an important consideration in regard to decorators' paints. The success of any paints was due to the fact that they were applied in thin coats, which dried very quickly, but where the coats were thick and a second was put on before the first had dried trouble arose from the effects of oxygen. The difficulty with regard to bolts and rivets was sometimes got over by making the specification so that the rivet and bolt heads had to be touched up before the painting was done. In that way the painter's attention was drawn to the rivets, and perhaps the work was then done a little more thoroughly than it otherwise would be.

Mr. R. P. L. Britten thought there was a large field before chemists to discover a paint which did not require pressure in its application. His experience of spraying was that, if proper paint was sprayed on, it lasted very well. His experience of air-dried and stove-dried enamel was that the former was brittle and the latter very flexible.

Mr. H. A. Carwood referred to a case in which a ship's bottom had to receive two coats of anti-fouling composition within 24 hours. The result was failure, for the ship came back after two or three months with all the composition gone. The manufacturers were blamed and did not get any further orders, but the trouble was due to the manner in which the composition was applied.

Mr. Makins said that in the future there would be a greater concentration upon mechanical means of applying paints, and unless paint manufacturers saw that their paints were of the right consistency for these methods of application they would be left. His experience was that spraying apparatus should use the smallest amount of air and the least amount of pressure.

Mr. Britten remarked that very little was known at the present time as to what happened when paint was sprayed. It was more than likely that paint sprayed at high pressure would be more durable than paint sprayed at low pressure.

The Author did not reply at length, but promised to do so in writing.

UNITED INDIGO AND CHEMICAL COMPANY, LTD.—Interim dividend at rate of 5 per cent. per annum for six months ending December 31.

THE ACTION OF WATER ON LEAD.

AN interesting paper on "The Action of Water on Lead," by Messrs. J. F. Liverseege, F.I.C., and Mr. A. W. Knapp, B.Sc., F.I.C., was read at a meeting of the Birmingham and Midland Section of the Society of Chemical Industry, held at the University of Birmingham, on Thursday (December 11). Mr. L. P. Wilson, the chairman, presided. The latter gave a cordial welcome to the Section to Professor Morgan, the successor to Dr. Percy Frankland in the Chemical Department at the University.

The paper was read by Mr. Knapp. It is well known, the authors pointed out, that many waters act on lead. The action was made the subject of extended experiments by Dr. Houston, who invented the erosion test. The waters which Dr. Houston examined were acid in character and notable for their power of dissolving lead. On the other hand, their experiments dealt with a faintly alkaline natural water, which, like distilled water or pure rain-water, dissolved very little lead, but which had in the untreated condition the power of eroding the lead, so that scales formed on it fell away, leaving a fresh, bright surface open to attack. The erosive ability was not considered by Dr. Houston to be a dangerous quality, save under special conditions and in the presence of bright lead.

The water used in the tests was from the Birmingham watershed at Rhyader, in Wales. In order to avoid any risk of so soft a water acting on lead, a small proportion of chalk is added to the water at the beginning of the aqueduct; the usual addition in recent years has been about two parts per 100,000. The Welsh water (Rhyader) has a slight alkalinity, due to bicarbonates, etc., equal to about 0.3 parts CaCO_3 per 100,000. The action on lead is mainly erosive. The erosion test is an estimation of the action of the water on completely immersed sheet lead. The value of the test lies in the fact that a high erosion figure is an advance warning that the water in its fluctuations may be approaching a dangerous condition. The erosion test is performed with bright lead in water with free access to air, and under these conditions a water will erode lead when it is unable to act on lead service pipes to any extent. The kind and position of the erosion will depend on a number of conditions, the chief of which is alkalinity. Three kinds of action occur—with waters of alkalinity 0.2 to 0.6 (*i.e.*, untreated Welsh waters) and generally with treated waters, whose alkalinity does not exceed 1.5, the whole of the surface of the lead is eroded. A flocculent precipitate forms, which falls to the bottom of the tube and leaves the lead surface quite bright, but mottled. With treated waters of alkalinity 1.5 to 2.5, the action is usually corrosion rather than erosion; a loosely held opaque white crust forms here and there irregularly on the lead surface. With waters of alkalinity 2.5 and over, the lead almost invariably becomes covered with a dull whitish film, which appears to act as a protective coating.

"Erosion" is due to the action of oxygen in the presence of water; such variations as occurred naturally in the percentage of oxygen present in the water produced no appreciable effect on the erosion. One day is the most suitable period for the erosion test. Exposure to glass lowers the water's erosive ability. In some experiments on the influence of contact with the glass of test tubes, ordinary tubes were compared with those which had been coated internally with a thin layer of paraffin wax. The mean alkalinity of the water was 2.3. The

results showed that the paraffin-coated tubes gave no better duplicates than ordinary tubes, and that the erosion figures in paraffin-coated tubes were higher (mean of 13 tests: paraffin-coated, 4.7; ordinary, 3.8). The greater the depth at which the lead is immersed in the water, the slower the erosive action. The velocity of erosion falls as time proceeds; variation in the volume of water does not appreciably affect erosion. For the untreated water the amount of lead eroded varies directly with the area of lead exposed. Small changes in the area of the water surface produce no appreciable effect on the erosion. Erosion readily occurs in waters which contain no carbon dioxide. Such variations as occurred naturally in the percentage of carbon dioxide present in the water produced no appreciable effect on the erosion. The presence of from 1 to 2 per cent. of carbon dioxide causes a sudden change from "erosion" to "plumbo-solvency." Carbon dioxide dissolves lead more rapidly in the presence of oxygen.

The question may be asked if the presence of carbon dioxide is necessary for erosion to occur. All the evidence the authors have goes to show that it is not necessary. Erosion takes place readily in the absence of free carbon dioxide—for example, when 1 to 200 parts of calcium hydrate per 100,000 are present,—and further, erosion takes place less rapidly in the presence of bicarbonate and carbon dioxide than with carbonate and hydrate alone. Under normal conditions for ordinary waters, carbon dioxide is an unimportant factor. Given oxygen, the alkalinity of the water is the principal factor determining the amount of "erosion." Not only the amount but the kind of erosion depends chiefly on the alkalinity of the water.

The addition of small quantities of calcium hydrate, carbonate, and bicarbonate, or of potassium permanganate, decreases erosion. Experiments show that as the amount of calcium hydrate present in the water increases, the amount of lead eroded falls to a minimum when there is present about 7 to 10 parts of calcium hydrate per 100,000. After this point, increase in the calcium hydrate causes increase in the erosion, which gradually attains about its original amount. As the amount of calcium carbonate and bicarbonate present in the water increases, the amount of lead eroded continually falls. Calcium carbonate is, by far, the most effective preventer of erosion. Only about half the quantity of bicarbonate is required to form a protective coating as compared with carbonate. This would receive a theoretical explanation if, as seems probable, the coating is a carbonate of lead. As little as 2 parts per 100,000 of calcium carbonate is generally sufficient to form a plumbo-protective coating on the lead. Erosion occurs in the absence of bacteria. The bacteria in the water are not all destroyed by exposure to lead for six hours.

DISCUSSION.

The chairman in the course of the discussion suggested that, as the tests had been made with ordinary commercial lead, comparative experiments should be made with chemically pure lead, as the latter almost entirely resisted dilute or strong sulphuric acid.

Dr. Maxted inquired as to the influence of agitation on the rate of the solution of lead. He imagined that agitation might loosen any protective deposit that might be formed.

Mr. Knapp, in reply, said commercial lead was used because it was felt they were dealing with a practical problem. Commercial lead was extremely pure, but he was willing to test with chemically pure lead. Neither the question of varying temperature nor that of agitation had been dealt with. They had tried the effect of adding small quantities of potassium permanganate and found it reduced erosive ability to a low figure.

PROSPECTS OF BRITISH CHEMICAL TRADE IN INDIA.*

CHEMICALS AND CHEMICAL PREPARATIONS.

THE imports of chemicals, excluding chemical manures and medicines, into India during the war, have been as follows:—

Principal Countries of Consignment.	1913-14.	1914-15.	1915-16.	1916-17.	1917-18.
	£	£	£	£	£
United Kingdom	505,271	556,851	799,260	868,827	1,219,976
Germany	84,072	37,276	6,555	182	—
Italy	35,112	35,721	44,576	70,121	5,775
Japan	10,110	15,166	63,210	215,772	371,078
United States	1,862	10,641	28,098	56,589	195,595
Total imports	676,506	683,361	972,426	1,251,322	1,815,004

The United Kingdom has been able to hold its own fairly well, and Japan and the United States have, broadly speaking, taken the place of all other suppliers to the market. It will probably be of interest if we deal with the principal classes of chemicals in greater detail.

Acids.—The total imports of acids have declined from 78,435cwt. in 1913-14 to 6,876cwt. in 1917-18. This decrease has been most marked in the case of sulphuric acid, the imports of which have been reduced from 3,197 tons to 21 tons. This decline is largely due to the increased manufacture in the country from sulphur imported from Sicily and Japan. A plant for the manufacture of sulphuric acid is being erected by the Burma Mines Co. at Jamshedpur (Sakchi), in connection with their scheme for the production of spelter from the Burma zinc concentrates. These concentrates consist largely of zinc sulphide, and when roasted produce sulphur dioxide, which can be used for the production of sulphuric acid in the ordinary lead chamber. As the sulphur dioxide is a by-product, the cost of producing the acid by this means should approximate that of imported acid, and consequently it is probable that before long India will produce the whole of her requirements of sulphuric acid. The imports of nitric acid have fallen from 4,868cwt. to 797cwt., and it is believed that the plant available for its manufacture in India is sufficient to meet all reasonable demands in the future, unless, of course, the manufacture of dyes or explosives is commenced in the country. The imports of hydrochloric acid are very small, and the output in India is approximately 600 tons per annum.

Bleaching Materials.—The imports of bleaching materials have increased from 75,628cwt. to 100,236cwt., and the principal supplier is now Japan, whose imports have risen from 1cwt. in 1913-14 to 61,840cwt. in 1917-18. The shipments from the United Kingdom have declined from 58,062cwt. to 33,418cwt.

Soda Compounds.—The total imports have increased from 662,962cwt. to 1,012,649cwt., and it is gratifying to note that the United Kingdom has well maintained her position in the trade, largely due to the energy of one of the largest British companies who, by dint of an active selling organisation in the country, are holding their own. The Magadi Soda Company of East Africa are shipping increasing quantities of crude soda, which are being worked up in Calcutta, and which compete with the United Kingdom supplies, while Japan has increased her shipments from 101cwt. to 13,168cwt. The principal articles of import are caustic soda, soda ash and soda crystals, which are largely used by soap and glass works, dye houses, etc. The imports of bicarbonate of

soda are also considerable. So far, India does not produce these articles, but will probably be able to build up an industry, using the crude soda from Lake Magadi as a raw material.

Sulphur.—The imports of sulphur have increased from 126,541cwt. to 195,692cwt., largely on account of the demand for the manufacture of sulphuric acid. Japan supplies 95 per cent. of India's requirements.

Carbide of Calcium.—About 1,000 tons a year were imported before the war, mainly from Germany, Norway, and the United Kingdom. The imports have now fallen to about 640 tons, of which 540 tons are drawn from Japan, and only 37 tons from the United Kingdom.

Potassium Compounds.—The imports have been reduced from 728 tons to 384 tons, but the values have increased from £39,000. to £93,000. The British imports have fallen to one-third of their pre-war size, while Japan has increased her shipments from nil to 112 tons, and the United States from nil to 97 tons.

Disinfectants.—In 1913-14 the imports were 1,270 tons, valued at £26,394. In 1917-18 they had increased to 1,570 tons, valued at £67,415. The United Kingdom has fairly well maintained her position, and in the latter year supplied 88 per cent. Here again Japan has increased her shipments from less than one ton to 150 tons, valued at £13,403., and now furnishes 10 per cent. of the supplies. The various British brands are the most popular on the market, and if only steps are taken to keep them well before consumers we shall retain the trade.

DRUGS AND MEDICINES (EXCLUDING CHEMICALS AND NARCOTICS).

The value of the total imports has increased from £780,490. to £889,210., but the shipments from the United Kingdom have receded from £401,000. to £354,000. Our principal competitors are Japan, the imports from which country have increased from £109,000. to £266,000., and the United States, the value of whose goods advanced from £31,000. to £64,000. The Japanese imports almost entirely consist of camphor, also a small but increasing trade in patent medicines. Japan has already obtained a firm hold on the China market in such harmless specifics as "Jintan" and "Ching Kuai Wa," and there are signs that she is making a bid for the large Indian market for proprietary and patent medicines. The American imports mainly consist of patent medicines, quinine salts, and miscellaneous drugs. The British trade is principally in patent medicines, of which the United Kingdom provides nearly two-thirds, quinine salts, and the whole range of chemists' requirements. The keenest competition so far as high-grade drugs are concerned will probably be from the United States, as American travellers are very active, and great attention is paid to the making-up and packing required by the market. Japanese patent medicines will probably compete more and more with British, but, on the whole, they are of a lower standard, and their low price is the main attraction.

DYEING AND TANNING SUBSTANCES.

The total imports, which in 1913-14 were valued at £943,000., fell to one-third of that figure in 1915-16 on account of the elimination of German dyestuffs from the market, but rose to £941,000. in 1917-18, and to £1,060,000. in 1918-19 now that more regular supplies of aniline dyes are being obtained from England and America.

Alizarine Dyes.—The decrease in the imports has been enormous. In 1913-14, 6,469,739lb. were imported, of

* Report on "The Conditions and Prospects of British Trade in India at the Close of the War," by H.M. Senior Trade Commissioner in India and Ceylon (Mr. Thomas Ainscough, O.B.E.).

which Germany supplied 4,637,450lb., the United Kingdom 963,698lb., and Belgium (mostly of German origin) 804,243lb. In 1917-18 only 157,862lb. were imported, of which the United Kingdom sent 154,673lb. and Japan 2,688lb. In the year 1918-19, however, there has been a great increase to 1,604,577lb., largely due to the increased exports from the United Kingdom and United States since the Armistice.

Aniline Dyes.—The imports in 1913-14 amounted to no less than 9,703,122lb., valued at £511,822. The figures declined to 552,732lb., valued at £95,274., in 1915-16, and then advanced to 1,970,304lb. and £574,038. in 1917-18, and 2,170,238lb. and £637,000. in 1918-19. In 1917-18 the United Kingdom supplied 1,425,527lb., valued at £288,000., the United States 385,114lb., valued at £247,077., and Japan 101,418lb., or £16,757.

Synthetic Indigo.—India has never been a very large market for artificial indigo, although the synthetic product was rapidly ousting the natural vegetable indigo from the market. In 1913-14 6,051cwt. were imported, of which Germany, including shipments via Belgium, supplied 5,986cwt., and the United Kingdom 20cwt. (probably of German origin). In 1917-18 the quantities imported had fallen to 39cwt. (69cwt. in 1918-19) and the values to £440. (£840. in 1918-19). Practically the whole of the synthetic indigo is now drawn from the United Kingdom, the small amount obtained from China in 1916-17 representing old German stock.

The remarkable strides made in British import dyes during the last three years are clearly shown in the following table:—

TOTAL IMPORTS OF DYES OBTAINED FROM COAL TAR (ALMOST ENTIRELY ALIZARINES AND ANILINES).

Countries of Consignment.	Quantities.			Value.		
	1916-17.	1917-18.	1918-19.	1916-17.	1917-18.	1918-19.
	Lbs.	Lbs.	Lbs.	£	£	£
United Kingdom .	610,436	1,580,200	2,697,907	150,241	363,273	362,015
Switzerland	41,713	49,035	152,753	12,562	14,549	60,852
United States	372,354	385,614	875,338	258,938	247,777	337,164
Other countries . . .	50,038	122,317	48,817	14,377	26,460	19,534
Total imports . . .	1,074,541	2,137,166	3,774,815	436,118	652,050	779,565

In the year ending March 31, 1919, therefore, the United Kingdom supplied 71 per cent. in quantity and 46 per cent. in value, while the United States furnished 23 per cent. in quantity and no less than 43 per cent. in value. The extraordinary discrepancy between the quantity and value of the British imports, as compared with the American, is probably accounted for by the fact that the British dyes were supplied principally for the use of the mills at reasonable rates, whereas the American dyes were largely sold to Indian importers at the inflated rates ruling in the bazaar. The Japanese dyes imported have not met with very great success, and there are many complaints with regard to the strength of the colour.

(To be concluded.)

EXPORT OF INDUSTRIAL EXPLOSIVES.—The Board of Trade announce that the present Open General Licence for the export of explosives, etc., has been withdrawn and an Open General Licence has been issued for the export of industrial explosives, smooth-bore guns, and munitions for use therewith, to the following destinations:—British Possessions and Protectorates; French Possessions and Protectorates; United States of America; South America; Japan and Korea; Asiatic Russia; France, Belgium, Spain, Portugal, Greece, Italy, Holland, Switzerland, Serbia, Roumania, Norway, Sweden, and Denmark.

SALTERS' COMPANY AND SCIENTIFIC PROGRESS.

DISTINGUISHED CHEMISTS ENTERTAINED.

IN their historic hall, St. Swithin's Lane, the Salters' Company, on Thursday evening (December 11), entertained a large number of distinguished chemists to dinner. The guests included Lord Moulton, Sir James Dobbie (president of the Chemical Society), Sir William Pope (ex-president of the Society and Professor of Chemistry at Cambridge University), Sir Herbert Jackson (president of the Institute of Chemistry), Mr. John Gray (president of the Society of Chemical Industry), Mr. R. G. Perry (chairman of the Association of British Chemical Manufacturers), and others.

The occasion was the first dinner the Company has held since the war, and the Master (Mr. W. B. M. Bird) gave an account of the recently established Salters' Institute of Industrial Chemistry, of which Dr. M. O. Forster is director. The Institute was founded with the object of promoting the application of chemical science to industrial processes, and with this in view several post-graduate fellowships have been awarded during the year, and are now held at various colleges and universities by young chemists whose training was interrupted by the war and whose desire was to devote themselves to the chemical industry. In addition to these benefactions, grants in aid have been given to a considerable number of young men employed in chemical factories in or near London and who desire to improve their knowledge of chemistry by attending evening classes.

This effort, the Master proceeded, was merely a beginning. Other City Guilds would no doubt follow the example of the Salters' Company and realise that their justification lay in rendering assistance to the trades which bore their names. It was only by successful trade that we would be able to grapple with the enormous debt the war had thrown upon us and avert national bankruptcy. (Cheers.) He proposed the toast of "The Salters' Institute of Industrial Chemistry."

Dr. Forster, replying, announced that the City Guilds had contributed £1,000,000. for the advancement of technical education, of which £40,000. was given by the Salters' Company.

Sir William Pope, replying to the toast of "Science and Industry," said that by endowing fellowships for the training of young men the Salters' Company were doing a work of great national value. The scheme was destined to play a considerable part in providing chemists which the technical industries of this country were demanding so insistently at the present time.

Mr. R. G. Perry also replied, and said that for 100 years the chemical industry had been entirely free from labour unrest. He thought that of all the industries of this country, that which contained the greatest number of educated men was the chemical industry, and as a direct consequence of this mixture in intelligence the labour problems of both sides were better understood, and the difficulties which surrounded other industries did not arise in the chemical trade. There was no better way of securing co-operation between masters and men than by affording increased facilities for technical education and research. State control of industry was not a panacea for our evils. What we wanted was the utilisation of the great trade organisations like the Salters' Company and others. If the Government departments would tell those great organisations what they wanted and when they wanted it, private enterprise would do the rest.

AMERICAN FOREIGN TRADE IN GLYCERINE.

AS a direct result of the war the United States trade in glycerine, according to the Bureau of Foreign and Domestic Commerce, has been completely revolutionised. Imports ranging from 20,000,000 to 40,000,000 pounds annually for a decade and a half prior to 1914 dwindled to a little over 1,000,000 pounds in 1919; and the increase in the production of glycerine in the United States since the outbreak of the war has been such as not only to supply in large measure the enormously expanded domestic consumption but also to make possible the exportation of 21,000,000 pounds in 1918 and 13,000,000 pounds in 1919.

The world production of crude glycerine prior to the war has been stated to be 40,000 tons per annum, 14,000 tons of which were from soap manufacture and 26,000 tons from stearine manufacture, of which England produced 5,500 tons, France 3,500 tons, the United States 3,000 tons, and Germany 2,000 tons from soap-making; and France 6,000 tons, Germany and the United States 3,000 tons each, Holland, Austria, and Russia 2,000 tons each, with smaller amounts in other countries, from the manufacture of stearic acid.

IMPORTS.

From 1884 to 1910 France led as a supplier of glycerine to the United States, with the exception of the year 1900, when the United Kingdom sent a slightly larger quantity. England ranked first in 1911, 1912, 1913, and 1915, France again in 1914 and 1916; and in 1917 imports of glycerine from these countries ceased, to be resumed with shipments aggregating only 102,655 pounds from the United Kingdom in 1919. With the outbreak of the war the United States had naturally to seek other sources for a goodly part of such glycerine as it continued to import. Cuba had long been a shipper of glycerine, and sent steadily increasing quantities each year from 1914 to 1918, but shipments declined somewhat in 1919. Canada contributed important amounts in 1914 and 1915, as did Mexico also, though there has been a decided drop in the shipments from the latter country to the United States dating from 1916, and shipments from the former entirely disappeared in 1918—to reappear, however, in 1919. Argentina and Brazil, and in lesser degree Uruguay, Venezuela, and Japan, have been the chief new sources of supply.

No accurate statistics are available showing the production of glycerine in the United States since the census taken in 1914. One of the war boards no longer functioning ventured an estimate of 70,000,000 pounds of crude glycerine as the domestic output in 1917. The Bureau of the Census gives the production of crude glycerine for sale in the calendar year 1914 as 16,568,920 pounds, valued at £456,000., but adds that figures are not available for the total production of crude glycerine as that made and consumed in the manufacture of the refined glycerine was not reported. The refined glycerine made during the same year amounted to 60,944,799 pounds valued at £2,156,000. This glycerine was produced in 119 establishments, 19 of which were located in New York and the same number in Ohio, 12 in Illinois, 10 in Pennsylvania, 9 each in California and Massachusetts, and the others scattered throughout the States.

Comparing these figures with the domestic exports of crude glycerine aggregating 21,045,991 pounds in the year ended June 30, 1918, and 13,018,882 pounds in the fiscal year 1919, while imports dropped to 1,875,531

pounds in the former year and to 1,171,679 in the latter, and in view of the well-known fact that enormous quantities of domestic glycerine were utilised in the increased manufacture of explosives in the United States since 1914, it is evident that tremendous expansion in the recovery of crude glycerine has taken place since the war began, no estimate of which would be more than guesswork until returns are available.

EXPORTS.

Glycerine made in the United States was exported to 54 countries during the fiscal year 1918, 91 per cent. of it going to Europe. The bulk of the 21,045,991 pounds exported in that year went to allied countries, Italy taking 18,886,974 pounds, Canada 1,436,922, England 214,953, France 100,940 pounds, and Japan only 80,917 pounds. Following the signing of the armistice there was a radical change in the destination of American exports of glycerine. Compared with the previous year, shipments to Italy show a sharp decline in 1919, none whatever having been made during the last half of the year, while those to the United Kingdom and Japan materially increased. Larger amounts are also going to South America. Further, a movement to oriental markets may be noted. The principal countries to which the domestic glycerine exported during the year ended June 30, 1919, went were:—

Exported to—	Pounds.	Value.
United Kingdom	6,840,022	\$3,873,393
Japan	2,515,513	1,136,244
Italy	1,713,636	937,144
Canada	1,022,824	600,696
Norway	262,930	57,926
Argentina	113,994	37,775
Cuba	87,561	34,040
China	66,485	21,067
British India	42,858	11,951
Total to countries named.....	12,695,853	6,710,236
Total to all countries	13,018,882	6,833,432

Nearly the whole of the amounts credited above to the United Kingdom and Canada was shipped prior to January, 1919. In normal times the British production of glycerine is more than sufficient to supply both England and Canada, while Italy finds a more convenient source of supply in France than in the United States if its own production fails to fully meet all demands.

A decline in the United States' export trade in glycerine during the last fiscal year is strikingly shown by comparing the total shipments for the first six months (July-December, 1918), amounting to 10,318,717 pounds, with the 2,700,165 pounds for the second half, ending with June, 1919. That this decline, in comparison with corresponding figures for 1918, still continues is shown in the shipments for July and August, 1919:—

Period.	Pounds.	Value.
July:—		
1918	485,985	\$245,164
1919	67,980	15,659
August:—		
1918	570,405	340,768
1919	391,154	82,956
8 months ending August:—		
1918	12,492,401	6,425,540
1919	3,158,899	1,005,019

A factor of prime importance to be considered if the United States is to maintain an export trade in glycerine is the difference in the rate of exchange. It is stated that the present rate is such as to make purchase of foreign glycerine possible in the United States at a price considerably below domestic quotations.

ALCOHOL FROM COAL.

THE extraction of alcohol from coke-oven gas on a commercial scale was proved to be possible at a meeting of the Cleveland Institution of Engineers at Middlesbrough by Mr. Ernest Bury, of the Skinningrove Iron and Steel Works. In a paper read before the Institution on Monday Mr. Bury showed that at the Skinningrove Works he had succeeded in extracting alcohol and its derivatives.

The practical working of Mr. Bury's process at the Skinningrove Works, where 5,800 tons of coal are carbonised per week, has revealed an average yield of 1.6 gallons of alcohol per ton of coal carbonised, and as the total weight of the coal which was reduced to coke in this country in 1918 was 14,635,000 tons, the application of this process to the whole of this coal would yield, according to Mr. Bury's calculation, 23,416,640 gallons, the value of which would be £2,341,664. Having regard to the scarcity of liquid fuel, that in itself was important. Mr. Bury further pointed out that the recovery of the alcohol at the gasworks of the country would yield a further 27,000,000 gallons, or, taking alcohol and benzole together, the total quantity of liquid fuel available from extraction through the carbonisation of coal would be 114,000,000 gallons, to meet the country's present total requirement of 160,000,000 gallons per annum.

The process of extraction by contact with sulphuric acid is not a new discovery, but Mr. Bury has been the first to show its commercial practicability. His principal discovery is that the best results are achieved at a temperature of 60° to 80° C., and in his process he has carried the utilisation of heat from the coke-oven plant to the utmost limit. Ether, chloroform, iodoform, acetic acid, and acetone are among the derivatives he has obtained from the coke-oven gas after the benzole has been extracted, and at the meeting at which these results were disclosed some of the foremost metallurgists of the day, including Mr. J. E. Stead, paid tribute to the brilliant research.

CHINESE MARKET FOR DYES.

H.M. CONSUL-GENERAL at Tientsin reports that the requirements for the China trade in dyes are known to be so enormous that British firms in China, despairing of getting supplies from home, are endeavouring to make arrangements with manufacturers of dyes in other countries. One firm, who have for the last three years imported dyestuffs from Switzerland on a small scale, propose to decentralise the business and work on a broader basis. During the war, when stocks were low and prices high, it suited both parties to sell the whole stock as it arrived directly to one dealer in Shanghai. Now, however, that prices are falling and competition is beginning to be felt, the obvious method to meet the new circumstances is to sell to a number of dealers in Shanghai and the other large ports and end the monopoly.

A tendency recently displayed by some British firms, when they think that their trade marks have been sufficiently well established, is to send out their own representatives. Certain Swiss and French concerns have also sent their own agents. While the result of these experiments will probably not be encouraging, it is a possibility that must be borne in mind by firms

entirely dependent on the goodwill of the manufacturer for supplies.

Other firms are importing dyes from America, but are not very satisfied with either the goods or the business methods of American exporters. For the most part American exporters of dyes appear to be dumping abroad their surplus stocks rather than attempting to build up a real export business on scientific lines, though there are exceptions. The only colours in which American manufacturers have hitherto been at all successful are reds and blacks; Japanese dyes are very inferior; and the only competition to be feared from American or Japanese firms is if they should be in a position to import dyes from Germany on a large scale.

In this connection it should be mentioned that since the signature of the Peace Treaty Germans have been canvassing for and are reported to have booked orders for dyes; how they propose to ship them is not explained, unless it is in Japanese bottoms. It is, therefore, a point to be considered whether, if German dyes are to be exported in part payment of the indemnity, British firms should not have a share in the handling of them.

THIRTY YEARS AGO.

From the "Chemical Trade Journal" of December 21, 1889.

A New Sugar.—The French chemist, M. Maqueene, has discovered it through the treatment of the commercial pinite with iodhydric acid. It is a new sugar of the aromatic group, and is to be classed with inosite and quercite, hitherto the only saccharine substances obtained from benzene. It may be called to mind that the pinite here spoken of was discovered by Berthelot in 1859. It is the chief constituent of pine sugar derived from the sap of the *Pinus Lambertiana*, which grows so abundantly on the western slopes of the Sierra Nevada in California. As for the sweet-tasted inosite, it is found particularly in the ox's heart, in the urine of man in case of Bright's disease, and in French beans. Quercite is the very sweet substance which Eichler discovered. It is extracted from acorns, and has been called "acorn sugar."

White Lead.—A new method of manufacturing white lead is proposed by a M. Thibaut, according to which the workpeople are not to be brought in contact with the vapours from the metal. Instead of manual labour, M. Thibaut has a machine for "dividing the lead and preparing the mixture" (*qui divise le plomb et opere le melange*). With this machine, he says that two men can make 3,500kilos. of white lead in two hours, whereas by the ordinary method it takes two men a whole day of 10 hours to make 4,500kilos. Those familiar with white-lead making will be the best able to estimate the value of this contrivance if it has any. Many methods have been introduced, having in view, in addition to economy, the decrease of lead-poisoning and Saturnian paralysis.

Smokeless Powder.—A Berlin telegram says, in rectification of various newspaper reports, it is semi-officially stated that the German War Department has its supply of smokeless powder, of whatever kind, made at its own factories. An exception is to be made only in the case of the Rottweller Powder Factory to this extent, that that establishment will be entrusted with the delivery of a certain quantity of a kind approved by the War Department. The Dynamite Trust preparation, it is added, has absolutely nothing in common with that powder.

NATIONAL ASSOCIATION OF INDUSTRIAL CHEMISTS.—At a recent meeting of the Executive Council of the National Association of Industrial Chemists, a further increase in membership was reported, and the association has now appointed a full-time Assistant Secretary. It has also been registered under the Trade Union Act, and claims to be the only body representing analytical chemists in the United Kingdom which is so registered. With the newer powers thus granted to it, the association anticipates a considerable increase in its influence and in its ability to assist the economic condition and professional status of its members. Further particulars can be obtained from the Secretary, The White Building, Sheffield.

FERTILISER NEWS.

(SPECIALLY CONTRIBUTED.)

Nitrate of Soda.—The main object of the Nitrate Producers' Association formed in Chili nearly a year ago was to "stabilise" prices, thus preventing fluctuations prejudicial to the industry through the encouragement of speculation. Starting in September last with a limit of 9s. per quintal, f.o.b., for ordinary quality, the Association—now comprising all except the German and American oficinas—has raised its prices successively to 9s. 4d., 9s. 7d., 10s. 6d., and as *l'appétit vient en mangeant* it is now reported to have taken a further step to 11s., making a total advance of no less than 2s. per quintal, or 22½ per cent., within three months. So far so good, and if the present rate of appreciation is kept up, the fancy prices charged to the Allies two years ago will soon be seen again; but it remains to be seen whether the delivery of the nitrate will be as easy as the sale has apparently been. Out of the stocks on the West Coast, amounting to about 1,680,000 tons on December 1, about 1,425,000 tons are sold for shipment up to March 31 next, and the task would have been a difficult one even in *ante-bellum* times, representing as it does 350,000 tons per month. Now, however, tonnage is extremely scarce, and matters are complicated not only by coaling difficulties for the numerous steamers chartered, but by strikes at the Chilean ports. The December total is therefore likely to be again very disappointing, thus increasing the proportion of exports falling on January-March, and, as stated in our last issue, it is altogether improbable that the full quantity intended will arrive in Europe in time for next season. Continental consumers may have to go short of the fertiliser, but, fortunately, the requirements of the British farmer are already insured by stocks in this country and cargoes on passage—always supposing he is prepared to pay the exorbitant prices asked by importers. The best feature in the nitrate position is the considerable fall in freights on later 1920 shipments.

Sulphate of Ammonia.—This material, as the year ends, manifests a very sound undertone. There is a most pronounced demand from British farmers in all parts of the country; and while it is a demand prompted, of course, very largely by the fact that in the New Year their sulphate of ammonia will cost them more, anyhow, until the end of May, there is also to be recognised the fact that years of effective propaganda have borne exceeding good fruit during 1919. In the matter of export there is very little to be said. Small consignments go out, but at prices which apparently are fixed almost entirely by private treaty—from £25. to £28. being the favourite range of quotations. These, of course, compare with the current price of £21. for domestic use. When to the export price is added the heavy cost of freight, it is very clear that there are a good many farmers or manufacturers of manures abroad who are prepared to pay a substantial price for their sulphate. So far as the American position is concerned, it is declared that quite a serious situation has developed. Supplies of sulphate of ammonia are decidedly scarce, with several round lots of the product having been resold on as many as three occasions within two days. It is declared by recent advices from New York that the export demand reaching that centre is prodigious, with some record prices having been paid. American sulphate of ammonia manufacturers seem to be in no position to offer material at least for the first six months of next year, and there are reported to be some large orders in the market covering the output for the whole year.

Basic Slag.—The production of this material cannot keep pace with requirements. The Rothamstead Experimental Station reminds farmers that there are three distinct types of slag, which must on no account be confused. The first is the kind for many years well known to agriculturists, whilst the second and third types have come into prominence of recent years, and especially during the war. The three sorts are differentiated as follows: (1) Bessemer slag, containing phosphoric acid equivalent to 40 per cent. or more of tricalcic phosphate, largely soluble in 2 per cent. citric acid, usually 80 per cent. of the total guaranteed soluble; (2) basic "open-hearth" slag, containing less phosphoric acid, equivalent to 15 to 31 per cent. of tricalcic phosphate, largely soluble (80 per cent.) in 2 per cent. citric acid, the first pourings being richer than the last; and (3) basic "open-hearth" slag made by the use of lime and fluorspar, containing as much phosphate as the poorer grades of the preceding class, but only slightly soluble (20 per cent. or less) in 2 per cent. citric acid.

Other Fertilisers.—Fertilisers of all kinds are meeting an average demand for this time of the year from consumers, and the season looks like being a brisk one. Bone meals are very firm, and supplies still remain poor. Pure steamed 1 per cent. and 60 per cent. meal is still quoted at £13. 10s. to £14. per ton, with pure dissolved 3 per cent. and 32 per cent. bones at £15. to £15. 10s. per ton, always ex works. A good trade is passing in potassic superphosphate, 4 per cent. and 26 per cent., in bags, at £9. 2s. 6d. per ton. Superphosphate moves off fairly well, and is not regarded as too dear.

Dutch Fertiliser Industry.—The production of sulphuric acid and superphosphate in the Amsterdam Superphosphate Factory has been small during the whole working year ending June 30 last, although other sections of the concern were active. The net profit was 220,212 florins, against 799,400 florins in the preceding year. A dividend of 7 per cent. will be paid, against 13 per cent. in the preceding year. Prospects for the ensuing year are reported better than for last year. The United Chemical Factories, of Rotterdam, which are interested in the Amsterdam concern, have also had an idle year for superphosphate production, and are paying 7 per cent. on the ordinary and 6 per cent. on the preference shares.

Nitrate of Lime.—This material is again on the market, but now in granular form. Sales are being effected at £19. to £20. per ton, c.i.f. British port.

Aschersleben Finance and Prospects.—The Disconto Gesellschaft has negotiated the issue of two-and-a-half million new shares of the Aschersleben potash concern, plus ten million marks 4½ per cent. bonds, irredeemable before July, 1925, on the Berlin Bourse. These issues had been arranged for as far back as December last. The money is required for paying off bank credits and extending factory construction and pit sinking both for the company itself and its subsidiary companies. The activity of the concern depends, of course, largely on the labour question making the export business possible. The prospectus observes also that the loss of the Alsatian potash concerns and the development of the potash deposits in Spain have broken the German monopoly in this branch of industry, particularly in regard to the foreign sales and fixing of prices. The profit value of the German potash fields will, of course, be largely dependent on the possibility of arranging with the competitors.

SOUTH WALES NOTES.

(SPECIALLY CONTRIBUTED.)

The position as regards fuel supplies to the tinplate factories has improved during the week, but it is still far from satisfactory. The abnormal demand for plates of every description continues. Given fair transport arrangements, manufacturers would soon be able to control the situation, and thus secure the foreign trade, which is so urgently required in order to meet the competition of American makers, who primarily rely upon quick dispatch of orders. Shipments of tinplates continue to be satisfactory, and it is confidently anticipated that Australia will become a much better market in the near future, the inquiries from that country being more numerous.

There is a satisfactory increase in the production of patent fuel, and export business is being extended. Foreign railways are taking to this form of fuel, and several large cargoes have been sent to them. During the week heavy consignments left Swansea, 5,319 tons being dispatched to Marseilles, 3,900 tons to Cette, 6,604 tons to Naples, 3,400 tons to Bordeaux, and 6,000 tons to Rouen. A cargo of 5,137 tons left Port Talbot for Mollendo, and one of 2,473 tons was sent from Cardiff to Rouen.

The copper trade is improving, and arrivals of copper ore are increasing. There is just now a strong demand for copper sheets for the shipbuilding yards.

An explosion, the cause of which is at present unknown, occurred at a powder magazine at Blaenavon blast furnaces on Monday, when two men were killed and another seriously injured.

The fertiliser trades are all busy. Basic slag orders are still behind in delivery, but makers are doing their level best in this respect, and customers are getting their supplies more promptly than has been the case for several seasons. The sulphate of ammonia manufacturers have plenty of orders on hand, and there is little or nothing left for export business.

The call for sulphuric acid has increased, and makers have become busy.



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LEGAL INTELLIGENCE.

Appeal Case in Respect of Soap Contract.

On Monday, in the Divisional Court, before Lord Justice Warrington and Lord Justice Scrutton (sitting as additional judges of the King's Bench Division), the case of the Russell Oil and Chemical Company, Ltd., v. City Soap-powder Works, Ltd., was heard on the defendants' appeal from a judgment of Judge Ruegg at Birmingham County Court.

The grounds of the appeal were that, on the facts as admitted or proved at the trial, judgment should have been entered for the defendants; that plaintiffs were not entitled to the relief claimed nor on the claim as amended at the trial to the amount recovered or to any sum whatever; there was no evidence that the defendants ever refused or neglected to deliver goods sold or that the consideration for the price paid by the plaintiffs had wholly failed; the consignment of goods complained of at the trial were not part of the parcel of two tons which the defendants were alleged to have refused to deliver; alternatively, if they were, the plaintiffs accepted them and made no claim in respect of their defects, and the learned judge was wrong in holding that the plaintiffs were entitled to or had, in fact, treated an accepted consignment of part of the goods as a repudiation by the defendants of this contract or as a refusal to deliver the balance; the learned judge was wrong in law in admitting evidence as to the nature and quality of the goods delivered which the plaintiffs had accepted and fully paid for, and in respect of the alleged defects of which no claim was made and no damages were recovered.

Defendants asked for an order that the judgment of His Honour Judge Ruegg, dated April 29, 1919, be set aside and judgment entered for the defendants, or (in the alternative) that a new trial be ordered, and that plaintiffs be ordered to pay the costs of this appeal and of the trial below.

Mr. R. A. Willes, for the appellants, said the action which was tried by His Honour Judge Ruegg was commenced by a plaint in which the respondents claimed £100. damages for the neglect or refusal of the appellants to deliver certain soap, and in the result the respondents got judgment for £87. 10s. for money had and received. The learned County Court judge appeared to have taken no notes of the proceedings. There were certain discussions on questions both of fact and law, and there was an amendment of a particular claim. Counsel submitted that the judgment delivered was inconsistent with the claim, the amended claim, and the facts. He asked their lordships to decide that the delivery proved to be right, and that there was no evidence to support the view that the delivery was wrong.

Without hearing counsel for the respondents their lordships dismissed the appeal with costs.

Fumes from Explosives.

An inquest was held at Nuneaton on Friday of last week on the body of Ernest Rowe, Bermuda, Nuneaton, a miner at Griff Colliery, who died suddenly a few weeks ago. The inquest had been adjourned for the explosives used at the pit to be analysed, and for the effect of the fumes therefrom on human beings to be ascertained.

The widow stated that on several occasions recently deceased had complained of pains in the stomach and chest after coming from work. On Monday, November 3, he again complained, remarking that the fumes from the explosives in the pit would kill him. On the morning of his death he got out of bed and later he complained of a renewal of the pains, and expired immediately.

Joseph Mockford said Rowe had not complained any more than the rest of them about the effect of the fumes after the use of explosives. All of them had been affected, sometimes in the head, chest, stomach, and legs.

James Thorburn, research chemist employed by the makers of the Viking powder, said both No. 1 and No. 2 powders were used at Griff colliery, and both had passed the Government tests before being sent to the mines. Nitro-glycerine was the component part which would be likely to produce poisonous effects. Following the explosion, however, it disappeared as nitro-glycerine. The nitrogen was set free into the stall, but was absolutely harmless. This was the first case of the kind he had known. He had no knowledge of anyone having given up work in the manufacture of this explosive. Following an explosion from Viking, carbon monoxide was not present in such large quantities as to be cumulative in its effect, as with proper ventilation it would be a fight

between this and oxygen, and the latter being in such large quantity would win. If, however, carbon monoxide became cumulative, and it could not get in touch with oxygen, it would, in the course of time, kill a person.

Dr. Price said the man's death might have been accelerated by the effects of the fumes given off by the powder after the explosion. Deceased's heart was fatty and enlarged.

Dr. Nason said his opinion was that death was due to latent heart disease.

The jury returned a verdict of "death from syncope," caused by fatty degeneration of the heart, probably accelerated by poisonous fumes discharged during the shot firing.

Alleged Damage by Picric-acid Fumes.

The action brought by the owners of the Crow Nest estate, Lightcliffe, Halifax, against Brookes' Chemicals, Limited, Lightcliffe, for damage to the estate by the manufacture of picric acid, was concluded in the High Court on December 11.

Mr. W. J. Waugh, K.C., for the plaintiffs, contended that the residence had been rendered intolerable by fumes and by continuous pollution of the stream, turning both it and the lake yellow, and the herbage as well. What man would live in a house rated at £400. under such conditions? Sir Titus Salt lived in the house, and Mr. Kershaw after him, until 1917, and there was no evidence that the premises had ceased to be residential until defendants' works were erected. It was paltry of the defendant to offer a little over £7,000. for the estate after he had ruined it. He afterwards gave £13,400. for it, while it was previously valued at £25,000.

Mr. Pollock, official referee, in giving judgment, said that in his opinion there was no fundamental injury to the estate. The fumes ceased at the Armistice, and the pollution of the stream would soon end. Having seen the premises, he agreed with the defence that it was not suitable as a residential estate. The house was such that it would be very difficult to let. The case failed on the ground of permanent injury, and beyond that the plaintiffs would not be able to recover damages because they obtained the full value of the estate at the sale. There would be judgment for the defendants with costs.

Quality of Basic Slag.

At Crediton, North Devon, last week, Messrs. H. Norrington and Son, Ltd., Exeter, were summoned for selling basic slag for use as a fertiliser and causing or permitting the invoice to be false in a certain material particular—namely, that the basic slag had 39 per cent. of phosphates, whereas it contained only 17 per cent. A second summons was for failing to send an invoice on or after delivery of the goods. It was stated that the difference in cash value on the 18 tons sold by Messrs. Norrington was £44.

The defendants explained that at the time this contract was made slag was difficult to obtain. When the purchaser pressed for delivery the employee who had the details of the matter in hand was on holiday. Another employee, knowing that there was a consignment at the railway station, told the buyer to help himself. The bags of this consignment were marked "Ruby," and this showed there was no intention to defraud. The invoice was made out on the assumption that the right kind had been supplied. The defendants regretted the clerical error, which, when pointed out, was corrected.

The magistrates imposed a fine of £2. 10s. on each summons, and costs.

Heads of Departments and Notice: Important Decision.

A case of considerable importance was heard in the Bow County Court on Friday (December 12) before Judge Graham, K.C. The plaintiffs were Messrs. Jenson and Nicholson, Ltd., of Goswell Works, Wharton Road, Stratford, paint, varnish, and chemical manufacturers, and they sued Mr. Sidney G. Lee, accountant, to recover £25., damages for his having left their employ without sufficient notice.

The plaintiffs engaged the defendant as the head of their accountancy department at a salary of £25. a month, and he started his duties on April 1. All went well till September, when on the 7th he wrote a letter giving a month's notice. It was pointed out to him that his position was such that three months would be a more adequate notice, and that he had been promised £100. a year increase at the end of twelve months. He said he was sorry to leave, but

his wife had been ordered to the seaside for her health, and he was bound to go; he agreed, however, to stay on till October 31. As a matter of fact, however, he went off on October 4, saying he had to go. They were bringing the action as, owing to the large amount of labour they employed, they wished to establish the principle that a man could not go off just when he liked, and throw the work of the business into confusion. In this case £500 statements were delayed three weeks, representing a sum of £20,000. They had to call in an accountant to put the matter straight, whilst they were now having to pay his successor £41. 13s. 4d. a month.

For the defence, Mr. Lee said he had always been treated with great kindness and consideration by the firm, and was sorry he had to go, but the doctor said it was imperative for the sake of the health of his wife. He accepted a post at Walton-on-the-Naze at less money than the defendants paid him. Defendant went on to say that he acted on legal advice when he left.

Judge Graham said it was quite clear the defendant had no right to have left in a broken month, and had acted very unwisely in doing so. He considered plaintiffs entitled to damages, and awarded £15. and costs on "B" scale.

Leave to appeal was asked for and granted, although Judge Graham told the defendant he considered the case hopeless for him.

Customs Seizure of Pyrogallie Acid.

A considered judgment of great importance was delivered on Wednesday by Mr. Justice Sankey in the King's Bench Division, who held that a Proclamation by the Crown prohibiting the importation of pyrogallie acid from the United States was illegal.

The case came before the Court on the application by the Attorney-General for a declaration that the forfeiture by the Customs authorities of six cases of pyrogallie acid which was consigned to Messrs. Brown and Forth, of Dolefield, Manchester, from the United States, was legal. The seizure was carried out under a Proclamation of June 25 last, which the defendants said was illegal and of no value.

In his written judgment Mr. Justice Sankey said it had been argued by the Attorney-General on behalf of the Crown that he was entitled to a declaration for the forfeiture and seizure of the six cases of pyrogallie acid which had been consigned to the defendants. By the Prohibition of Imports Proclamation, 1919, the Crown, purporting to act under Section 43 of the Customs Consolidation Act, 1876, prohibited the importation into the United Kingdom of chemicals of all descriptions except under licence. Section 43 provided as follows: "The importation of arms, ammunition, gunpowder, or any other goods may be prohibited by Proclamation or Order in Council." The argument for the Crown was that the words in Section 43 meant what they said, and that His Majesty was entitled to prohibit the importation of goods of any sort or description into this country. On behalf of the defendant it was contended that the familiar rule of construction known as *ejusdem generis* should be applied to Section 43, that general words following particular words should not be narrowed, and that the section should be read so that the general words should be construed to mean the same as the particular words—viz., goods of the same sort as arms, ammunition, and gunpowder. Further, the defendants contended, that in any event the Proclamation was bad because of the exercise of dispensing power, and there was no right in His Majesty to make exceptions in the class of goods not to be imported. He could prohibit the import of goods altogether, but he could not prohibit the importation from one country while allowing it from another. If Parliament had wanted to confer power to prohibit importation of all goods they need not have used any particular words, but might have said generally that the importation of all goods could be prohibited. For these reasons he was of the opinion that the *ejusdem generis* rule must be applied to the construction of Section 43, and that the general words must be applied to the construction of Section 43, and also that the general words must be restricted to the meaning of the particular words. These words "any other goods" meant arms, ammunition, and gunpowder.

The Attorney-General had also argued that he was entitled to succeed on the ground that pyrogallie acid was of the same class as goods as arms, etc. He had been instructed to argue that the acid was used in photography and photography was used for war. It might be just as well quoted, said his Lordship, that for the same reason bread

and meat could be prohibited from importation because they were used to feed soldiers. In fact, it was hard to conceive any article that was not used in modern warfare. Consequently his Lordship, on the facts and law, found that this acid was not of the same class as the articles mentioned in the Section.

Finally, it must be recollected that the section was a penal one, and must in consequence be strictly construed. In his view, therefore, it would not be proper to hold that Parliament intended to impose the penalty demanded in this case by words which were uncertain and equivocal. He came to the conclusion that His Majesty had no power to make the Proclamation in question, and that it was illegal and invalid. He therefore gave judgment for the defendants with costs.

Leave to appeal was allowed on terms.

Phosphate for Munitions: Prize Court Decision.

The President of the Prize Court has delivered judgment in the action in which the Svafvelsyrre Fabriks Aktiebolaget claimed damages from the Crown, or, alternatively, the fair value of a cargo of phosphate rock on the Consul Olsson, in respect of which the appraised value of £16,420. was paid into court by the Crown after the Government had requisitioned the cargo. The Crown had "released" the goods as innocent of enemy interest upon investigation.

His Lordship, in his judgment, disallowed the claim for damages and costs against the Crown for unwarrantable seizure, holding that the seizure and proceedings in prize were warranted by the information in the possession of the Procurator-General, and that no steps were taken for any indirect purpose alleged by the claimants either to induce guarantees from Sweden against the exportation of phosphates, or to direct the flow of neutral phosphates to this country. On the score of appraisement, however, he found in the claimants' favour. The value of phosphates in the making of certain explosives was well known, and the question here was whether a fair value should be paid for the phosphates taken by the Crown irrespective of appraisement, or whether the £16,420. paid into Court under the Crown's certificated appraisement was, in fact, adequate. It was material, as a point of law, that the appraisement made by the Crown was not an appraisement acquiesced in by the claimants. They had no notice of it. The cargo was shown to have been valued merely as a cargo of phosphates undisposed of in an English port, of which no buyer was in view. It took no account of the Swedish demand for phosphates, and none of the urgent demand there then was in England for phosphates for munitions of war. He found that the actual value of the cargo must be ascertained by the Court, if it could not be agreed, and the claimants must receive any such sum by which the amount was proved to exceed the sum paid into Court.

Mr. Wright, K.C., for claimants, suggested that failing an agreement, it might be better that his Lordship should indicate the proper sum and not the Registrar.

His Lordship said he had considered that. He had acquainted himself with the facts of this case, and probably he could take the inquiry more briefly than anybody else.

Heavy Loss on a Seap Contract.

At the London Bankruptcy Court on Wednesday before Mr. Registrar Hope, the public examination was appointed to be held of Sarah Alice Duffield, residing at 29, Lichfield Street, Burton-on-Trent, and W. H. R. Weller, residing at 19, Bouverie Road, W., Folkestone. The joint statement of affairs showed gross liabilities amounting to £8,508. 11s. 2d., and assets, consisting of stock in trade, valued at £50., thus leaving a deficiency of £8,458. 11s. 2d.

The Receiving Order was made on the petition of a creditor on April 29 last. The firm had dealt principally in soaps and tinned goods, and the failure was attributed to a judgment for £3,500. being given in an action brought against the firm in respect of certain soap which was alleged not to be up to the standard guaranteed, and which was afterwards sold at a heavy loss; also to the cancellation of large contracts by the firm bringing the action, and to the absolute stagnation of the soap market, owing to the prohibition of export and fears of the result of Government control.

The Official Receiver said he had received a letter from Mr. Duffield stating that his wife was very ill and quite unable to attend for public examination. Under the circumstances the Official Receiver asked that the examination might be adjourned *sine die*, but the learned Registrar decided to adjourn the examination generally with liberty to apply.

ITEMS OF INTEREST.

GERMAN DYES FOR BRITISH USERS.—According to the *Manchester Guardian*, about 650 tons of German dyestuffs are now in Manchester awaiting distribution.

PERSONAL.—Dr. Cecil H. Desch, of the Royal Technical College, Glasgow, has been appointed Professor of Metallurgy at Sheffield University in succession to Dr. Arnold, who recently resigned and has been elected Emeritus Professor.

OIL-FUEL STORAGE AT LIVERPOOL.—According to the *Liverpool Post*, steps are being taken by four of the leading oil companies to make Liverpool one of the largest oil-supplying ports in the country by the erection of huge storage tanks on land belonging to the Mersey Docks and Harbour Board.

A CORNISH MINING ARRANGEMENT.—A circular has been issued to shareholders of the Geevor Tin Mines, stating that a provisional arrangement has been made by the directors with the Levant Mines Committee under which the respective undertakings will be worked on lines which are expected to have a far-reaching effect on the future of both companies.

COMPLIMENTARY DINNER.—At the Victoria Hotel, Manchester, on Tuesday, December 9, the staff of Messrs. Millward and Co. (Drysalters) Ltd., Manchester, entertained their two governing directors—Mr. F. T. T. Reynolds, J.P., and Mr. Percy Cryer—to dinner. After the loyal toasts had been proposed by Mr. J. H. Gregson (director), Mr. Wignall (chairman), the oldest member of the staff, proposed "Our Guests and Success to the Firm."

EXPLOSION.—An explosion took place at Nobel's Ardeer Factory, Stevenston, on Thursday (December 11), and one man was killed. The accident occurred on a "hill" in the blasting explosives department. A quantity of nitro-glycerine was being washed, when there was an explosion, and the house and contents were blown up. There was only one man on the "hill" at the time, John Curr (33), and he was killed. The explosion caused considerable alarm in the neighbourhood, and was heard over a wide area.

PROPOSED AMERICAN PLATINUM CORPORATION.—A Bill has been introduced into Congress providing for the incorporation of the United States Platinum Corporation, with capital stock of \$30,000,000., the object of which is to secure a concession from the Government of land areas in Alaska containing platinum sands, and to pay for such privileges, as a royalty or subsidy, one-eighth of the net products obtained from the working of the concession. The operation would be under the jurisdiction of the Treasury Department.

JAPANESE-AMERICAN ALUMINIUM COMPANY.—Representatives of an American aluminium concern have recently arrived in Japan to confer with Japanese aluminium interests in the formation of a company, the proposed capital of which is yen 10,000,000, the Americans to take one-half the shares and the Japanese the other. The parties are in negotiation with the Japanese Government for water-power rights in Toyama Prefecture. The American company, having agreed to transfer to the Japanese company all its manufacturing rights and technical experience, do not wish that the shares to be offered in Japan should be open to public subscription.

GLAUBER'S SALT IN SIBERIAN LAKES.—The following is an estimate of supplies of precipitated Glauber's salt in some of the Siberian lakes: (1) The Great Marmyshansk Lake, 144,000,000 poods (2,600,000 short tons) of crystalline salt ($\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$) and 22,000,000 poods (397,210 short tons) of evaporated Glauber's salt; (2) Little Marmyshansk Lake, 25,000,000 poods (451,400 tons) of crystalline salt; (3) Lake Tuskal (Minusinsk district), up to 100,000,000 poods (1,805,500 tons) of crystalline salt; (4) Lake Varche (Minusinsk district), up to 100,000,000 poods (1,805,500 tons) of precipitated crystalline salt and an enormous quantity of Glauber's salt in solution.—*U.S. Com. Rep.*

BUSINESS NOTICES.—Messrs. Holt, Thompson and Co., Ltd., fine chemical manufacturers, Liverpool, inform us that they have acquired the whole of the fine chemical business of the Bradford Wool Extracting Company, Ltd., of Pit Lane Mills, Bradford, and are transferring the entire plant to their own works at Binns Road, Liverpool.—Messrs. K. L. Allan and Co., lubricant manufacturers and merchants, The Albany, Liverpool, have taken over Messrs. J. B. and J. Atherton, Ltd., as a going concern, and have developments in view. Large works at Rainford have already been bought, and are being equipped. Mr. J. B. Atherton has joined the board of Messrs. Allan's, and has been appointed chairman.

MALAY TIN EXPORTS.—The exports of tin from the Federated Malay States in November amounted to 2,972 tons, compared with 3,221 tons in October and 3,131 tons in the corresponding month last year. The total export for eleven months of the present year was 34,454 tons, compared with 34,337 tons in 1918 and 36,308 tons for the corresponding period of 1917.

SOUTH AFRICAN NITRATES.—In the Government report on the nitrate deposits in the Priestra district of South Africa it is stated that the costs for crushing, leaching, etc., will probably amount to from 4s. 6d. to 5s. 6d. per ton of rock, and that the total costs of producing commercial nitrate will come to from 10s. to 13s. per short ton of rock handled. The rock contains some 12 per cent. of recoverable nitrates.

EXPORT OF OLIVE OIL FROM SPAIN.—A Spanish Royal Order has now been issued (No. 160, dated November 18) in virtue of which export licences for olive oil are to be issued, to those who have sent in offers of deposits, to the extent of 20,307,514 kilograms. These export licences, when issued, are to be valid until March 15, 1920, for consignments packed in hogsheads, and until May 1, 1920, for consignments packed in tins bearing printed Spanish marks.

STOCKS OF NON-FERROUS METALS.—The Ministry of Munitions announce that the following stocks (exclusive of old metal and scrap) in this country were in their possession on December 1, 1919: Copper, 14,867 tons; spelter (G.O.B.), 12,848 tons; spelter (refined), 10,940 tons; aluminium, 8,911 tons; soft pig lead, 59,912 tons; nickel, 1,800 tons; antimony regulus, 2,950 tons. A proportion of the above stocks is already sold to the trade for forward delivery.

ELECTROLYTIC ZINC COMPANY'S CAPITAL.—According to a Melbourne advice, it is reported that in the New Year the Electrolytic Zinc Company will require further capital for the extension of the Ridsdon works. New shares will be offered to Amalgamated Zinc, Ltd., the North and South Broken Hill Companies, and the Zinc Corporation, Ltd., in the proportion of their holdings. These companies will offer shares to individual shareholders for subscription. The ultimate outlay on the Ridsdon works is estimated at £1,500,000. So far only £500,000. has been expended.

ELECTROLYTIC DISINFECTING FLUID.—During the year 1918, according to the report of Dr. F. W. Alexander, Medical Officer of Health for the Borough of Stepney, 30,750 gallons of electrolytic disinfectant were manufactured, making 61,500 gallons as diluted for distribution. The cost was for materials £114., electrical energy £51., total £165. Since the installation of the plant, a period of 13 years, 504,219 gallons of fluid have been manufactured at a cost for electricity of £786., and materials of £645.; previous to the war the cost was under ½d. per gallon, and even with the strong fluid which at present is being made, and is diluted, the cost is still about ¾d. per gallon.

FIRES.—A fire broke out in the sulphate storerooms at Lord Ellesmere's by-product works at Brackley Collieries, near Walkden (Lancs.), on Sunday morning. Lord Ellesmere's fire brigade kept the fire from the large stocks of benzole and other inflammable spirit and from the gas-producing plant, which lights the township of Little Hulton. The damage was extensive, the storerooms and large quantities of sulphate being destroyed.—Two Rochester barges, the Tom Tuff and Arthur, with cargoes of high explosives, were destroyed by fire in the Thames off Dagenham on Monday morning, and the barge Clanwood, lying alongside, was damaged. The fire-engines at first could not go near, owing to the explosions which occurred.

ACTIVE NITROGEN.—Some years ago Professor Strutt (now Lord Rayleigh) discovered that nitrogen, generally a sluggish gas, can be activated by the electric discharge under conditions which are still obscure to a certain extent. The active nitrogen has never been prepared in a pure state, and its constitution is unknown. Max Trantz suggests in the *Zeitschrift für Elektrochemie* of last September, that active nitrogen is N_3 , a body somewhat analogous to ozone O_3 , and that at any rate at very low temperature active nitrogen consists essentially of N_3 , and at ordinary temperature partly of N_3 . He believes at the same time that it will be impossible to prepare pure N_3 , because when cooled in the presence of N its active nitrogen passes into N_2 , and when heated it decomposes into N_2 . Lord Rayleigh's original opinion was that his active nitrogen was simply atomic nitrogen N , not molecular N_2 .—*Engineering*.

PARLIAMENTARY NEWS.

Oilcake.

In the House of Commons, Sir N. Griffiths asked the Food Controller whether he is aware that oilcake has recently been contracted forward from the mills at £10. per ton, and is now being retailed at prices ranging from £22. to £28. per ton; whether he will state what becomes of the intermediate profit in such transactions; and if he will state the present cost of such oil-cake ex works?

Mr. McCurdy: The Food Controller has no knowledge of any such sales of oilcake as those to which the hon. member refers. Certain quantities of palm kernel cake and rape cake have been sold at low prices, but farmers are for the most part unwilling to purchase these varieties, and prefer linseed and cotton-seed cake, the respective prices for which are about £25. and £19. to £20. per ton, ex mill.

Colonel Wedgwood: Is it not a fact that this extraordinary increase in the price of oilcake is largely due to the confining of the sales of palm kernels to a ring of manufacturers in this country?

Sir N. Griffiths: Is there any intention of taking control off these goods—oilcakes in particular?

Mr. McCurdy: I will inquire into the matters to which the hon. gentlemen refer.

Mr. McCurdy, in reply to a further question, said: The present maximum prices for oilcakes are fixed in accordance with the prices in the countries of origin of the seeds from which they are manufactured.

Import of Cement.

Sir A. Geddes, replying to Mr. J. Davison, said: The importation of cement is not restricted, and any difficulty in obtaining it from abroad is not due to the action of the Government.

Petroleum Storage Facilities.

Sir H. Greenwood, in answer to Sir W. Seager, said: The need of adequate storage facilities for petroleum is fully realised. A considerable amount of tankage has been erected or is projected both on Government and private account, and the position will be kept carefully under review.

Explosives Stores.

Mr. Kellaway, in reply to Mr. H. Jones, said: The number of magazines provided for the storage of explosives during the war was eighty-nine. Of these, fifty-four have been given up, and five more are being cleared prior to restoration to the owners. The annual charge based on present requirements is, approximately, £80,000.

Wolfram Contracts.

Mr. Short, on Monday, asked the Parliamentary Secretary to the Ministry of Munitions whether, since the armistice, any contributions have been paid or are due to be paid to certain firms because of the absence of a break clause in their contracts?

The Deputy-Minister of Munitions (Mr. Kellaway): In the case of one group of contracts placed overseas, through the agency of Colonial and other governments, for the whole Empire supply of wolfram, the producers refused to accept the break clause. This entailed additional expenditure estimated at £450,000.

Pulverised Coal.

Sir Arthur Fell asked the President of the Board of Trade if any action is being taken to develop the use of pulverised coal for smelting and power purposes; is he aware that the use of pulverised coal is spreading rapidly in the United States, and that the smelting works of the Steel Trust use this method only; if poor coal and coke and small coal can all be used by this process; and if there is, approximately, a saving of from 25 per cent. to 30 per cent. in its use?

Sir A. Geddes: Considerable development is taking place in the use of pulverised coal for smelting and power purposes in this country as well as in the United States. I am unable to say whether the saving is as high as that suggested in the last part of the question.

MANCHESTER COLLEGE OF TECHNOLOGY.—An appeal has been issued for the sum of £150,000. for the purpose of carrying out extensions at the Municipal College of Technology, Manchester.

CORRESPONDENCE.

***We do not hold ourselves responsible for the opinions expressed by our correspondents.*

What is a Catalyst?

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—Your brightly written article, "What is a Catalyst?" brings home to us the inadequacy of definition, even when formulated by "scientific gents." Huxley pointed out that the dead soul of Peter Bell would not have been roused one whit from its apathy had he been told that "the primrose is a Dicotyledonous Exogen with a monopetalous corolla and central placentation." Similarly, those seeking enlightenment upon the nature of a miracle are merely stunned when they learn that it is "an abnormal exercise of constitutional sovereignty on the part of the very divine Ego, in respect of the subsistence of the cosmical selfhood of the metamorphosed non-Ego."

One of the most telling descriptive definitions is that attributed to a well-known French historical character who said, "When one man is attempting to explain a point which he does not himself understand to another who does not comprehend what he is saying, that is metaphysics."

The action of a catalyst might—etymologically speaking—be the converse, or opposite, of that of an analyst. This, however, certainly does not seem to fit the facts.

Is chemistry a branch of metaphysics?

Sir William Tilden, in his delightful book, "Chemical Discovery and Invention in the Twentieth Century," tells us that "catalysis is a process in which a chemical change, which without assistance proceeds either not at all or very slowly, is greatly accelerated by contact of the materials with a small quantity of some agent, called a catalyst, which remains after the reaction undiminished." At best, this can only be said to be correct within the limits of accuracy of our measuring instruments and of our powers of observation.

Criticising A. R. Wallace's views on Darwin's Theory of Natural Selection, Huxley wrote: "Mr. Wallace, presumably, believes in that correlation of phenomena which we call cause and effect as firmly as I do. But if he has even been able to form the faintest notion how a cause gives rise to its effect, all I can say is that I envy him," and a little further on, "In ultimate analysis everything is incomprehensible, and the whole object of science is simply to reduce the fundamental incomprehensibilities to the smallest possible number."

I fear we must leave it at that. In the present state of our knowledge we are certainly not in any position to dogmatise either upon the "how" or upon the "why" of catalytic action.—Yours, etc.,

ED. C. DE SEGUNDO.

Dashwood House, New Broad Street, London, E.C.

December 16, 1919.

Waste-heat Boilers.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—On page 601 of your issue of November 29 one of your contributors suggests that unless a gas engine is of at least 500B.H.P. it does not pay to install a waste-heat boiler. If this remark is true of other boilers it is certainly not true of the "Bonecourt" patent waste-heat boiler; for only the other day a client wrote to us and told us that a "Bonecourt" boiler he had installed on his 250B.H.P. gas engine was saving him £5. per week in fuel and attendance. The return on his money is therefore in this case 140 per cent. per annum, probably one of the best investments which could be found.—Yours, etc.,

BONECOURT WASTE HEAT BOILER CO., LTD.

Parliament Mansions, Victoria St., London, S.W. 1.

December 16, 1919.

ZINC AND ZINC DUST PRICES.—In common with the rise in spelter, Australian high-grade zinc dust (88/92% metallic zinc) has firmed up to £80. per ton. There is a strong demand for the material on this basis, but practically nothing offering for prompt supply. Lower grades are obtainable at correspondingly cheaper prices. The price of Australian electrolytic zinc (99/95% purity) has been advanced to £48. per ton f.o.b. Australia for direct shipment to New Zealand, India, South Africa, and the Far East.

EXPORTS OF CHEMICALS AND ALLIED PRODUCTS.

(Concluded from page 690.)

ARTICLES.	QUANTITIES.		VALUE.		ARTICLES.	QUANTITIES.		VALUE.	
	Month ended Nov. 30th.		Month ended Nov. 30th			Month ended Nov. 30th.		Month ended Nov. 30th	
	1919.	1918.	1919.	1918.		1919.	1918.	1919.	1918.
OILS, Refined :			£	£	OIL-SEED CAKE, not			£	£
Coco-nut cwt.	—	—	—	—	sweetened :			—	—
Cotton-seed tons	543	—	53,407	—	Cotton-seed Cake tons	—	—	—	—
Olive tuns	15	—	3,711	—	Linseed Cake .. "	10	—	244	—
Palm cwt.	1,060	—	4,730	—	Rape-seed Cake .. "	—	—	—	—
Palm Kernel .. "	—	—	—	—	Soya Bean Cake .. "	—	—	—	—
Total Val. £	—	—	61,848	—	Unenumerated.. "	—	—	—	—
OILS, Unrefined :					Total "	10	—	244	—
Coco-nut cwt.	—	—	—	—	PARAFFIN WAX .. cwt.	29,768	600	84,962	1,170
Olive tuns	1	—	70	—	SOAP :				
Palm cwt.	510	—	2,085	—	Soft Soap cwt.	13,322	1,304	37,663	3,870
Palm Kernel .. "	499	—	2,348	—	Household and Laun-				
OIL, SEED :					dry Soap, in bars or				
To Netherlands tons	1,309	—	119,686	—	Tablets :				
Belgium "	2,109	—	211,164	—	To China "	493	3,057	1,855	9,408
Brazil "	378	—	43,483	—	Other Foreign				
Egypt (includ-					Countries .. "	138,610	21,604	548,300	71,790
ing Anglo-					British South				
Egyptian					Africa "	—	—	—	—
Sudan) "	79	—	7,942	—	British East				
British India "	44	—	5,279	—	Indies "	11,064	13,996	26,112	32,058
Straits					Other British				
Settlements "	56	—	7,199	—	Possessions .. "	28,608	16,697	91,385	49,844
Ceylon "	13	—	1,396	—	Total "	178,775	55,354	667,652	163,100
Australia .. "	50	—	5,483	—	Polishing and Scouring				
Canada "	159	—	16,005	—	Soap cwt.	487	297	1,163	759
Other C'tries "	7,428	156	706,978	9,714	Soap Powder .. "	637	1,285	1,699	2,512
TOTAL :					Toilet Soap "	15,793	3,981	174,722	45,035
Castor-seed Oil "	456	—	47,740	—	Unenumerated .. "	1,536	182	8,700	1,704
Cotton-seed Oil,					Total of Soap .. "	210,560	62,403	891,590	216,980
Unrefined ... "	286	—	18,655	—					
Linseed Oil :									
Pure "	8,150	2	782,295	148					
Not Pure "	379	154	37,279	9,566					
Rape-seed Oil .. "	1,963	—	191,908	—					
Soya Bean Oil .. "	246	—	28,267	—					
Other Seed Oils "	145	—	18,471	—					
Total "	11,625	156	1,124,615	9,714					
CANDLES :									
To British South									
Africa cwt.	8	—	46	—					
Other C'tries .. "	46,713	123	282,454	738					
Total "	46,721	123	282,500	738					
CEMENT for Building &									
Engineering purposes :									
To Netherlands tons	6,074	—	19,489	—					
U.S.A. "	53	13	401	191					
Brazil "	103	—	836	—					
Argentine									
Republic .. "	324	252	1,803	1,700					
British South									
Africa "	751	—	4,100	17					
British East									
Indies "	11,962	41	66,947	733					
Australia .. "	—	—	—	—					
New Zealand .. "	4	—	20	—					
Canada "	15	—	156	—					
Other C'tries "	21,354	1,721	114,245	6,302					
Total "	40,640	2,027	207,997	8,943					
GLUE, Size, and									
Gelatine cwt.	14,803	1,397	67,601	10,323					

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

(SPECIALLY CONTRIBUTED.)

The outlook is brightening steadily. The imminence of a settlement of the ironmoulders' strike makes almost certain the revival of business in the Cumberland and North Lancashire hematite pig-iron trade in the spring, and already Midland users of low phosphorus brands of iron, who have been hit by the strike, are commencing to put out feelers concerning their commitments three months ahead. Even if there is no expansion of the local production of steel there are good prospects of the Midlands greatly increasing their requirements of ordinary iron as soon as the strike is over. As a matter of fact, however, the steelworks on this coast expect to be much busier in the spring, and in that case, of course, there will be a larger demand for the coke made at the by-product ovens here. But already production in the coking industry is being speeded up, and the ovens are now working five days a week, and though that does not represent full capacity it is a considerable improvement on the state of affairs existing last month. As more trucks become available more coke is carried across to the East Coast for shipment to Belgium and Switzerland; and when the ovens have both local and foreign needs to satisfy the industry will be overwhelmed. One effect of the greater liveliness in the coke trade is the falling off in the shipments of coal for the Irish market. East Coast coke supplies to West Cumberland this week are about 5,000 tons, and to the Furness district under 15,000 tons, and the increasing make of benzole is being eagerly absorbed. There is a duller demand for sulphate of ammonia, and tar, pitch, and creosote are all rather quiet.

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REPORTS OF COMPANIES.

Loders and Nocoline, Ltd.

The annual meeting was held in London on Thursday, December 11, Mr. W. F. Irvine, chairman of the company, presiding.

The Chairman, in the course of his address, said: A good demand for the company's products has been experienced since the removal of restrictions—in excess, indeed, of our present power of production; and, as stated in the report, large additions to the company's premises and plant have been authorised, and are now in progress. While this is the condition of trade at present—a condition which will probably last for some time,—there can be no doubt that the time will soon come when competition at home will become keen, while we shall, at the same time, feel the effects of the increased production of competing material in France, Belgium, America, and eventually Germany and Austria. In view of these considerations, your directors have felt for some time that the day would soon come when it would be difficult, however well equipped and staffed, for a factory dependent for its raw materials on merchants, who in some cases were themselves crushers and refiners, and relying on the other hand for many of its sales on firms who were already producing their own finished goods, and who in the near future may actually have a surplus for sale in competition, to maintain anything like the present level of profits. Your directors therefore decided that the time had come when it was imperative we should link ourselves up with some other group or organisation to secure permanently our supply of raw material, or to provide an outlet for our finished goods, or both. In the prosecution of their search for such support, your directors believe they have been successful, and you now have in your possession a circular explaining the details of a provisional transaction, which, we feel sure, you will recognise as one you can heartily ratify. The provisional agreement with the African and Eastern Trade Corporation, Ltd., has been adopted and ratified by holders of the requisite minimum number of shares, and has become absolute.

The report was adopted.

American Cyanamid Company.

Messrs. Sperling and Company announce that the American Cyanamid Company reports on operations during October as follows: Operations of the plant at Niagara Falls were on the basis of full capacity. At the ammo-phos plant at Warners, N.J., the manufacture of ammos-phos, temporarily suspended due to the cessation of phosphate rock shipments, was resumed. At the phosphate mines, Brewster, Fla., we were able to further increase our operations during the full mining operations; the drying and shipping operations during October were upon a substantial normal basis. The net value of the shipments of the various products for the month of October totalled \$693,953.49. Sales of the various products for the month of October represent a value of approximately \$1,108,000. Unfilled contracts as at October 31 represent a sales value of approximately \$3,390,000.

Low Temperature Carbonisation, Ltd.

The annual meeting was held on Monday in London, Mr. H. L. Armstrong (the managing director) presiding.

The Chairman said: The company's Barnsley plant was operated from April to September, and the results obtained were such that the engineering staff was able to report to the board on September 15 that the claims made in the past for the company's processes were fully justified. In view of this conclusion, we commenced negotiations for several large schemes to erect plants as soon as industry had settled down. A contract has now been arranged with an electric power company in Yorkshire to erect a plant and supply all the gas that can be made from the carbonisation of 500 tons of coal per day. This gas is to be burnt in the power company's boilers in place of raw coal; and since the electric company in question is one of the foremost in the country, and supplies its electric power at a very low rate, we are actually offering to supply them with gas at a price which shows a great saving over coal. Negotiations were then begun with an influential group of manufacturers situated in a great industrial district in Scotland, the object being to provide enormous quantities of power-gas for burning under boilers in place of coal, and our process lends itself so well to this scheme that it immediately found favour with the parties interested. Assurances

have been given that consumers whose aggregate consumption of coal is from 4,000 to 5,000 tons of coal per week will purchase gas from a super-carbonising station operated on our process as soon as erected. We are now getting out a plan by which this scheme can be worked on co-operative lines whereby the consumers will also be shareholders in the company. Negotiations are also practically complete for the erection of a plant to carbonise a minimum of 500 tons of coal per day near Sheffield. Although in all these schemes the only arrangements are those which have been made to sell the gas, large quantities of motor spirit, oil, smokeless fuel, sulphate of ammonia, chemicals, etc., will also be made and marketed. Work upon the above plants is expected to start next year, and will in all probability be handled by subsidiary companies.

Cassel Cyanide Company, Ltd.

Sir George Beilby presided at the annual meeting held last week in Glasgow, and, in moving the adoption of the report, said that two factors had operated during the war—a greatly reduced turnover and a lessened margin of profit. Within the last few months the demand for cyanide had improved, and German and American competition was already active in certain markets. The directors were fully alive to the need for improving their processes and methods of manufacture, especially having regard to the changed conditions, and much experimental work was being done. Several questions were asked, the Chairman stating in reply to one inquiring whether consideration had been given to the broadening of the basis of manufacture, that they had always been a highly specialised industry, but that consideration would be given to any suggestion. The report was adopted.

Courtaulds, Ltd.

At an extraordinary general meeting on Monday, Mr. H. G. Tetley, who presided, explained that the meeting was convened for the purpose of passing a resolution revising and extending articles of association with regard to reserves in relation to dividends and as to the position of affairs in Russia, on which some shareholders had asked for information. He said that, considering the state of Russia generally at the present time, it was uncertain as to whether there would be any sort of Government there at all. It was impossible to make any forecast as to the future of their business in that country. The resolution was carried.

Sapon Soaps, Ltd.

The net profit for the year ended September 30, after making various deductions, amounts to £8,234., which, with £4,335. brought forward, makes total available for dividends, etc., of £12,569. Dividend of 2½ per cent. for year on ordinary—viz., £2,500.—making total dividend distribution of £9,500., leaving to be carried forward £3,069. No dividend was paid on the ordinary for the preceding year.

Ropp Tin Company, Ltd.

Interim dividend of 50 per cent. (2s. per share). The directors recommend that the capital be increased to £168,000. by the creation of 465,000 shares of 4s. each.

DIVIDENDS.

MAZAPIL COPPER COMPANY, LTD.—Interim dividend of 7½ per cent. (1s. 6d. per share), less tax.

MERCHANDISE MARKS.—The Merchandise Marks Committee, which is considering the questions of indications of origin on goods and of national trade marks, met at the Board of Trade offices on Thursday and Friday of last week under the chairmanship of Mr. Harry Greer, M.P. Evidence was given regarding the present position of the matters into which the committee are inquiring, in so far as those matters affect the Board of Trade and the Customs, by Mr. H. Fountain, C.B., C.M.G., an Assistant Secretary of the Board of Trade in charge of the Commercial Relations and Treaties Department; Mr. Temple Franks, C.B., Comptroller-General of Patents, Designs and Trade Marks and Comptroller of the Industrial Property Department of the Board of Trade; and Mr. J. L. Mackie, an Assistant Secretary of the Board of Customs and Excise.

THE PATENT LIST.

PATENTS AND DESIGNS ACT, 1907.

APPLICATION FOR RESTORATION OF Lapsed PATENT UNDER SECTION 20.

Notice is given that William Innes and the National Lead Company, Limited, have made application for the restoration of the Patent granted to the said William Innes for an invention entitled "Improvements in or Connection With the Production of Lead Oxide and in Means or Apparatus Employed Therein," numbered 15,664, of 1912, and also of the Patent of Addition, No. 10,387, of 1913, both of which expired on July 4, 1919, owing to the non-payment of the prescribed Renewal Fee. Any person may give notice of opposition to the restoration by leaving Patents Form No. 16 at the Patent Office, 25, Southampton Buildings, London, W.C.2, on or before February 17, 1920.

W. TEMPLE FRANKS, *Comptroller-General*.

APPLICATIONS FOR BRITISH LETTERS PATENT.

December 8th to 13th (inclusive).

Apparatus for Heating Liquids. Abogado, L. G. 30,834.
Process of Heating Liquids. Abogado, L. G. 30,835.
Solder for Aluminium. Adams, D. M.; and Melrose, J. 30,768.
Filters. Arrighi, E. S. 30,675.
Rubber Compound. Bashford, J. E. 30,814.
Pickling Iron or Steel. British and Foreign Chemical Producers, Ltd. (*Rheinische Kampferfabrik Ges.*). 30,960.
Working Oil Shales. Brown, T. E.; and Hoover, W. W. 31,104.
Thermostats. Calico Printers' Association; and Turner, G. 31,112.
Purification of Tin. Collins, J. J. 30,950.
Vulcanising India-rubber. Conner, M. S.; and Lyttlemore, S. 30,739.
Preparation of Peat Fuel for Producer Gas. Davidson, S. C. 31,074.
Manufacture of Acetic Anhydride. Dreyfus, H. 31,294.
Process for Manufacture of Gelatinous Nitro-glycerine Explosives Proof Against Fire-damp. Dynamit-Akt.-Ges. vorm. A. Noble and Co.; and Navum, P. 31,201.
Manufacture of Borneol. Fabriques de Produits Chimiques de Thann et de Mulhouse. 30,706.
Process of Converting Hydrocarbons. Goold, L. W. (*Universal Oil Products Co.*). 31,138.
Method of Obtaining Perylene. Hansging, F. 31,085.
Protein Food Products. Hort, E. C. 30,820.
Method of Evaporation. Hort, E. C. 30,821.
Mono-azo Dyestuffs. Inray, O. (*Soc. of Chemical Industry in Basle*). 30,839.
Manufacturing Iron Compounds. Marks, E. C. R. (*West Coast Kalsomine Co.*) 30,832.
Liquid Detergents. Marlborough, E. J. 30,653.
Gas-fired Furnaces. Maschinenbau-Akt.-Ges. Balcke Abteilung Moll. 31,223.
Centrifugal Atomisers. Maschinenbau-Akt.-Ges. Balcke Abteilung Moll. 31,225.
Regulating Flow of Liquids. Muntz, W. E. 31,216.
Means for Calcining Magnesia. Newall, F. S. 30,816.
Extraction of Sulphur from Sulphide Ores. Pedersen, H. C. 30,977.
Heating Furnaces by Liquid Fuel. Richmond Gas Stove and Meter Co. 30,736.
Composite Fuel. Rushton, B. F. 31,196.
Purifying Air. Schattner, E. 30,714.
Apparatus for Electrostatic Deposition of Particles from Gases. Skinningrove Iron Co.; and Bury, E. 31,066.
Carbonisation or Destructive Distillation. Underfeed Stoker Co.; and McEwen, S. 31,073.
Scarlet Dye. Ward, E. W. 31,234.
Devulcanising Vulcanised Rubber. Willard, C. F. 30,870.
Producing a Gaseous Pressure Medium. Witkiewicz, R. 30,670.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 6d. in stamps to the Comptroller, Patent Office Sales Branch, 25 Southampton Buildings, Chancery Lane, W.C.

The numbers in heavy type are those under which the Specifications will be printed and abridged and all subsequent proceedings will be taken.

1917.

Manufacture of Products of Addition of Desoxycholic Acid. Wieland, H. 5,589. **105,769**

1918.

Combustion of Pitch. Rowntree and Co.; and Fryer, F. G. 15,809. **135,886**
Measuring Quantities of Different Materials in Varying Proportions. Lea, T. 16,854. **135,888**
Fixation of Atmospheric Nitrogen and the Production of Ammonia. Haslup, E. W. 17,364. **135,889**
Raising Liquids by Direct Fluid Pressure. Ogden, J. E. L. 19,416. **135,900**
Electric Air Shaft Furnaces. Bibby, J. 19,671. **135,905**
Liquid-raising Apparatus. Grant, J. C. 19,907. **135,923**
Purifying Gas and Obtaining By-products Therefrom. Umsted, F. A. 20,002. **135,931**
Apparatus for Use in the Manufacture of Margarine. Blichfeldt, S. H. 20,079. **135,939**
Preparing Pigment Zinc-oxide. American Zinc Lead and Smelting Co. 20,208. **122,170**
Gas-producing Plant. Climie, W.; and Lees, W. 20,392. **135,959**
Spraying Liquids. Dunn, C. E. 20,656. **135,965**
Recovery of Lead and Silver from Sulphide Ores. Amalgamated Zinc (De Bavay's), Ltd.; and Ganelin, S. 26,761. **135,968**

Manufacture of Lactose or Milk Sugar. Martin, G. 20,836. **135,969**

Filter Presses. Webster, R. W. 21,057. **135,976**

Process for Separating Ortho- and Para-toluene-sulpho-chlorides. Matthews, F. E.; and Strange, E. H. 21,402. **135,987**

Separating Solid Particles of Matter from Liquids. Acton, W. 21,756. **135,992**

1919

Method of Burning Combustible Gases. Dunham, M. K. 5,664. **125,364**

Synthetic Production of Ammonia. General Chemical Co. 7,872. **124,762**

Apparatus for Sintering Concentrates, Distilling Shale, and the Like. Berglund, J. M. 9,903. **136,076**

Manufacture of Manganese and Its Alloys in the Electric Furnace. Lenoir, C. L. 10,755. **126,303**

Apparatus for Feeding and Burning Powdered Coal. Marks, E. C. R. (*Combustion Economy Corporation*). 18,128. **136,121**

Apparatus for Fractional Distillation. Chenard, E. A. R. 19,318. **130,992**

Manufacture of Alcohol. Elektrizitätswerk Lonza. 19,573. **134,521**

Filter-bag Cleaning-devices for Air Filters. Beth, W. F. L. (firm of). 22,128. **132,513**

COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

1919.

Method of Reducing the Viscosity of Viscous Solutions of Nitro-cellulose, Acetyl-cellulose, and Other Cellulose Esters. Carlsson, O.; and Thall, E. 22,187. **136,141**

Apparatus for Concentrating or Washing Ores and for Similar Purposes. Lesser, M. 25,529. **136,145**

Recovery of Zinc by Electrolysis. Electrolytic Zinc Co. 29,504. **136,151**

Production of Oxides of Nitrogen and a Catalyser Therefor. General Chemical Co. 30,090. **136,158**

Means for Producing Hot Air. Pedersen, H. A. M. 30,118. **136,160**

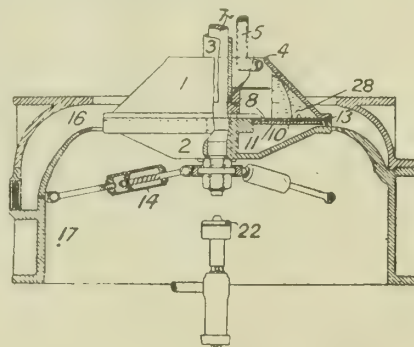
Process for Treating Sulphide Ores by Dissolution and Selection Through the Medium of a Neutral Solution of Certain Chlorides, Particularly Ferric Chloride. Soc. Anon. Minerais et Metaux. 30,233. **136,163**

Process for Neutralising Mineral Oils Which have been Treated with Acid. Gresaid, G. 30,379. **136,169**

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Centrifugal Separators. W. Mauss, Johannesburg, South Africa. British Patent, 133,448, of 1918.

In centrifugal separators in which the separated solid is progressively deposited on a filter cloth through which the separated liquid passes away, the unseparated material is prevented from coming into contact with the filtering-surface. The separating-drum is made up of two conical members 1, 2 carried by a hollow shaft 3 and a solid shaft 7 respectively. The illustration shows the drum in separating position; the material is fed in by a pipe 5 to the cone 1 in the direction of rotation and passes down the cone to the filter



surface 8, which is arranged over a grooved plate 10. Solids 23 are deposited on the conical surface, and the liquid passes away through the filter to the chamber 11 and escapes through the recurved channel 13 to the receiver 16. After the separation has proceeded, the material passes over the rim 4, which is of greater diameter than the inner edge of the filter surfaces. The supply is then stopped, the drum is lowered into the receiver 17, and the two parts are separated, the lower part resting on the support 22. The solids then escape from the cone 1, and are thrown from the filter. The lower end of the shaft 7 is supported in a bearing carried by spring arms 14.

Motor Spirit. A.-de-feo Lopez, Buenos Aires, Argentine. British Patent, 133,434, of 1918.

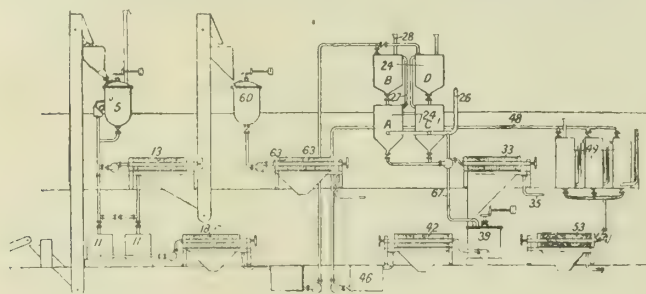
A fuel for internal-combustion engines comprises alcohol partly etherified, as by bubbling it through a mixture of alcohol and sulphuric acid at a temperature of from 100 to 150° C., mixed with from 10 to 40 per cent. of unetherified alcohol and from 5 to 50 per cent. of a distilled hydrocarbon oil, the proportions being such as to give a mixture having a specific gravity of from 0.73 to 0.78.

Potassium Fluoride. E. E. and P. C. Dutt, Jubbulpore, India. British Patent, 133,474, of 1918.

A silicate mineral such as feldspar is treated at about 500-600° C. with silicon tetrafluoride and steam, and the mass is then lixiviated to dissolve out potassium fluoride. The solution is evaporated to dryness.

Carbon. Broxburn Oil Company, Glasgow; and R. H. Findlater, Broxburn, Linlithgow. British Patent, 133,452, of 1918.

The carbonaceous residue of the distillation of bituminous shales, cannel coal, etc., is ground, washed, and digested with sulphuric, hydrochloric, nitric, or hydrofluoric acid in a digester 5, the mixture is filtered in a press 13, and the filter-cakes digested in a digester 60 with caustic soda, the carbon being filtered off in a press 63 and washed with water, dilute acid, and then water. Alternatively, the material may be treated first with acid as described above, then with sodium carbonate, in which case some silica separates on cooling, and then with caustic soda. The acid extract collected in tanks 11 is filtered in a press 18 to remove any calcium sulphate which separates during cooling, and is then passed to saturators 24 arranged in two groups A, B and C, D used alternately. Ammoniacal gases which may be



derived from the shale distillation are passed in by a pipe 26 to the lower saturator A, the outlet gases passing by a pipe 27 to the saturator B, leaving finally at 28. When the liquor in A is filtered in a press 33, the liquor from B is passed into A, and fresh liquor is run into B. Alternatively, ammoniacal liquor may be used for this precipitation. The press-cakes from the press 33, consisting of alumina and iron hydrate, are digested with caustic soda in a digester 39, iron hydrate being filtered off in a press 42, and sodium aluminate solution being passed through a tank 46 and pipe 48 to towers 49, in which it is treated with gases containing carbonic acid, the alumina being finally separated in a press 53, while the sodium carbonate may be caustified for reuse. Any ammonia cooled in the digester 39 is passed by a pipe 67 into the saturators. The caustic-soda extract from the digester 60 is concentrated for sale as sodium silicate. The ammonium salt solution from the press 33 is withdrawn at 35 and evaporated.

Dyeing Compounds. V. H. Gatty, Whiteholme, near Preston. British Patent, 133,620, of 1919.

Vegetable fibres, yarns, or fabrics are dyed various shades by means of mixtures of oxides, hydroxides, or insoluble salts of copper and manganese. The process is carried out by impregnating the material with solutions of soluble salts of the two metals—e.g., sulphates, chlorides, or acetates,—removing surplus liquid, and then passing through a hot alkaline bath—e.g., hydrates, carbonates, or silicates of sodium or potassium or mixtures thereof. When salts of volatile acids, such as acetates, have been used, the colours may be developed by steaming. Light olive, brown, or fawn, to deep olive or brown shades are obtained.

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

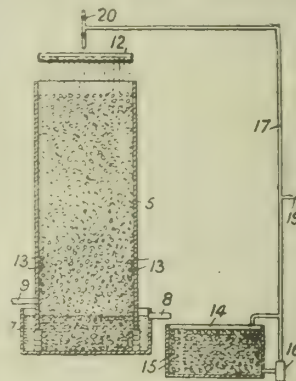
Synthetic Resins. M. Melamid, Freiburg-im-Breisgau, Germany. British Patents, 133,712 and 133,713. Convention date, February 4, 1918.

Resinous compounds are prepared by the reaction of aromatic sulphochlorides on salts of organic acids of high molecular weight, such as resin acids, humic acid, or lignoceric acid. According to an example, naphthalene sulphochloride and sodium colophionate are used. The products are soluble in organic solvents or linseed oil, and may be used in making oil-varnishes.

Resinous compounds, according to the second patent, are prepared by the reaction of aromatic sulphochlorides upon coal-tar pitch; instead of pitch, its alkali-soluble fractions, or the heavy tar oils (anthracene oils) obtained in the manufacture of hard pitch may be used. The products are soluble in organic solvents, and may be used in the manufacture of varnishes.

Zinc Chloride. C. F. Burgess, Laboratories, Madison, Wisconsin, U.S.A. British Patent, 13,319. Convention date, September 26, 1918.

Zinc chloride is obtained by treating with chlorine in the presence of water, zinc, such as zinc scrap, spelter, galvanising dross, and zinc alloys high in zinc. Impure or dilute chlorine may be used, the residual gas being free from chlorine. When electrolytic chlorine containing hydrogen is used air may be added to avoid risk of explosion. Metals such as cadmium, lead, copper, tin, and antimony, if present, are removed from the solution by passing it over zinc, and iron precipitates as hydrate owing to the presence of basic zinc chloride in the solution. The zinc is placed in a tower 5 standing in a tank 7 having an overflow 8, and is supplied with liquor from a distributor 12. Chlorine is admitted at 9, and the heat of reaction may be absorbed by a cooling-coil 13. The solution overflows into a tank 14 containing zinc and a cooling coil 15, and is pumped up for use again by a pump 16 and pipe 17. Water is admitted when necessary by a valve 20, and strong solution is withdrawn at 19.



Glycerine. J. R. Eoff, Washington, U.S.A. British Patent, 133,374. Convention date, July 21, 1917.

Glycerine is produced by fermenting sugars with yeast in the presence of an alkali or alkaline salt, the proportion of alkali, etc., being just below that which inhibits the activity of the yeast. Acetic acid, alcohol, and acetone are obtained as by-products. Any yeast capable of acclimatisation in an alkaline medium is used. The yeast is first cultivated in sterile grape juice, and when in vigorous growth is added to a medium consisting of a wort made from malt sprouts, dextrose, and a yeast food such as Pasteur's solution, or a mixture containing ammonium nitrate, potassium phosphate, ammonium phosphate, magnesium sulphate, and traces of zinc and iron salts. When fermentation is active, sodium or potassium carbonate, phosphate, or hydroxide is added in successive doses up to the limit previously indicated. The "starter" so obtained, when fermenting vigorously, is added to a larger quantity of the medium, and alkali is added as before, the product being used for the manufacturing operation. The material treated for the production of glycerine may be either a solution of dextrose to which a wort obtained from malt sprouts is added, or "black strap" or other molasses, or purified and neutralised waste sulphite liquor. The temperature is maintained at 27.50° C., preferably 37° C., during the fermentation. In treating molasses, the initial stage of the fermentation is effected while the molasses is slightly acid, in order that the sucrose may be inverted by the invertase of the yeast. Afterwards, successive doses of alkali are added in the ordinary manner.

GAZETTE NEWS.

MORTGAGES AND CHARGES.

Farmers' Manure Company, Ltd., Royston.—Registered November 26, deb. securing all moneys due or to become due, to Barclays Bank, Ltd.; general charge. November 26, 1918.

Low Temperature Carbonisation, Ltd., London, E.C.—Registered November 22. Trust Deed dated November 7, 1919, for securing £150,000. 6 per cent. 1st mort. deb. stock; charged on freeholds in Wednesfield and Barugh, also general charge. (December 31, 1918.)

Midland Refractories Company, Ltd., Sheffield.—Registered November 24, £1,000. debts; charged on freehold hereditaments, Bull Bridge Brick Works, Ambergate (Derby), also general charge. (July 24, 1919.)

Mottram Chrome Tanning Company, Ltd., Mottram-in-Longdendale.—Registered November 19, mort. for securing all moneys due or to become due, to Lancashire and Yorkshire Bank, Ltd.; charged on freehold hereditaments in Elton, Bury. (September 19, 1919.)

LIMITED COMPANIES.—Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions. Orders, and Official and Other Notices.

Bechuanaland Copper Company, Ltd.—Resolved November 12, confirmed November 28: That the company be wound up. H. A. Allison, chartered accountant of J. Dix Lewis, Caesar and Co., Kennan's House, Crown Court, Cheapside, E.C., liquidator. Meeting of creditors at liquidator's, December 18.

Liquid Purification Company, Ltd.—Resolved November 21: That the company be wound up. C. G. Baron, 15, Copthall Avenue, E.C., chartered accountant, liquidator.

DISSOLUTIONS OF PARTNERSHIP.

(Note.—When two dates are given in the following announcements, the first is the date of the dissolution. The date in parentheses is that of the official advertisement.)

Carper, Faulkner and Co. (Joseph Burman Carper and Geo. Aubrey Faulkner), Two Waters Mills, Hemel Hempstead, oil refiners. November 17. Debts by J. B. Carper. (December 2.)

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 4, Queen Anne's Gate Buildings, London, S.W. 1, whence, unless otherwise stated, further information may be obtained:—

British India.

H.M. Trade Commissioner in India reports that a Calcutta firm desire to obtain agencies, to cover Bengal and the United Provinces, for United Kingdom suppliers of paints. A partner of the firm is now in England to discuss likely propositions. (Reference No. 1182.)

Canada.

A firm of manufacturers' agents in Toronto desire to represent United Kingdom manufacturers, for the whole of Canada, for drug specialities, soap, dyes, etc. (Reference No. 1185.)

The following inquiries have been received at the Canadian Government Trade Commissioner's Office, Portland House, 73, Basinghall Street, London, E.C. 2, whence further information may be obtained:—

A firm of manufacturers' agents in Ontario wish to get into touch with United Kingdom manufacturers of dyes (particularly blues and reds for colouring inks) who are desirous of extending their markets to Canada.

A firm of perfume manufacturers in Toronto wish to effect connections with manufacturers of, or dealers in, raw materials for perfumers, with a view to purchasing supplies.

A Canadian company manufacturing corundum, emery, and other wheels, also a variety of abrasive cloths and papers, is considering the appointment of a representative each in England, Scotland, and Ireland, and would be pleased to hear from responsible firms possessing a first-class connection among the engineering, shipbuilding, and similar trades.

British West Indies.

A general commission and shipping merchant at Port of Spain, Trinidad, desires to represent United Kingdom manufacturers of soap (ordinary in bars) for Trinidad and Venezuela. (Reference No. 1194.)

Denmark.

A trained chemist in Copenhagen desires to take up agencies for essential oils, drugs, waxes, and articles used in technical chemical factories. (Reference No. 1208.)

NEW COMPANIES.

Bengal Iron Company, Ltd.—Capital £2,500,000., £1. shares. Registered office: 17, Victoria Street, S.W.

Branscomb's Glassworks, Ltd.—Capital £50,000., £1. shares (25,000 7½ per cent. cumulative preference, tax free up to 6s. in the £). Registered office: 40, Chancery Lane, W.C.

Colombian Oilfields, Ltd.—Capital £1,000,000., £1. shares. Registered office: 10, Throgmorton Avenue, E.C.

General Petroleum Company of Trinidad, Ltd.—Capital £300,000., £1. shares. Registered office: 13, Copthall Court, E.C.

Powell and Ricketts, Ltd.—Capital £50,000., £1. shares. Registered office: Cheese Lane, St. Phillips, Bristol.

South Wales Fuel Company, Ltd.—Capital £125,000., in 120,000 shares of £1. each and 100,000 shares of 1s. each. Objects: To take over the business lately carried on by the Swansea Fuel Company, Ltd., at King's Dock, Swansea, and to enter into an agreement with Coal Treatment Processes, Ltd. Solicitors: R. S. Taylor, Son and Humbert, 4, Field Court, Grays Inn, W.C.

Trinidad Consolidated Oilfields, Ltd.—Capital £400,000., £1. shares. Registered office: 13, Copthall Court, E.C. 2.

British Smelting and Refining Company, Ltd.—Private company. Capital £1,000., £1. shares. Office: 13, Victoria Street, S.W. 1.

Bute Lime Works Company, Ltd.—Private company. Capital £10,000., £1. shares (8,000 preference). Registered office: Mwynwy Villa, Pontyclun, Llantrisant.

Crossland Chemical Refining Company, Ltd.—Private company. Capital £250., 1s. shares. Registered office: 20, Southampton Row, W.C.

H.C.P. Syndicate, Ltd.—Private company. Capital £2,000., £1. shares. Objects: To carry on the business of colliery proprietors, coal merchants, and briquette manufacturers and dealers, etc., and to enter into an agreement with the Associated Chemical and General Industries, Ltd. Registered office: 125, High Holborn, W.C.

H. Pearce, Ltd.—Private company. Capital £6,000., £1. shares. General merchants and factors, merchants' factors, buyers and sellers of oils, greases, metals, etc. Office: County Chambers, Marten Road, Middlesbrough.

Lysle Export and Import Company, Ltd.—Private company. Capital £20,000., £1. shares. Object: To take over the business of exporters, importers, manufacturers of, agents and dealers in perfumes and toilet and other chemical or medicinal preparations carried on by J. de Lysle at 25, Cross Street, Hatton Garden, E.C., as the "Lysle Export and Import Company." Registered office: 9, Gamage Buildings, Holborn, E.C.

Mosses and Mitchell, Ltd.—Private company. Capital £35,000., £1. shares. Object: To take over the business of dealers in vulcanised fibre, etc., carried on at 122-4, Golden Lane and 34-8, Banner Street, E.C., as "Mosses and Mitchell," and to carry on the business of manufacturers of and dealers in "Vulmos" and other vulcanised fibre, Emanden steam jointing, asbestos, insulating materials, etc. Registered office: 122-4, Golden Lane, Barbican, E.C.

T. and T. Lubricants, Ltd.—Private company. Capital £5,000., £1. shares. Registered office: 53, Conduit Street, W. 1.

Intermediates and Explosives, Ltd.—Private company. Capital £50,000., £1. shares. Objects: To carry on the business of manufacturers of and dealers in chemicals, coal and tar products, explosives, etc. The first directors are to be appointed by Bolekow, Vaughan and Co., Ltd. Registered office: 15, Philpot Lane, E.C.

MARKET REPORTS.

TAR AND AMMONIA PRODUCTS.

WEDNESDAY.

Benzole: London, 90%, 2s. to 2s. 1d.; North, 1s. 11d. to 2s.; 50%, 1s. 10d. to 1s. 11d.; North, 1s. 9d. to 1s. 10d.; naked, pure, 2s. 9d. to 3s., naked at works. Carbolic acid, crude, 60%, East and West Coast, nominally 2s. 3d. to 2s. 4d.; crystals, 39-40%, 10d. to 11d., f.o.b. Crude tar, London, 50s. to 55s.; Midlands, 50s.; North, 50s. per ton, ex works. Refined tar, 35s. per barrel. Pitch, 85s.; East Coast, 82s. 6d. to 85s.; f.o.b.; West Coast, 72s. 6d. to 75s., f.a.s. Solvent naphtha, naked, London, 90-100%, 2s. 5d.; North, 2s. 3d. to 2s. 4d.; 95-100%, naked, London, 2s. 9d. to 2s. 10d.; North, 2s. 8d. to 2s. 9d. Crude naphtha, naked, 30%, 9d.; North, 8d. to 8½d. Refined naphthaline, £18. to £22.; salts, £6. to £7. Toluol, naked, London, 2s. 6d.; North, 2s. 5d. Creosote, naked, London, 6½d.; North, 5½d. to 6d.; heavy oil, 6½d. Anthracene, 40-45%, 7d. per unit. Cresylic acid, 95%, 2s. 5d. to 2s. 6d.; 97-99%, 2s. 8d., ex works, London, and f.o.b. other ports. Sulphate of ammonia: home trade, December, £21., basis 24½%. Nitrate of soda, £22. 10s. to £22. 15s.

FERTILISER MATERIALS.

LIVERPOOL, THURSDAY.

Nitrate of Soda.—There is no change in either the tone of the market or in the price of this material, the quotation on spot for 95/96% quality remaining at £20. 17s. 6d. per ton, net cash, f.o.r., prompt delivery. East Indian Bone Meal.—This market is without alteration, the quotation for January/March shipment being £15. per ton, net cash, ex ship Liverpool for 4½% ammonia and 52% phosphates. On spot, holders ask £16. per ton, net cash, for 4½% and 45% quality. Mineral Phosphates.—There is no change to report in this market, and values at present are only nominal. Dried blood scarce, the value being about 35s. per unit of ammonia per ton, net cash.

LONDON METAL MARKET.

THURSDAY.

Copper: Standard brands, £104. 15s. to £105., cash; £106. 5s. to £106. 10s., three months; electrolytic, £115. to £118. Tin: Standard, £314. 15s. to £315., cash; £316. 10s. to £316. 15s., three months; Straits, £315. 5s., English, £313. to £314. Lead: Soft foreign, £39. 10s.; English, £40. 10s. Spelter, £51. 10s.; hard, £37. to £39. Antimony, English regulus, 90%, £47 10s. Aluminium, £150. Nickel, £215., ex warehouse. Quicksilver, £24. Bismuth, 12s. 6d. Platinum, 502s. per oz. Wolfram, 32s. 6d. per unit.

SWANSEA MARKET REPORT.

THURSDAY.

Tinplate prices remain firm with plenty of business passing on the basis of 46/6 to 47/- per standard box, f.o.b. Copper firm with better inquiry and slightly dearer at £103. prompt, and £104. three months. Tin, £315. per ton cash, and £316 10s. three months. Lead easier with good movement at £39. 12s. 6d. per ton prompt for Spanish, and £40. 15s. 0d. English. Spelter very active at £52. 10s. prompt. Zinc sheets firm: English £73.; American £68. at New York. Antimony regulus £47. 10s. Aluminium £150. Nickel £208. delivered London or equal. Silver 78½d. per ounce. Sulphate of copper remains quiet, with limited export trade at £41. per ton f.o.b. Sulphate of ammonia steady, with fair sales at £21. per ton prompt delivery. Nitrate of soda, 21s. to 22s. per cwt. in bags, ordinary and refined. Palm oil: Lagos £89. 10s.; softs £88. 10s.; Benin £87. 10s.; and hards £86. Turpentine firm at £6. 16s. 6d. per cwt. Oxalic acid quiet at 1s. 2d. per lb.

MANCHESTER CHEMICAL MARKET.

THURSDAY.

The general demand for heavy chemicals continues satisfactory, both for home and export trade, and values all round have a strong upward tendency. For caustic soda, the home prices are firm at £24. for 76/77% with proportionate allowances for lower strengths. Refined bicarbonate of soda, bags, £8. 10s., and 58% alkali, £6. 10s. per ton. Soda crystals unchanged at £5. 10s. 6d. carriage paid. Bleaching powder softwoods, £17. on rails. Chlorates quiet at 6d. and 1s. for soda and potash respectively. Salts steady at 70s. per ton, bulk, carriage paid. For sulphate of copper there is little or no inquiry and price remains nominal at £41. f.o.b. Commercial hyposulphite of soda, £19. per ton. Phosphate of

soda scarce and dear at £32. per ton. Concentrated sodium sulphide 60/65% casks, £25. 10s. per ton. Nitrate of soda, £21. per ton. White powdered arsenic still in short supply, and quotations firm at £65. per ton for best Cornish brands. Carbonate of potash easy at £105. per ton, basis 85%. Yellow prussiate only moving off slowly at 2/1 per lb. Makers are well sold ahead in prussiate soda and price higher at 1/1½ per lb. Acetic acid and acetate of soda in good request, and prices are firm. English brown acetate of lime higher at £15. 10s. per ton. American grey, £26. per ton. Acetone, steady at £90. per ton. Miscible wood naphtha 10/6 per gall. Lead salts are dearer in sympathy with the metal. White acetate £84.; brown, £67. and nitrate £60. per ton. Nitrite of soda scarce on the spot and price firm at £62. per ton. Green copperas is meeting with rather more inquiry, but stocks are plentiful. Oxalic acid quiet at 1/5 per lb.

LIVERPOOL CHEMICAL MARKET.

THURSDAY.

A brisk inquiry for heavier chemicals has again been experienced, a very fair demand on export account having been made. Supplies at works are still very small, and fresh orders are taken subject to this condition, deliveries to be made as it allows. Bleaching powder has met with a moderately active inquiry. For home trade uses £17. per ton is the price, f.o.r. or conveyance, in buyers' packages, and for export £15. to £18. per ton. Chloride of calcium has been but little in demand, and is £8. to £10. per ton, in casks, f.o.r. Caustic soda has been in good request, but has been in very small supply. It is £24. per ton for 76%; £22. per ton for 70-72%, and £21. per ton for 60%. Nitrate of soda has been in moderate demand, and is £21. 10s. to £22. 10s. per ton. Saltcake has been in very fair request, and is £7. 15s. per ton, in casks, f.o.b. Soda crystals have met with a brisk inquiry, and are £5. 10s. per ton, in 2cwt. bags, f.o.r. at works. Bicarbonate of soda has again been in good request, and has been in limited supply. Prices are £8. 5s. to £10. per ton, according to terms of delivery. Borax continues to meet with a very fair inquiry. Ordinary is £39. per ton, and powdered £40. per ton, in bags, less 3%, for lots of not less than 50 tons. Ammonia alkali has been in good demand, and is £6. 10s. to £6. 15s. per ton, f.o.r. Hyposulphite has been quiet, and is £18. 10s. per ton for ordinary, and £22. per ton for pea crystals, in 1cwt. kegs. Sulphite of sodium continues quiet, and is £11. per ton for ordinary, and £16. to £18. per ton for pea crystals, in 1cwt. kegs. Sulphide of sodium has been but little in request, and is £23. per ton, in barrels, and £24. per ton, in drums. Prussiate of soda has been rather more inquired for, and is 1s. 0½d. per lb. Bichromate of soda has sold more readily, and is 10d. per lb. Phosphate of soda has been in fair demand, and is £30. per ton. Chlorate of potash has met with a quietly steady inquiry, and is 1s. to 1s. 1d. per lb. Permanganate has been but little in request, and is 3s. 6d. per lb. Sulphate of potash has been inactive, and is £23. per ton. Carbonate of potash has been in moderately active demand, and is £95. to £100. per ton for 80-85%. Caustic potash has been well inquired for, and is £120 per ton. Nitrate of potash has been in fair demand, and is £60. to £62. per ton for refined, and £40. per ton for ordinary. Canadian potashes have had a slow sale. Montreal first quality are £200. to £220. per ton, and second quality £190. to £210. per ton. Bichromate of potash has been in moderate request, and is 1s. 6d. per lb. Yellow prussiate of potash has been rather more in demand, and is 1s. 10d. to 2s. 1d. per lb. Sal ammoniac has been in quietly steady request, and is £95. per ton for first quality lump; £90. per ton for second quality, and £5. per ton extra for crushed. Sulphate of ammonia has been in moderate inquiry, and is £21. per ton for December; £21. 7s. 6d. for Jan., 1920; £21. 15s. for Feb., and £22. per ton for March to May, 1919. Carbonate of ammonia has been in very fair request, and is 7½d. per lb. Muriate of ammonia has been but little called for, and is £45. to £50. per ton, according to grade. Magnesia has moved rather more freely. Carbonate is £2. 5s. per cwt., and sulphate £11. to £16. per ton, according to grade. Alum has been steadily inquired for, and supplies available for early deliveries have again been very light. Prices are: For home trade uses, £18. 10s. per ton, and for export, £18. 10s. to £19. 10s. per ton. Aluminoferric has been very

quiet, and is £8. 10s. to £12. per ton, according to quality. Sulphate of alumina has been in moderate demand, and is £12. to £17. per ton, according to grade. Sulphur has had a fairly active inquiry. English flowers are £32. per ton; roll is £28. per ton, and rock £22. per ton, in bags, f.o.r. In Sicilian, flowers are £28. per ton; roll is £22. 10s. per ton, and rock £17. 15s. per ton. Cream of tartar has been more inquired for, and is £13. to £13. 5s. per cwt. Tartaric acid has been in fair request, and is 3s. 3d. per lb. Boracic acid has been rather more in request, and is £72. per ton for crystals, £74. per ton for powdered, and £2. to £3. more in casks. Oxalic acid has sold a little more freely, and is 1s. 4d. per lb. Citric acid has met with a steady inquiry, and is 4s. 4d. per lb. White acetate of lead has been quiet, and is £84. to £85. per ton. Arsenic has been in moderate demand. White powdered is £65. per ton. Sulphate of copper has been quiet in the home trade branch, but has been more called for on export account. It is £41. per ton for home trade uses, and £41. per ton for export, in casks, less 5%, f.o.b. at Liverpool.

TYNE CHEMICAL REPORT.**TUESDAY.**

Business is still very brisk, with a good inquiry for export. For home consumption a considerable volume of business has been transacted for 1920, particularly in caustic soda and bleaching powder.

Prices per ton, net, are nominally: Bleaching powder, softs and hards, £17.; caustic soda, 76-77%, £26.; do., 74-76%, £25.; do., 70%, £24.; do., 60%, £23.; recovered sulphur, 2cwt. bags, £25.; hyposulphite of soda, 5-7cwt. casks, £19.; do., 1cwt. kegs, £25.; sulphite of soda, 5-7cwt. casks, £12.; do., 1cwt. kegs, £20.; silicate of soda, 75° Tw., £9. 12s. 6d.; do., 100° Tw., £10.; do., 140° Tw., £10. 10s.; soda crystals, 2cwt. bags, £5. 10s.; sulphate of soda (saltcake), in bulk, £4. 10s.; pure white sulphate of alumina, £19. 10s.; blanc fixe, £22.; sulphide of sodium, crystals, £18.; do., refined concentrated solid, 60-62%, £25.; hydrate of barium, crystals, £56.

COALS.—There is a very strong market, and a great scarcity of coal for immediate loading. Nominally prices for export are: Best Northumbrian steam, 95s. to 100s. per ton; do., seconds, 90s. to 92s. 6d.; Northumberland small coal,

75s. to 80s.; do., seconds, 70s. to 72s. 6d.; best Durham gas coals, 80s. to 85s.; do., seconds, 75s. to 77s. 6d.; Durham bunker coals, 70s. to 80s.; do., seconds, 65s. to 67s. 6d.; foundry coke, 100s.; gas coke, 95s.

WEST OF SCOTLAND CHEMICALS.**GLASGOW, WEDNESDAY.**

During the past week the demand for the various heavy chemicals has continued fairly steady, and there has been a substantial inquiry as far as the home market is concerned. Prices are keeping to the firm side, and some of the leading chemicals continue to be somewhat scarce. Current prices are as follows: Arsenic, £65. per ton, net, Glasgow; bicarbonate of soda, £10. 10s. and £12. 10s. per ton for 6-8 cwt. casks and 1cwt. kegs, net, Liverpool; boracic acid crystals, English refined, £72. for 2cwt. bags; and borax crystals, £39. for 2cwt. bags, carriage paid; caustic soda, white, 70-72%, £27. per ton, net, Glasgow; chlorate of potash, 1s. 2d. per lb., net, Glasgow; chlorate of soda, 8d. per lb., net, Glasgow; citric acid, 4s. 4d. per lb., 5%, Glasgow; cream of tartar, 98%, £12. per cwt., net, Glasgow; paraffin wax, U.K. deliveries, 125°, 6½d. to 6¼d.; 121-3°, 5½d. to 5¼d.; 118-20°, 5d.; 110-12°, 4d. to 4½d.; and 98-102°, 4d. to 4½d.; salammoniack, £95. and £90. per ton, net, any port, for first and second lump respectively; salammoniack crystals, £70. per ton, net, Glasgow; saltpetre, £3. 4s. per cwt., net, Glasgow; tartaric acid, 3s. 3d. per lb., 5%, Glasgow.

Among the sea oils the demand is also well maintained, and the most noticeable feature is the upward tendency of practically all the prices. Whale oils, as an example, bear firmer quotations all round, and the latest rates ruling are 98s. for pale (as against 94s. previously); 78s. for brown (as against 76s. previously); and 77s. for black (as against 75s. previously). The demand is good, but deliveries are not always easy of prompt execution. Newfoundland cod is the only sea oil which is at its previously quoted figure—namely, 82s.—but pale seal has advanced from 96s. to 98s., and Menhaden from 80s. to 82s.

In the coal trade conditions are more or less unchanged. Demand continues brisk all round, and the leading industrial works continue to take up big quantities of fuel.

IMPORTS OF CHEMICAL PRODUCTS**AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.****LIST OF CONTRACTIONS USED IN THE IMPORT AND EXPORT LIST.**

Blus.	Balloons.	Cbys.	Carboys.	Gals., Gls.	Qty.	Quantity (otherwise undeclared).	qr.	Quarters.
Bls.	Bales.	Css. or Cs.	Cases.	or Glns.	Gallons.		lb.	Pounds.
Brls.	Barrels.	Cks.	Casks.	Hf. pps.	Half pipes.	Note.—There is no information available as to the net weights of the various items, nor do we recognise in them any standard.		
Bgs.	Bags.	Chts.	Chests.	Hds.	Hogsheads.			
Btls.	Bottles.	Cylds.	Cylinders.	Kgs.	Kegs.			
Bdls.	Bundles.	Dms. Drs.	Drums.	Ozs.	Ounces.			
Bskts.	Baskets.	Djns.	Demijohns.	Pks.	Packages.			
Bxs.	Boxes.	Frkns.	Firkins.	Pns. Puns.	Puncheons.	Rnlt.	Runlets.	
						Sks.	Sacks.	
						Slbs.	Slabs.	
						Tcs.	Tierces.	
						t. c.	Tons.	Cwts.

BRISTOL.

Publication of Official Returns
Suspended.

GLASGOW.

Week ending December 13.

AMMONIA—
Philadelphia, 100 cys.

BARIUM SULPHATE—
Antwerp, 650 bgs.

CREAM OF TARTAR—
Genoa, 20 brls.

DYESTUFFS—
Chestnut Extract
Genoa, 25 brls.

Dyedwood Extract
Philadelphia, 85 brls.

ANURE SALT—
Antwerp, 4,562 bgs.

PARAFFIN WAX—
Philadelphia, 4,745 brls.

PHOSPHATE OF LIME—
Philadelphia, 138 brls.

TARTAR—
Oporto, 40 cks.

TARTARIC ACID—
Genoa, 20 brls.

WAX—

Philadelphia, 2,357 brls.

WHITE LEAD—

Philadelphia, 48 brls., 264 cks.

GOOLE.

Week ending December 13.

OXALIC ACID—
Rotterdam, 21 brls.

GRANGEMOUTH

Week ending December 13.

LITHOPONE—
Rotterdam, 53 cks.

MANURE SALT—
Rotterdam, 1,946 bgs.

POTASSIUM MURIATE—
Rotterdam, 798 bgs.

SODIUM NITRATE—
Christiania, 35 cs.

GRIMSBY.

Week ending December 13.

ACID—
Antwerp, 6 cks.

PITCH—
Rotterdam, 96 cs.

SODIUM CHLORATE—
Antwerp, 40 cks.

HULL.

Week ending December 13.

ACID—
Genoa, 400 brls.

BARIUM SULPHATE—
Bilbao, 97 brls.

BARYTES—
Rotterdam, 24 cks.

CHINA CLAY—
Rotterdam, 3 cs.

DYESTUFFS—
Aniline Colour
Antwerp, 385 cks., 8 cs., 8 tins.

Annato
Copenhagen, 1 ck.

Sunac
Palermo, 650 bgs.

FERRO SILICON—
Christiania, 312 cs.

LITHOPONE—
Amsterdam, 708 cks.

MANGANESE ORE—
Bombay, 1,950 t.

OXALIC ACID—
Christiania, 15 cks., 4 cs.

SILICON—
Christiania, 132 cs.

TAR PITCH—
Gothenburg, 30 cs., 42 kgs.

TAR (WOOD)—

Gothenburg, 126 brls.

TAR OIL—

Gothenburg, 21 brls., 6 cks.

TURPENTINE—
Gothenburg, 55 cks.

ZINC OXIDE—
Antwerp, 40 brls.

LEITH.

Week ending December 13.

NIL.

LIVERPOOL.

Week ending December 13.

ACETIC ACID—
Montreal, 202 brls.

AMMONIA—
Callao, 1 drin.

BEESEWAX—
Beira, 100 bgs.; Valparaiso, 3 sks.

BORATE OF LIME—
Antofagasta, 3,942 sks., 1,200 bgs.; Buenos Ayres, 5,493 bgs.

CARNAUBA WAX—
Para, 375 bgs.

CAUSTIC SODA—
La Guayra, 638 bgs.

COAL PRODUCTS—
Tar
Bordeaux, 10 cs.

COBALT OXIDE—
Montreal, 79 cs.

CREAM OF TARTAR—
Bordeaux, 5 cks.; Genoa, 8 brls.

DYESTUFFS—
Argols
Leghorn, 99 cks.; Naples, 59 cks.
Chestnut Extract
Genoa, 70 cks., 400 cs.
Quebracho Extract
Buenos Ayres, 1,350 bgs.
Sumac
Palermo, 4,110 bgs.
Wattle Bark
Sydney, 1,919 brls.

GLUE—
Boston, 20 brls.

LEAD ASH—
Alexandria, 13 bgs.

MAGNESITE—
Limni, 2,900 t.

MAGNESITE DUST—
Montreal, 3,153 bgs.

MANURE SALT—
Rotterdam, 3,293 bgs.

MINERAL WHITE—
Bergen, 1,150 bgs.; Bordeaux, 700 bgs.

PARAFFIN WAX—
Baltimore, 100 brls.; Rotterdam, 15 cs.

PHOSPHATE—
Antwerp, 1,000 bgs.

PHOSPHATE ROCK—
Sfax, 5331 t.

POTASSIUM MURIATE—
Rotterdam, 1,871 bgs.

PITCH—
Boston, 100 brls.

ROSIN—
Bordeaux, 1,221 cks.; Pensacola, 1,750 brls.

SILICO MANGANESE—
Bordeaux, 30 cks.

SOAP—
Galveston, 1,050 brls.

SODIUM NITRATE—
Mejillones, 26,951 sks.

SULPHUR—
Catania, 161 brls., 133 cks., 3,462 bgs.

TALLOW—
Bordeaux, 4 cs.; Buenos Ayres, 1,429 cks.; Boston, 600 brls.
Sydney, 1,008 cks., 123 pps.

TARTARIC ACID—
Genoa, 100 kgs.

TURPENTINE—
Pensacola, 135 brls.

ULTRAMARINE—
Antwerp, 51 pkgs.

WAX—
Galveston, 99 sks.

WHITE LEAD—
Bordeaux, 200 cs.; Montreal, 259 brls.

LONDON.

Week ending December 13.

ARGON GAS—
Holland, £180.

ARSENIC—
Germany, 2 t. 5 c.

BEESEWAX—
Egypt, 104 bgs.; France, 2 cs.; Portugal, 195 pkgs.; Portuguese East Africa, 38 bgs.

CALCIUM LACTATE—
Canada, £65.

CAMPHOR—
Hong Kong, 86 cs.

CARBON BLACK—
Japan, 20 cs.; U.S.A., 12 cs.

CARNAUBA WAX—
Brazil, 54 bgs.

CHEMICALS (otherwise undescribed)
Switzerland, £260.

CHLOROPHYL—
Switzerland, £133.

CREAM OF TARTAR—
Italy, 68 pkgs., 40 cks.

DISINFECTANTS (otherwise undes.)
U.S.A., £900.

DYESTUFFS—
Aniline Dye
Holland, 40 cks.; Switzerland, 103 pkgs.; U.S.A., 47 pkgs.
Argols
France, 1,510 bgs.; Italy, 795 bgs.; Spain, 44 cks.
Cutch
British India, 500 bxs.
Gambier
British India, 25 bgs.
Logwood
Jamaica, 30 t.
Myrobalans
British India, 6,982 bgs., 2,955 pkts.
Saffron
Spain, 5 cs.
Sumac
Italy, 950 bgs.

DYESTUFFS—
Sumac Extract
Switzerland, 12 cks.
Tanner's Bark
British India, 1 t.; Natal, 99 t.

FISH OIL—
N.S.W., 400 cs.; Victoria, 203 cs.

FORMALDEHYDE—
U.S.A., £383.

GELATINE—
Germany, £270.; Holland, £2,380.

GLUE—
Belgium, £1,200.; France, £4,375; U.S.A., £385.

HYDROQUINONE—
U.S.A., £560.

LITHIUM CARBONATE—
U.S.A., £853.

LITHOPONE—
Germany, 35 cks.; Holland, 60 cks.; U.S.A., 2 cks.

MAGNESITE—
British India, £3,137.

MERCURY BICHLORIDE—
Italy, £1,250.

METHYLIC ALCOHOL—
Canada, 2 drms.

METHYL SALICYLATE—
U.S.A., £189.

PARAFFIN WAX—
British India, 300 t.; U.S.A., 11 t. 17 c.

PHENAZONE—
Switzerland, £321.

PITCH—
U.S.A., 6 cks.

POTASH—
Canada, £108.

POTASSIUM BROMIDE—
Germany, £298.

POTASSIUM IODIDE—
Japan, 20 cs.

POTASSIUM PRUSSIAN—
Holland, 35 cks.

ROSIN—
France, 50 brls., 348 cks.; Spain, 300 brls., 298 cks.; U.S.A., 200 brls.

SOAP—
Canada, £32.; Spain, £550.; U.S.A., £14,466.; Victoria, £420.

SODIUM FLUORIDE—
Germany, 3 t. 3 c.

STEARINE—
Holland, 1 bg.; Japan, 1 bg.; N.S.W., 23 cks.

TALLOW—
Argentine Republic, 85 t. 15 c.; China, 8 t.; N.S.W., 377 t. 16 c.; N.Z., 1,781 t. 12 c.

TANNIC ACID—
Switzerland, £90.

TAR—
Sweden, 200 brls.

WAX—
U.S.A., 2 cs.

WHITE LEAD—
Canada, 113 cks.; U.S.A., 1,400 kgs.

WOOD OIL—
China, 360 brls.

ZINC CHLORIDE—
U.S.A., 400 brls.

MANCHESTER.

Week ending December 13.

DEXTRINE—
New York, 880 bgs.; Norfolk 215 bgs.

ROSIN—
Mobile, 2,000 brls.

SOAP—
New York, 24 brls.

STEARINE—
New York, 284 brls.

TARTAR EMETIC—
Rouen, 60 cs.

TARTARIC ACID—
Rotterdam, 8 cks.

WAX—
New York, 2,209 brls.

MIDDLESBROUGH.

Week ending December 13.

NIL.

NEWCASTLE-ON-TYNE

Week ending December 13.

ACID—
Gothenburg, 50 brls.

CARBIDE—
Bergen, 198 drms.

POTASH—
Rotterdam, 677 bgs.

N. & S. SHIELDS.

Week ending December 13.

MAGNESITE—
Christiania, 508 bgs.

SWANSEA.

Week ending December 13.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

BRISTOL.

Publication of Official Returns Suspended.

GLASGOW.

Week ending December 13.

CHEMICALS (otherwise undescribed)
Halifax, 41 pkgs.; Madras, 52 pkgs.; Wellington, 3 pkgs.

COAL PRODUCTS (otherwise undes.)
Boston, £1,098.; Calcutta, £140.; Chittagong, £29.; Colombo, £37.; Madras, £904.

DEXTRINE—
Halifax, 2 t. 2 c.

DISINFECTANTS (otherwise undes.)
Colombo, £160.

DYESTUFFS—
Quebracho Extract
Alexandria, £1,334.

GELATINE—
Halifax, 9 c.

MAGNESITE (CALCINED)—
Halifax, 5 t.

MAGNESIUM CARBONATE—
Halifax, 2 t.

MAGNESIUM SULPHATE—
Alexandria, 2 t. 7 c.

NITRIC ACID—
Madras, 2 t. 10 c.

POTASSIUM BICROMATE
Alexandria, 12 t.

SHEEP DIP—
Buenos Ayres, £1,500.

SIZE—
Halifax, 9 c.

SOAP—
Buenos Ayres, 1 bx.; Colombo, 98 bxs.; Gibraltar, 3 bxs.

SODIUM BICROMATE—
Madras, 10 t. 15 c.

SULPHURIC ACID—
Colombo, 1 t. 17 c.

TAR (STOCKHOLM)—
Calcutta, £150.; Madras, 1 t. 2 c.

TAR (WOOD)—
Alexandria, 4 t. 10 c.

GOOLE.

Week ending December 13.

NIL.

GRANGEMOUTH.

Week ending December 13.

NIL.

GRIMSBY.

Week ending December 13.

NIL.

HULL.

Week ending December 9.

ACID—
Helsingfors, 10 drms.

AMMONIA—
Helsingburg, 25 cks.

BORAX—
Abo, 1 cs.; Dunkirk, 450 bgs.; Rotterdam, 1 ck.

CAUSTIC SODA—
Alexandria, 500 drms.; Rotterdam, 82 drms.

CHEMICALS (otherwise undescribed)
Alexandria, 24 cks., 800 bgs.; Abo, 400 drms.; Antwerp, 1 cs., 5 cks., 10 bgs., 5 drms.; Amsterdam, 4 kgs.; Bergen, 5 cs., 494 lbs., 1 dm.; Copenhagen, 12 kgs., 7 drms.; Christiania, 7 cs., 43 cks., 2 bgs., 1 dm., 121 kgs.; Christiansund, 1 cs.; Dunkirk, 6 cks.; Helsingfors, 14 cs.; Hamburg, 2 cks.; Rouen, 1 dm., 8 cks., 420 bgs.; Rotterdam, 35 cks., 19 kgs.; Trondhjem, 4 cks.; Wyburg, 5 sks.

COAL PRODUCTS (otherwise undes.)
Amsterdam, 4 kgs.

COAL PRODUCTS—
Benzol
Rotterdam, 89 drms.

Tar
Copenhagen, a qty.

FATTY ACIDS—
Dunkirk, 290 brls.

GLUE—
Antwerp, 2 cks.; Bergen, 20 bgs.;
Helsingfors, 10 bgs.; Rotterdam,
150 bgs.

MANGANESE—
Hamburg, 400 t.

PITCH—
Antwerp, 866 t.; Rotterdam,
478 t.

SALT—
Aalesund, 272 sks.; Trondhjem,
75 cs.

SALTCAKE—
Bergen, 5 bgs.

SHEEP DIP—
Stavanger, 80 drms.

SOAP—
Alexandria, 13 bds., 20 drms.;
Antwerp, 469 cs., 25 bxs., 3 brls.;
Aalesund, 70 brls.; Bergen, 5 cs.;
Christiania, 400 drms.; Rotter-
dam, 525 cs.; Stavanger, 400
drms.; Stockholm, 4 cs.; Trond-
hjem, 12 brls.

SODA—
Bergen, 4 drms.

SODIUM CARBONATE—
Helsingfors, 139 drms.

TALLOW—
Abu, 3 cks.

TAR—
Antwerp, 1,114 tns., 115 cs.;
Copenhagen, 30 cks.; Christiania,
150 brls.; Helsingfors, 100 brls.;
Rotterdam, 10 brls., 1 ck.;
Stockholm, 13 brls.; Wyburg,
150 cks.

TURPENTINE—
Alexandria, 25 drms.; Antwerp,
25 brls.

WOOD PRESERVATIVE—
Helsingfors, 4 brls.

LEITH.

Week ending December 13.

AMMONIUM SULPHATE—
Dunkirk, 413 t. 10 c., £9,499.

CHROMETAN CRYSTALS—
Rouen, 5 t., £258.

IODINE—
Rotterdam, 7 c., £532.

MAGNESIA—
Rouen, 5 t. 14 c., £260.

MAGNESIUM CARBONATE—
Rouen, 20 t., £781.

MANGANESE CHLORIDE—
Rouen, 5 c., £15.

POTASSIUM BICHRIMATE—
Rouen, 8 t. 2 c., £1,291.

SODA (CALCINED)—
Rouen, 7 t. 10 c., £677.

SODA ASH—
Rotterdam, 9 t. 6 c., £63.

SODA CRYSTALS—
Dunkirk, 4 c., £1.

SODIUM BICHRIMATE—
Rouen, 48 t. 11 c., £2,605.

LIVERPOOL.

Week ending December 12.

ACETIC ACID—
Buenos Ayres, 1 t., £60.; Genoa,
4 t. 10 c., £286.

ALUM—
Bathurst, 1 c., £2.; Callao, 3 t.,
£53.; Sao Paulo, 4 t. 19 c., £109.;
Valencia, 1 t., £18.; Zanzibar,
2 c., £10.

ALUMINA SULPHATE—
Lisbon, 5 t. 2 c., £85.

ALUMINO FERRIC—
Bombay, 15 t. 2 c., £122.;
Rosario, 69 t. 18 c., £632.

AMMONIUM CARBONATE—
Buenos Ayres, 1 t. 5 c., £83.;
Bordeaux, 1 t. 5 c., £81.; Genoa,
24 t. 11 c., £1,324.; Kobe,
7 t. 19 c., £485.; Moji, 2 t. 19 c.,
£181.; Monte Video, 1 t., £60.;
Nantes, 1 t. 16 c., £120.; Oporto,
10 c., £36.; Yokohama, 9 t. 1 c.,
£551.

AMMONIUM MURIATE—
Barcelona, 1 t. 4 c., £61.; Rouen,
19 t. 11 c., £1,012.; Sydney,
19 c., £46.

ANTIMONY—
Pt. Harcourt, 3 cs.; Rotterdam, 2 t.

BLEACHING POWDER—
Bordeaux, 20 t. 4 c., £245.;
Piraeus, 4 t. 19 c., £77.; Vera
Cruz, 25 t., £109.

BORAX—
Patras, 18 c., £48.; Zanzibar,
2 c., £5.

CALCIUM CARBONATE—
Punta Arenas, 1 c., £2.

CALCIUM CHLORIDE—
Amoy, 2 t., £18.; Buenos Ayres,
20 t. 1 c., £138.; Bagdad, 15 t.
1 c., £153.

CALCIUM HYPOPHOSPHATE—
Genoa, 1 c., £22.

CARBONATE OF LIME—
Lisbon, 2 t. 1 c., £34.

CAUSTIC SODA—
Batavia, 100 drms.; Bergen,
20 drms.; Buenos Ayres, 60
drms.; Brisbane, 117 drms.;
Fremantle, 21 drms.; Funchal,
20 drms.; Galatz, 483 drms.;
Gibraltar, 64 drms.; Naples,
453 drms.; Pernambuco, 11
pgs.; Perth, 5 drms.; Porto
Alegre, 650 drms.; Porto Mores-
by, 75 drms.; Piraeus, 92 drms.;
Rio de Janeiro, 349 drms.;
Rosario, 100 drms.; Sydney,
N.S.W., 33 drms.

CHEMICALS (otherwise undescribed)
Buenos Ayres, 13 t. 5 c., £1,069.

CHINA (CLAY)—
Calcutta, 296 pgs.

COAL PRODUCTS—
Carbolic Acid
Melbourne, 6 c., £47.

Naphtha
Adora, 1 c., £4.

Naphthalene
Adora, 2 t. 10 c., £18.; Libreville,
8 c., £1.

COPPER SULPHATE—
Mombasa, 1 t., £47.

CRYOLITE—
Valencia, 1 t., £50.

DISINFECTANTS (otherwise undescribed)
Calcutta, 6 t. 3 c., £259.;
Colombo, 2 c., £5.; Kilindini,
6 t. 1 c., £10.; Lisbon, 2 c., £2.;
Lome, 13 c., £67.; Leon, 11 c.,
£17.; Lagos, 2 c., £9.; Punta
Arenas, 1 c., £3.

DYESTUFFS (otherwise undescribed)
Alexandria, 10 t., £3,175.; Ant-
werp, 144 t., £20,884.; Calcutta,
33 t. 15 c., £309.; Constantinople,
1 t., £163.; Galatz, 1 c., £23.;
Kobe, 4 t. 16 c., £670.; Lodz,
8 t. 4 c., £4,329.; Rangoon, 4 c.,
£260.; Samarang, 1 t. 6 c., £410.;
Toronto, 2 t., £457.

FERRO MANGANESE—
Antwerp, 1 t.; Gothenburg, 35 t.

GELATINE—
Santos, 2 pgs.

GLUE—
Auckland, 5 bgs.

GLUE, SIZE, AND GELATINE—
Boston, 123 pgs.; Buenos Ayres,
107 pgs.; Calcutta, 20 pgs.;
Cape Town, 20 pgs.; Christian-
iania, 20 pgs.; Constantinople,
1 pgs.; Galatz, 35 pgs.; Las
Palmas, 3 pgs.; Lisbon, 10
pgs.; Paranagua, 12 pgs.;
Puerto Cabello, 3 pgs.; Quebec,
2 pgs.; Rangoon, 40 pgs.;
Valparaiso, 2 pgs.; Vancouver,
1 pgs.; Yokohama, 469 pgs.

HYDROCHLORIC ACID—
Secondee, a. qty.

IODINE—
Genoa, 2 c., £215.

IRON SULPHATE—
Patras, 10 t. 1 c., £60.

MAGNESIA—
Naples, 6 pgs.

MAGNESIUM CHLORIDE—
Bangkok, 1 t., £21.

PARAFFIN WAX—
Genoa, 46 bgs.

POTASSIUM BICARBONATE—
Genoa, 13 c., £104.

POTASSIUM CARBONATE—
Buenos Ayres, 1 c., £21.

POTASSIUM CHLORATE—
Paranagua, 200 pgs.; Salonica,
1 pgs.

POTASSIUM CHLORIDE—
Kobe, 50 t., £3,033.

POTASSIUM IODIDE—
Genoa, 2 c., £171.

POTASSIUM SULPHATE—
Las Palmas, 10 t., £300.

RED LEAD—
Santiago de Cuba, 20 pgs.

SALAMONIA—
Rouen, 3 t., £208.

SALT—
Aalborg, 700 t.; Abeokuta, 25 t.;
Abonema, 194 t.; Accra, 285 t.;
Antwerp, 936 t.; Belize, 79 t.;
Bergen, 257 t.; Buenos Ayres,
50 t.; Calabar, 100 t.; Cape
Palmas, 6 t.; Cape Coast Castle,
6 t.; Christiania, 2,925 t.;
Conakry, 75 t.; Cotonou, 88 t.;
Dakar, 1 t.; Danzig, 40 t.;
Demerara, 44 t.; Dixcove, 5 t.;
Duala, 427 t.; Durban, 4 t.;
Grand Bassam, 37 t.; Gefle,
30 t.; Gothenburg, 460 t.; Half
Assinee, 84 t.; Helsingfors,
300 t.; Kingston, 19 t.; Koko,
10 t.; Lagos, 994 t.; Manaoa,
93 t.; Para, 436 t.; Puerto
Barrios, 55 t.; Pt. Harcourt,
197 t.; Pt. of Spain, 13 t.;
Rotterdam, 54 t.; Secondee,
40 t.; Sierra Leone, 324 t.;
Sydney, N.S.W., 6 t. 8 c.; Warri,
411 t.

SALT PETRE—
Callao, 2 t. 15 c., £158.; Corinto,
2 c., £7.; Zanzibar, 2 c., £8.

SHEEP DIP—
Buenos Ayres, 35 t. 17 c., £1,057.;
Buena Ventura, 1 c., £30.; Dela-
goa Bay, 3 t. 7 c., £209.; Durban,
4 t. 13 c., £294.; Mombasa,
4 t. 10 c., £175.; Punta Arenas,
75 t. 15 c., £2,875.; Rio de
Janeiro, 1 t., £70.; Wellington,
14 t., £915.

SOAP—
Accra, 1,924 bxs.; Abonema,
224 pgs.; Alexandria, 324 bxs.;
Algiers, 850 pgs.; Attuaboe,
200 bxs.; Antwerp, 558 bxs.;
Algoa Bay, 25 bxs.; Auckland,
5 pgs.; Amsterdam, 200 pgs.;
Barbados, 180 cs.; Bangkok,
635 bxs.; Batavia, 1,304 bxs.;
Belawan, 25 cs.; Belize, 3 cs.;
Bombay, 1,958 bxs.; Calcutta,
2,295 bxs.; Copenhagen, 50
pgs.; Cologne, 500 bxs.; Corral,
50 pgs.; Durban, 4 bxs.;
Esmeraldas, 112 pgs.; Grand
Bassam, 5 pgs.; Genoa, 20 bxs.;
Hong Kong, 2,000 bxs.; Kilin-
dini, 32 cs.; Madras, 51 cs.;
Monrovia, 12 pgs.; Naples,
1,000 bxs.; Padang, 200 bxs.;
Panama, 1,105 pgs.; Penang,
1,000 brls., 40 bxs.; Pt. Harcourt,
279 bxs.; Pt. Swettenham, 200
bxs.; Port-au-Prince, 463 cs.;
Port of Spain, 2,456 cs.; Punta
Arenas, 153 cs., 6 bxs.; Quitah,
1 bx.; Rio de Janeiro, 9 bxs.;
Rosario, 250 cs.; Rufisque, 890
cs., 150 bxs.; Samarang, 100
bxs.

SODA ASH—
Bergen, 100 pgs.; Bombay,
400 pgs.; Buenos Ayres, 1,001
pgs.; Calcutta, 4,600 pgs.;
Fremantle, 12 bgs.; Maranham,
86 cks.; Palermo, 400 pgs.;
Para, 7 pgs.; Patras, 2 t.;
Piraeus, 150 cks.; Perth, 28 cks.;
Puerto Colombia, 16 pgs.;
Shanghai, 7,230 pgs.; Sydney,
298 pgs.

SODIUM BICARBONATE—
Antofagasta, 12 pgs.; Bergen,
965 pgs.; Delagoa Bay, 10 pgs.;
Genoa, 948 pgs.; Gibraltar,
1 pgs.; Gothenburg, 362 pgs.

SODIUM BICARBONATE—
Leghorn, 100 pgs.; Palermo,
205 pgs.; Pernambuco, 40 pgs.;
Rangoon, 48 pgs.; Valparaiso,
150 pgs.

SODA CRYSTALS—
Fort de France, 1 ck.; Penang,
20 pgs.; Rosario, 200 pgs.;
Trieste, 200 pgs.

SODIUM CYANIDE—
Padang, 50 pgs.

SODIUM HYPO—
Genoa, 1 c., £27.

SODIUM IODIDE—
Genoa, 1 c., £53.

SODIUM NITRATE—
Lima, 1 c., £18.

SODIUM SILICATE—
Bombay, 3 pgs.; Buenos Ayres;
50 pgs.; Genoa, 500 pgs.;
Gothenburg, 32 pgs.; Mitylene,
80 cs.; Monte Video, 100 pgs.;
Para, 33 pgs.; Pernambuco,
32 pgs.; Pelotas, 20 pgs.;
Quebec, 117 pgs.; Rangoon,
48 pgs.; Rouen, 10 pgs.;
Santos, 75 drms.; Shanghai,
378 pgs.

SODIUM SULPHITE—
Philadelphia, 63 pgs.

SULPHURIC ACID—
Sherbro, 1 c., £4.

**SUPERPHOSPHATES (otherwise un-
described)**—
Cape Town, 1,116 bgs.

TARTARIC ACID—
Melbourne, 2 t. 10 c., £798.

WAX—
Singapore, 4 pgs.; Sydney,
N.S.W., 1 pgs.

WOOD PRESERVATIVE—
Kingston, 1 t. 2 c., £2.

ZINC CHLORIDE—
Melbourne, 9 c., £25.

LONDON.

Week ending December 10.

ACETANILID—
Brussels, 1 cs., £21.; Karachi
(F.), 1 cs., £30.

ACETIC ACID—
Adelaide, 5 cs., £14.; Fremantle,
6 cs., £18.; Salonica (F.), 11 cks.,
£138.

ACETIC ANHYDRIDE—
Amsterdam, 7 cbys., £330.

ACETO SALICYLIC ACID—
Cape Town, 2 cs., £52.; Fre-
mantle, 1 cs., £20.; Gothenburg,
40 cs., 18 kgs., £1,407.

ACETONE—
Antwerp, 3 drms., £84.; Barce-
lona, 1 dr., £37.; Brussels,
1 dr., £31.

ALUM—
Bombay, 2 c., £8.; East London,
4 c., £7.; Piraeus, 2 c., £15.; Pt.
Elizabeth, 9 c., £14.; Shanghai,
1 ck., £8.; Singapore, 1 t. 15 c.,
£48.; Soerabaya, 13 c., £120.

ALUM (CHROME)—
Singapore, 1 c., £9.

AMMONIA—
Antwerp, 4 drms., £39.; Batoum,
5 cs., £10.; Boulogne, 58 drms.,
£808.; Brussels, 37 pgs., £177.;
Bombay, 62 cs., £234.; Cape
Town, 32 cs., £60.; Durban,
8 cs., £18.; Kilindini, 2 cs., £5.;
Lagos, 1 cs., £6.; Mombasa,
10 cs., £19.; Piraeus, 3 cs., £7.;
Pt. Sudan, 3 cs., £6.; Seville,
12 drms., £37.

AMMONIA (ANHYDROUS)—
Lisbon, 3 cys., £59.

AMMONIUM ACETATE—
Calcutta, 2 cs., 1 cs. (pt.), £29.

AMMONIUM BROMIDE—
Bombay, 1 cs., 1 cs. (pt.), £18.;
Bombay (F.), 2 cs. (pt.), £12.;
Karachi, 1 cs., £20.

AMMONIUM CARBONATE—
Bombay, 2 c., £15.; Cochin, 2 c.,
£10.; Dunedin, 4 c., £16.; Eten,
2 c., £14.; Gibraltar, 2 c., £8.

- AMMONIUM CARBONATE**—
Hio-go, 10 t., £598.; Hong Kong, 12 c., £65.; Karachi, 1 c., £8.; Kobe, 2 t. 10 c., £149.; Kuala Lumpur, 15 c., £72.; Penang, 1 t. 16 c., £167.; Singapore, 8 c., £47.; Telok Anson, 13 c., £60.; Timaru, 2 c., £8.; Yokohama, 10 t., £598.
- AMMONIUM CHLORIDE**—
Canton, 2 cs., £9.
- AMMONIUM CITRATE**—
Calcutta, 1 cs. (pt.), £5.
- AMMONIUM MURIATE**—
Kobe, 9 t. 14 c., £540.
- AMMONIUM PHOSPHATE**—
Barcelona, 2 cks., £41.; Rotterdam, 1 ck., £11.
- AMMONIUM SULPHATE**—
Dunkirk, 2,138 t., £49,642.; Rouen, 550 t., £1,265.
- AMYL ALCOHOL**—
Dieppe, 12 drms., £1,500.
- ANTIMONY CHLORIDE**—
Santos, 1 cs. (pt.), £13.
- ANTIMONY REGULUS**—
Rotterdam, 18 c.
- ANTIMONY SULPHIDE**—
Antwerp, 4 cks., £103.; Boulogne, 8 pkgs., £112.; Dunkirk, 8 cks., £181.; Lisbon, 40 cs., £92.; Rio de Janeiro, 100 cks., £244.; Rotterdam, 1 ck., £25.; Yokohama, 2 cks., £108.
- ANTIMONY TARTRATE**—
Karachi, 1 cs. (pt.), £8.
- ARSENIC SULPHIDE**—
New York, 10 kgs., £44.
- BARIUM NITRATE**—
Bombay, 21 cks., £168.
- BEESEWAX**—
Gothenburg, 16 c.
- BISMUTH**—
Bombay, 1 cs., £79.; Brussels, 2 cs., £152.; Gothenburg, 2 cs., £204.; Karachi, 1 cs., £78.
- BISMUTH CARBONATE**—
Auckland, 1 cs. (pt.), £43.; Baku, 1 cs. (pt.), £5.; Danzig, 1 cs. (pt.), £17.; Melbourne, 2 cs., £92.; Sydney, 1 cs. (pt.), £22.
- BISMUTH GALLATE**—
Buenos Ayres, 2 cs. (pt.), £17.
- BISMUTH SALICYLATE**—
Danzig, 2 cs. (pt.), £33.
- BISMUTH SUBGALLATE**—
Baku, 1 cs. (pt.), £11.
- BISMUTH SUBNITRATE**—
Auckland, 1 cs. (pt.), £19.; Bombay, 2 cs., £168.; Calcutta, 11 cs., £786.; Canton, 1 cs. (pt.), £9.; Madras, 18 cs., £1,312.; Sydney, 1 cs. (pt.), £10.; Tiflis, 1 cs. (pt.), £5.
- BISULPHITE OF LIME**—
Paris, 5 cks., £22.
- BORAX**—
Aarhus, 1 t., £40.; Amsterdam, 4 t. 18 c., £192.; Antwerp, 17 t., £655.; Germany (*via* Antwerp), 14 t., £728.; Switzerland (*via* Antwerp), 8 t., £470.; Switzerland (*via* Bordeaux), 1 t. 10 c., £58.; Danzig, 5 t. 2 c., £304.; Cologne, 10 t., £500.; Gibraltar, 3 c., £6.; Hamburg, 10 c., £25.; Payta, 2 c., £5.
- BORIC ACID**—
Bombay, 2 c., £11.; Cochin, 1 c., £7.; Danzig, 2 t. 6 c., £206.; Foochow, 3 c., £18.; Hamburg, 2 t., £162.; Karachi, 2 c., £8.; Reval (F.), 1 t., £73.; Santos, 2 c., £9.; Shanghai, 5 c., £20.
- BROMIDE**—
Cape Town, 1 cs., £28.
- BUTYL ACETATE**—
Brussels, 1 cs., £5.
- CALCIUM CARBIDE**—
Penang, 1 t. 5 c., £31.; Pt. Elizabeth, 19 t. 4 c., £495.; Secoondoe, 1 t., £26.
- CALCIUM CHLORIDE**—
Alexandria, 6 c., £42.; Calcutta, 2 cs., £10.; Lisbon, 1 t., £15.; Melbourne, 1 t., £70.
- CALCIUM GLYCEROPHOSPHATE**—
Tiflis, 1 cs. (pt.), £8.
- CALCIUM HYPOPHOSPHITE**—
Boston, 20 cs., £397.
- CALCIUM LACTATE**—
Sydney, 1 cs. (pt.), £24.
- CALCIUM PHOSPHATE**—
Danzig, 1 cs. (pt.), £48.
- CARBONATE OF LIME**—
Buenos Ayres, 12 cks., £35.
- CARNAUBA WAX**—
Barcelona, 2 t.; Messina, 10 c.
- CAUSTIC POTASH**—
Buenos Ayres, 1 cs., £5.; Fremantle, 1 cs., £20.; Hong Kong, 1 cs., £24.
- CAUSTIC SODA**—
Hong Kong, 5 c., £7.; Naples, 34 t. 12 c., £670.; Novorossisk, 9 t. 16 c., £369.
- CERESINE WAX**—
Barcelona, 1 t. 4 c.; Copenhagen, 9 c.; Galatz, 4 t.; Genoa, 1 t.; Gothenburg, 10 c.; Melbourne, 4 t.; Palermo, 12 c.; Reval, 10 c.
- CHEMICALS (otherwise undescribed)**—
Alexandria, 74 pkgs., £309.; Beyrout, 17 cs., £41.; Brisbane, 8 cs., £100.; Buenos Ayres, 1 cs., £50.; Colombo, 1 cs., £16.; Delhi, 1 ck., £45.; Hamburg, 4 pkgs., £18.; Mombasa, 1 cs., £38.; Nagasaki, 36 bgs., £83.; New York, 4 cs. (pt.), £219.; Pt. Swettenham, 1 cs., £9.; Singapore, 17 pkgs., £444.; Shanghai, 1 cs., £21.; Toronto, 6 cs., £49.; Trinidad, 1 cs. (pt.), £5.; Sydney, 9 pkgs., £138.
- CHINA CLAY**—
Antwerp, 5 t.
- CHLORIDE OF LIME**—
Danzig, 6 c., £24.
- CHRYSOPIANIC ACID**—
Calcutta, 1 cs., £23.
- CITRIC ACID**—
Amsterdam, 10 c., £226.; Auckland (F.), 1 c., £15.; Auckland, 1 c., £26.; Bilbao, 1 c., £25.; Danzig, 1 c., £25.; Georgetown, 2 c., £20.; East London (F.), 1 c., £14.; Fremantle, 2 c., £50.; Hong Kong, 19 c., £460.; Hamilton, Ont., 1 t., £443.; Montreal, 3 t. 13 c., £1,553.; Piraeus, 1 cs. (pt.), £11.; Toronto, 10 c., £217.; Vancouver, 13 c., £235.; Winnipeg, 10 c., £222.
- COAL PRODUCTS**—
Alizarine
Copenhagen, 1 brl., £26.; New York, 2 cks., £121.
Aniline Colour
Dahny, 1 cs., £46.
Aniline Dye
Brussels, 2 kgs., £28.; Durban, 2 cs., £40.; Sydney, 8 kgs., £268.; Yokohama, 1 cs. (pt.), £15.
Aniline Salt
Switzerland, 25 cks., £515.
Benzene
Las Palmas, 4 drms., £4.
Benzonaphthol
Odessa, 1 cs., £100.
Carbolic Acid
Buenos Ayres, 9 cs., £21.; Calcutta, 10 drms., £9.; Kobe, 79 drms., £330.; Malacca, 1 cs., £17.; Piraeus, 3 cs., £8.; Singapore, 1 cs., £6.; Yokohama, 67 pkgs., £840.
Creosote
Dordrecht, 19,201 galls., £520.
Dyes
Melbourne, 7 kgs., £215.; New York, 2 cs., £40.; Osaka, 18 cks., £973.; Paris, 61 pkgs., £1,791.
Naphthalene
Halifax, N.S., 41 cks., £195.; Kilindini, 2 cs., £6.; Melbourne, 7 cks., £22.; Shanghai, 380 cs., £1,254.
Pitch
Calais, 255 t., £980.; Fecamp, 260 t., £1,138.; Pt. Elizabeth, 20 cks., £40.; Salonica, 84 brls., £90.; Treport, 130 t., £520.
- COAL PRODUCTS**—
Pyridine
New York, 27 drms., £550.; Philadelphia, 9 drms., £171.
Tar
Beira, 100 drms., £38.; Durban, 500 drms., £42.; East London, 160 drms., £16.; Mauritius, 5 brls., £10.; P. Elizabeth, 350 drms., £54.
- COBALT SULPHATE**—
Amsterdam, 1 ck., £44.
- COPPERAS**—
Brussels, 3 cks., £13.; Pt. Elizabeth, 9 c., £10.
- COPPER OXIDE**—
Paris, 11 cks., £563.
- COPPER SULPHATE**—
Danzig, 3 c., £9.; St. Vincent, B.W.I., 2 c., £7.
- CREAM OF TARTAR**—
Bombay (F.), 1 cs., £8.; Bombay, 1 cs., £6.; Cape Town (F.), 1 c., £18.; Cochin (F.), 1 cs. (pt.), £8.; Colombo, 1 kg., £8.; Danzig, 2 c., £20.; East London, 1 c., £12.; East London (F.), 2 c., £35.; Calcutta, 1 c., £14.; Durban, 1 cs. (pt.), £7.; Madras, 1 cs., £7.; Pt. Elizabeth (F.), 1 c., £16.; Rio de Janeiro, 1 c., £15.; Valparaiso, 10 c., £131.; Brisbane (transit), (F.), 3 t., £540.; Cairns (transit), (F.), 1 t. 5 c., £225.; Fremantle (transit), (F.), 4 t. 5 c., £720.; Perth (transit), (F.), 1 t. 12 c., £270.; Melbourne (transit), (F.), 10 t. 13 c., £2,556.
- DIPHENYLAMINE**—
Alicante, 2 cs., £29.
- DISINFECTANTS (otherwise undescribed)**—
Amoy, 4 c., £6.; Antigua, 10 c., £25.; Barbados, 9 c., £10.; Bangkok, 1 c., £10.; Bombay, 8 t. 6 c., £429.; Buenos Ayres, 47 t. 9 c., £2,266.; Cape Town, 31 t. 9 c., £1,050.; Calcutta, 11 t., £776.; Colombo, 2 t. 4 c., £113.; Constantinople, 6 c., £8.; Demerara, 5 t. 10 c., £292.; Dunedin, 6 t. 2 c., £734.; Fremantle, 2 c., £13.; Hamburg (F.), 19 c., £156.; Hong Kong, 17 c., £56.; Karachi, 11 c., £27.; Lourenco Marques, 3 t. 5 c., £150.; Lytleton, 8 t., 19 c., £731.; Marseilles, 2 c., £8.; Melbourne, 16 c., £41.; Rangoon, 4 t. 18 c., £191.; St. John, N.B., 2 t. 4 c., £225.; Santander, 1 c., £6.; Shanghai, 12 c., £33.; Singapore, 9 c., £31.; Teneriffe, 18 c., £53.; Timaru, 12 c., £46.; Valparaiso, 5 c., £27.
- ETHER**—
Coconada, 1 os., £14.; Colombo, 11 cs. (pt.), £17.
- ETHER (METHYLIC)**—
Pt. Said, 10 cs., £42.
- FLUORIC ACID**—
Copenhagen, 1 cs., £8.
- FULLER'S EARTH**—
Buenos Ayres, 45 t.
- GELATINE**—
Madras, 1 c.
- GLUE**—
Kobe, 4 t. 18 c.
- GLUE, SIZE, AND GELATINE**—
Adelaide, 18 c.; Antwerp, 24 t. 7 c.; Auckland, 1 c.; Bangkok, 3 c.; Bombay, 15 c.; Barbados, 1 c.; Brisbane, 19 c.; Calcutta, 4 t. 1 c.; Calcutta, 9 t. 9 c.; Boulogne, 11 t. 2 c.; Cape Town, 6 t. 5 c.; Christiania, 2 t. 5 c.; Colombo, 2 c.; Copenhagen, 11 c.; Durban, 1 t.; Gibraltar, 2 c.; Jamaica, 1 c.; Karachi, 3 c.; Kobe, 5 t.; New York, 17 c.; Pt. Elizabeth, 2 c.; Pt. Sudan, 2 t. 19 c.; Rotterdam, 3 t.; Singapore, 1 t. 19 c.; Sydney, 8 c.; Valparaiso, 2 c.; Valencia, 10 c.
- GLYCERINE**—
Barcelona, 1 t. 6 c., £155.; Bombay, 2 cs., £5.; Buenos Ayres, 4 c., £28.; Bucharest, 8 t., £1,000.; Colombo, 2 c., £16.; Cape Town, 5 t., £332.; Constantinople, 2 c., £15.; Danzig, 9 c., £69.; Durban, 1 c., £13.;
- GLYCERINE**—
Kilindini, 1 c., £6.; Paris, 2 t. 18 c., £445.; Pt. Elizabeth, 2 c., £18.; Pt. Said, 3 c., £17.; Shanghai, 10 c., £65.; Tientsin, 2 c., £15.; Wellington, 2 cs., £7.
- HYDROCHLORIC ACID**—
Bombay, 1 c., £10.; Colombo, 1 c., £8.
- HYDROGEN PEROXIDE**—
Alexandria, 27 cs., £273.; Pt. Said, 2 cs., £14.
- HYDROQUINONE**—
Sydney (F.), 1 cs. (pt.), £29.
- INFUSORIAL EARTH**—
Paris, 11 c., £10.
- IODINE**—
Antwerp, 6 cs., £606.; Genoa (F.), 7 cks., £3,520.; St. John, N.B., 2 cs. (pt.), £26.
- IODINE (RESUBLIMED)**—
Brussels, 4 cs., £404.; Bombay, 1 cs. (pt.), £58.; Melbourne, 1 cs. (pt.), £5.; Naples, 1 cs., £25.
- IRON AND AMMONIUM CITRATE**—
Antwerp, 1 cs. (pt.), £6.; Auckland, 1 cs. (pt.), £6.; Brussels, 1 cs., £29.; Naples, 2 cs., £22.; Paris, 4 cs., £80.; Sydney, 1 cs. (pt.), £5.
- IRON CITRATE**—
Naples, 1 cs., £17.
- IRON HYPOPHOSPHITE**—
Paris, 2 cs. (pt.), £38.
- IRON LACTATE**—
Baku, 1 cs. (pt.), £8.
- IRON PERCHLORIDE**—
Singapore, 2 cs., £7.; Sydney, 3 cs. (pt.), £8.; Valparaiso, 9 kgs., £23.
- LEAD ACETATE**—
Paris (F.), 1 brl., £26.
- LEAD ARSENATE**—
Melbourne, 162 drms., £664.
- LEAD RESINATE**—
Brussels, 1 bg., £8.
- LEAD SULPHATE**—
Calais, 14 cks., £260.
- LITHIUM BENZOATE**—
Paris, 4 cs., £370.
- LITHIUM CARBONATE**—
Paris, 2 cs., £249.
- MAGNESIA**—
Cape Town, 2 cs., £50.
- MAGNESIA (CALCINED)**—
Bombay, 1 cs., £9.; Leghorn, 10 cks., £61.; Lisbon, 2 cks., £42.; Rio de Janeiro, 2 cs., £34.
- MAGNESIUM CARBONATE**—
Danzig, 4 cs., £9.; Lisbon, 2 cs., £10.; Rio de Janeiro, 1 cs., £8.; Tiflis (F.), 2 cs., £11.
- MAGNESIUM CITRATE**—
Adelaide, 10 cs., £102.; Alexandria, 1 ck., £12.; Switzerland, 2 cs., £15.
- MAGNESIUM SULPHATE**—
Auckland, 1 t. 10 c., £64.; Christchurch, 10 c., £20.; Fremantle, 5 c., £10.; Greymouth, 6 c., £12.; Kilindini, 12 c., £26.; Launceston, 1 t., £39.; Lytleton, 1 t. 4 c., £47.; Melbourne, 6 t. 6 c., £244.; Monte Video, 6 c., £20.; Singapore, 6 c., £26.; Sydney, 6 t. 8 c., £231.; Wellington, 5 t. 15 c., £227.
- MANGANESE BORATE**—
Paris, 6 t., £360.
- MANGANESE HYPOPHOSPHITE**—
Paris, 2 cs. (pt.), £30.
- MANGANESE RESINATE**—
Brussels, 1 bg., £9.
- MERCURIALS**—
Brussels, 1 cs. (pt.), £57.
- MERCURY AND MANGANESE OXIDE**—
Antwerp, 2 cks., £26.
- MERCURY BENZOATE**—
Constantinople, 1 cs. (pt.), £5.
- MERCURY BICHLORIDE**—
Buenos Ayres, 2 cs. (pt.), £7.; Constantinople, 1 cs. (pt.), £15.; Paris, 4 cs., £300.

MERCURY CHLORIDE—

Buenos Ayres, 2 cs. (pt.), £8.;
Paris, 4 cs., £325.

MERCURY OXIDE—

Danzig, 1 cs. (pt.), £16.; Jamaica,
1 cs. (pt.), £21.; Paris, 14 cs. (pt.),
£1,186.

MERCURY PRECIPITATE—

Baku, 1 cs. (pt.), £5.

METHYL SALICYLATE—

Constantinople, 1 cs., £9.;
Smyrna (F.), 11 cs. (pt.), £10.

MINERAL WAX—

Amsterdam, 2 t.

NICKEL SALTS—

Sydney, 1 ck., £15.

NITRIC ACID—

Bombay, 1 c., £11.

OLENIC ACID—

Helsingfors, 1 brl., £20.

OXALIC ACID—

Kobe, 2 cks., £66.; Karachi,
2 kgs., £15.; Melbourne, £53.;
Malmo, 2 cks., £120.; Piraeus,
1 kg., £6.; Sydney, £53.

PARAFFIN WAX—

Antwerp, 10 c.; Barcelona, 5 t.;
Genoa, 6 c.

PEROXIDE—

Gibraltar, 1 cs., £6.

PHOSPHORIC ACID—

Lisbon, 1 cs., £22.

PHOSPHORUS (AMORPHOUS)—

Bombay, 10 cs., £133.

PITCH (STEARINE)—

Cologne, 30 t.

PITCH (VEGETABLE)—

Antwerp, £659.

PLUMBAGO—

Alicante, 1 t. 11 c.; Alexandria,
£387.; Batoum, 7 t. 14 c.

POTASH & TARTARIC ACID—

Bombay, 1 cs., £18.

POTASSIUM ACETATE—

Bombay, 3 cs. (pt.), £56.

POTASSIUM BICARBONATE—

Brussels, 3 cks., £25.

POTASSIUM BICHRIMATE—

Bilbao, 1 c., £5.; Buenos Ayres,
14 pkgs. (pt.), £5.; Danzig,
5 t. 3 c., £820.

POTASSIUM BROMIDE—

Bombay, 1 cs. (pt.), £13.; Cal-
cutta, 1 cs., £25.; Karachi, 1 cs.,
£25.

POTASSIUM CARBONATE—

Sydney, 1 cs., £10.

POTASSIUM CHLORATE—

Bombay, 2 c., £21.; Buenos
Ayres, 1 c., £7.; Colombo, 1 c.,
£8.

POTASSIUM CITRATE—

Bombay, 1 cs. (pt.), £14.; Cal-
cutta, 1 cs. (pt.), £7.; Canton,
1 cs. (pt.), £7.; Melbourne, 1 cs.
(pt.), £7.; Sydney, 1 cs. (pt.),
5 cs., £130.

POTASSIUM CYANIDE—

Bombay, 3 cs., £47.; Buenos
Ayres, 14 pkgs. (pt.), £5.; Cal-
cutta, 3 pkgs., £45.; Colombo,
1 pkg., £26.

POTASSIUM HYDROXIDE—

Buenos Ayres, 3 cs. (pt.), £8.

POTASSIUM IODIDE—

Antwerp, 4 cs., £342.; Baku,
1 cs. (pt.), £20.; Bangkok, 1 cs.,
£50.; Buenos Ayres, 3 cs. (pt.),
£8.; Brussels, 27 cs., £598.;
Canton, 1 cs. (pt.), £24.; Naples,
15 cs. (pt.), £613.; Sydney, 2 cs.,
1 cs. (pt.), £171.; St. John, N.B.,
2 cs. (pt.), £130.; Zanzibar, 1 cs.
(pt.), £5.

POTASSIUM METABISULPHITE—

Algiers, 20 kgs., £210.

POTASSIUM PERMANGANATE—

Boulogne, 13 c., £267.; Bombay,
1 c., £8.; Piraeus (F.), 2 c., £47.

POTASSIUM PRUSSIAN—

Bilbao, 1 cs., £6.; Singapore,
1 cs., £12.

POTASSIUM SULPHATE—

Channel Islands, 8 t. 5 c., £189.

POTASSIUM SULPHOGUAIACO-**LATE—**

Buenos Ayres (F.), 2 cs. (pt.),
£15.

QUININE—

Melbourne, 100 ozs.; New York,
10,000 ozs.

RESORCIN—

Baku, 1 cs. (pt.), £20.; Constan-
tinople, 1 cs. (pt.), £15.; Tiflis,
1 cs. (pt.), £5.

ROSIN—

Colombo, £58.

SALAMMONIAC—

Beira, 3 c., £12.; Bombay,
7 t. 10 c., £543.; Ghent, 1 t.,
£85.; Novorossisk, 1 t., £105.

SALICYLIC ACID—

Bombay, 1 cs., £8.; Rangoon,
2 cs., £21.

SALT—

Bombay, 7 t.; Boulogne, 10 t.;
Mombasa, 1 t.

SALTCAKE—

Helsingfors, 520 t., £1,950.

SALTPETRE—

Barcelona, 1 t., £52.; Colombo,
5 c., £19.; Durban, 1 t., £68.;
East London, 19 c., £58.; Jaffa,
1 t., £66.; Pernambuco, 50 t.,
£2,570.; Pt. Elizabeth, 11 c.,
£36.; Rio de Janeiro, 3 t. 19 c.,
£236.

SLEEP DIP—

Bluff, 3 t. 11 c., £200.; Buenos
Ayres, 22 t. 11 c., £736.; Cape
Town, 1 t. 6 c., £63.; Novorossisk,
17 t. 10 c., £1,540.; Wellington,
16 t. 4 c., £796.

SILVER NITRATE—

Antwerp, 2 c., £1,469.; Calcutta,
1 c., £49.; Piraeus, 1 c. (pt.), £7.

SOAP—

Acora, 1 c.; Aden, 1 c.; Alex-
andria, 1 t. 1 c.; Antwerp, 192 t.
11 c.; Bangkok, 7 c.; Bombay,
6 t. 10 c.; Barbados, 1 c.;
Buenaventura, 2 c.; Boston,
2 t. 18 c.; Boulogne, 62 t. 9 c.;
Calcutta, 5 t. 8 c.; Callao, 1 c.;
Cape Town, 5 c.; Canary Islands,
6 c.; Christiania, 2 c.; Cochín,
1 c.; Christiansund, 2 c.;
Cologne, 28 t. 8 c.; Colombo,
1 t. 4 c.; Constantinople, 2 t. 3 c.;
Copenhagen, 6 c.; Danzig, 9 t.
10 c.; Djibouti, 1 c.; Dunkirk,
1 t. 2 c.; Durban, 10 c.; East
London, 1 t. 1 c.; Genoa, 50 t.
13 c.; Gothenburg, 4 c.; Hong
Kong, 4 c.; Jamaica, 3 c.;
Karachi, 11 c.; Kilindini, 4 c.;
Lisbon, 3 t. 6 c.; Lytleton,
1 t. 10 c.; Madagascar, 31 t. 16 c.;
Madras, 1 t. 5 c.; Malta, 19 c.;
Marseilles, 12 c.; Mollendo,
10 c.; Mogador, 1 t. 5 c.; Mon-
treuil, 5 c.; Monte Video, 11 c.;
Naples, 1 c.; New York, 6 c.;
Novorossisk, 8 t.; Ostend, 1 t.
8 c.; Paris, 2 t. 3 c.; Penang,
11 c.; Piraeus, 4 c.; Pt. Said,
3 c.; Pt. Sudan, 13 c.; Rio de
Janeiro, 1 c.; Rotterdam, 17 t.
2 c.; Rouen, 8 c.; Shanghai,
1 t. 13 c.; Santa Cruz, 2 t. 4 c.;
Singapore, 5 c.; St. John, N.B.,
17 c.; Sydney, 14 t. 2 c.;
Toronto, 2 t. 6 c.; Trinidad, 1 t.;
Valparaiso, 1 t. 6 c.; Wellington,
16 c.

SODA (CALCINED)—

Pt. Said, 1 t., £18.

SODA ASH—

Antwerp, 60 t., £236.; Genoa,
5 t. 10 c., £66.

SODA CRYSTALS—

Barbados, 10 c., £7.; Buenos
Ayres, 10 c., £5.; Lisbon, 1 t.
10 c., £16.; Penang, 11 c., £5.

SODIUM AND POTASSIUM**TARTRATE—**

Melbourne, 2 cks., £54.

SODIUM BENZOATE—

Baku, 1 cs. (pt.), £10.; Santos,
2 cs., £35.; Shanghai, 11 cs.,
£269.

SODIUM CARBONATE—

Antwerp, 50 t., £219.; Bombay,
2 c., £7.; Danzig, 4 t. 5 c., £187.;
Durban, 4 c., £7.; Iloilo, 1 c., £6.

SODIUM BICHRIMATE—

Danzig, 4 t. 17 c., £486.

SODIUM BISULPHITE—

Colombo, 2 t., £60.; Singapore,
5 c., £13.

SODIUM BROMIDE—

Auckland, 1 cs. (pt.), £7.

SODIUM CARBONATE—

Brussels, 4 cks., £7.; Singapore,
4 c., £17.; Shanghai, 1 t., £16.

SODIUM CITRATE—

Melbourne, 1 cs., £13.

STRONTIUM HYDRATE—

Paris, 1 ck., £14.

SODIUM HYPO—

Brussels, 10 c., £14.; Deli
Sumatia, 10 c., £14.; Iquique,
4 c., £11.; Kilindini, 5 c., £8.

SODIUM HYPOPHOSPHITE—

Boston, 20 cs., £178.

SODIUM IODIDE—

Naples, 11 cs. (pt.), £402.;
Santos, 1 cs. (pt.), £22.

SODIUM NITRATE—

Genoa, 1 t., £435.

SODIUM PHOSPHATE—

Brussels, 5 cks., £39.

SODIUM PRUSSIAN—

Toronto (F.), 3 t., £300.

SODIUM PYROPHOSPHATE—

Florence, 1 t. 10 c., £90.; Kobe,
1 t. 11 c., £133.

SODIUM SALICYLATE—

Baku, 1 cs. (pt.), £7.; Bombay,
1 cs., £11.; Calcutta, 3 cs., £42.

SODIUM SILICATE—

Barcelona, 3 t. 2 c., £33.

SODIUM SULPHATE—**(GLAUBER SALTS)—**

Alexandria, 1 t. 1 c., £8.; Brus-
sels, 16 c., £17.

SODIUM SULPHIDE—

Paris, 19 t. 13 c., £472.; Piraeus,
5 t., £140.

SODIUM SULPHITE—

Deli Sumatia, 1 c., £5.; Paris,
3 t. 2 c., £120.; Pt. Swettenham,
5 t., £150.; Singapore, 2 c., £11.;
Shanghai, 12 c., £15.

SODIUM TARTRATE—

Amsterdam, 3 c., £16.; Cape
Town, 1 ck., £8.; Gothenburg,
4 c., £23.; Rotterdam, 1 c., £8.;
Sydney, 1 t., £110.

SULPHUR—

Amsterdam (F.), 5 t., £140.;
Brussels, 1 t., £31.; Danzig (F.),
4 c., £10.; Gothenburg (F.),
7 t. 10 c., £214.; Helsingfors (F.),
5 t., £195.; Launceston, 10 c.,
£10.; Piraeus, 10 c., £17.;
Switzerland, 2 c., £9.

SULPHURIC ACID—

Bombay, 1 c., £10.; Channel
Islands, 1 t. 1 c., £27.; Gibraltar,
1 c., £5.; Malta, 5 c., £20.;
Piraeus, 7 t., £145.; Secondee,
6 t. 10 c., £210.; Singapore,
17 c., £38.

SUPERPHOSPHATE—

Dunkirk, 460 t.

SUPERPHOSPHATE OF LIME—

Cape Town, 50 t., £562.

TALLOW—

Genoa, 48 t. 15 c.

TANNIC ACID—

Bombay, 2 cs., £26.; Trinidad,
1 cs., £5.

TARTARIC ACID—

Amsterdam, 1 t., £310.; Cal-
cutta, 1 c., £21.; Callao, 1 c.,
£23.; Cape Town (F.), 2 c., £39.;
Cape Town, 1 t. 8 c., £494.;
Coconada (F.), 1 c., £23.; Dur-
ban, 3 c., £62.; Hankow, 7 c.,
£134.; Hiogo (F.), 15 t., £4,784.;
Hong Kong, 5 c., £91.; Karachi,
1 c., £23.; Jamaica, 1 c., £20.;
Montreal, 2 t., £621.; Piraeus,
1 cs. (pt.), £8.; Tokio (F.), 2 t.,
£674.

THEOBROMINE—

Buenos Ayres, 2 cs. (pt.), £25.

TITANIUM AND SODIUM**OXALATE—**

Paris, 1 kg., £8.

TURPENTINE—

Rotterdam, 15 t. 19 c.

URANIUM NITRATE—

Italy, 1 cs., £55.

WAX—

Piraeus, 12 c.

WHITE LEAD—

Antwerp, £748.; Buenos Ayres,
£480.; Broome, £19.; Dunkirk,
£300.; East London, £225.;
Paris, £280.; Pt. Said, £31.;
Pt. Swettenham, £806.; Ran-
goon, £114.; Rio de Janeiro, £29.;
St. Thomas, £32.

ZINC OXIDE—

Dunkirk, £260.

MANCHESTER.

Week ending December 10.

ALUM (LUMP)—

Brisbane, 7 brls.; Sydney, 7 brls.

MIDDLESBROUGH.

Week ending December 13.

AMMONIA—

Antwerp, 3,280 galls., £672.

BARIUM CHLORIDE—

Rouen, 10 t., £190.

COAL PRODUCTS—

Benzole
Dieppe, 23,522 galls., £5,238.

Cresote Oil

Hamburg, 817 t., £20,425.

Naphtha

Dieppe, 22,257 galls., £2,763.;
Rouen, 8,009 galls., £1,074.

Naphthalene

Melbourne, 15 t., £413.; Sydney,
12 t., £229.

PITCH—

Antwerp, 2,472 t., £9,087.; Rot-
terdam, 908 t., £2,951.; St.
Nazaire, 3,137 t., £10,122.

SALT—

Launceston, 2 t., £90.; Mel-
bourne, 10 t., £427.; Sarpsborg,
1,597 t., £3,992.; Sydney, 26 t.,
£1,236.

TOLUOL—

Dieppe, 3,298 galls., £453.

XYLENE—

Dieppe, 528 galls., £92.

NEWCASTLE-ON-TYNE

Week ending December 13.

ANTIMONY—

Gothenburg, 1 t.

BORIC ACID—

Gothenburg, 2 t.

CAUSTIC SODA—

Gothenburg, 1 t. 11 c.

RED LEAD—

Hangesund, 1 t. 14 c.

SOAP—

Bergen, 10 c.

SODIUM SILICATE—

Gothenburg, 1 t. 14 c.

SODIUM SULPHATE—

Gothenburg, 2 t.

SULPHUR—

Gothenburg, 10 c.

N. & S. SHIELDS.

Week ending December 13.

FERRO MANGANESE—

Stockholm, 60 t.

GLUE—

PRICES CURRENT.

THURSDAY, Dec. 18, 1919.

PREPARED BY MESSRS. HIGGINBOTTOM AND CO., 21, SPRING GARDENS, MANCHESTER.

The values stated are F.O.R. at makers' works, or at usual ports of shipment in U.K., unless otherwise specified.
The prices in different localities may vary.

Acids:—				Lime, Acetate (brown)			
*Acetic 40% and 60%	...	per cwt.	33/- & 49/6	...	...	per ton	15 10 0
" Glacial	...	per ton	85 0 0	" (grey), 80%	...	"	26 0 0
Arsenic, S.G. 2,000 ²	...	per ton	80 0 0	Magnesium Chloride	...	"	15 10 0
Boric Crystals	...	...	72 0 0	" Carbonate (light)	...	per cwt.	2 7 6
*Fluoric	...	per lb.	0 0 7	" Calcined (heavy)	...	per ton	36 0 0
*Muriatic (Tower Salts), 28° Tw.	...	per carboy	0 7 0	" Sulphate (Epsom Salts) (coml.)	...	"	12 0 0
*Nitric, 80° Tw.	...	per ton	34 10 0	" (druggists)	...	"	16 0 0
Oxalic	...	per lb.	0 1 5	Magnesite Calcined	...	"	22 0 0
Phosphoric, 1,750 ⁵	...	...	0 1 9	Manganese, Sulphate	...	"	75 0 0
*Sulphuric (fuming, 70%)	...	per ton	—	" Borate	...	"	110 0 0
" (Pyrites, 168°)	...	"	7 18 9	*Methylated Spirit, 64° (industrial)	...	per gal.	0 5 7
" (" 140°)	...	"	4 10 0	*Naphtha (Wood), Solvent	...	"	0 10 0
" (free from arsenic, 144°)	...	"	5 7 4	" " Miscible, 60° p.	...	"	0 10 6
Tannic (commercial)	...	per lb.	0 2 6	Oils:—			
Tartaric (crystals)	...	...	0 3 1	*Cottonseed	...	per ton	105 0 0
*Acetone	...	per ton	90 0 0	*Linseed, Raw	...	"	105 0 0
*Alum, loose lump (delivered)	...	"	16 10 0	Stearine, 115-120° M.P.	...	"	105 0 0
Alumina Sulphate (pure)	...	"	16 10 0	Potassium, Bichromate	...	per lb.	0 1 6
Aluminoferic (in slabs)	...	"	8 10 0	" Carbonate, 85%	...	per ton	105 0 0
Aluminium (Ingot Metal, 98/99%)	...	per ton	150 0 0	" Chlorate	...	per lb.	0 1 1
*Ammonia, Anhydrous	...	per lb.	0 2 0	" Hydrate (Caus. Pot.) 88/90%	...	per ton	105 0 0
" 880	...	per ton	33 0 0	" " 75/80%	...	"	95 0 0
" 920	...	...	20 0 0	" Potash Hydrate Liquid, 50° B.	...	"	65 0 0
" Carbonate	...	per lb.	0 0 7½	" Nitrate (refined)	...	"	55 0 0
" Muriate (grey)	...	per ton	47 0 9	" Permanganate (commercial)	...	per lb.	0 3 3
" (salaminoniac) 1st & 2nd,	...	per cwt.	80/- & 75/-	" Prussiate (yellow)	...	"	0 2 1
" Nitrate	...	per ton	60 0 0	" " (red)	...	"	0 5 6
" Phosphate	...	"	110 0 0	" Sulphate, 90% (ex ship)	...	per ton	25 0 0
" Sulphate (grey), London, not	...	"	—	" Muriate, 80%	...	"	25 0 0
" " Hull	...	"	—	Silver (metal)	...	per oz.	0 6 7½
" " Manchester	...	"	—	Sodium (metal)	...	per lb.	0 1 3
*Aniline Oil (pure)	...	per lb.	0 1 6	" Acetate	...	per ton	51 0 0
Aniline Salt	...	"	0 1 6	" Arseniate, 45%	...	"	45 0 0
Antimony	...	per ton	45 0 0	" Borate (Borax), Crystals	...	"	39 0 0
" (tartar emetic), 43/44%	...	per lb.	0 3 1	" Bicarbonate (2 cwt. bags)	...	"	8 5 0
" (golden sulphide)	...	"	0 1 3	" Bichromate	...	per lb.	0 0 11
Arsenic, white powdered	...	per ton	65 0 0	" Carb. (Caustic Soda-ash), 48%	...	per ton	16 0 0
Barium Chloride (in casks)	...	"	22 0 0	" " (Alkali), 58% (bags)	...	f.o.r. {	6 10 0
" Carbonate (native), 92/94%	...	"	10 10 0	" " (Soda Crystals), (bags) car. pd.	...	wks. {	5 10 6
" Sulphate (native levigated)	...	"	£7 to £14	" Chlorate	...	per lb.	0 0 6
Baryta Chlorate	...	per lb.	0 1 1	" Cyanide (100% basis) for export	...	"	0 0 11
*Bisulphide of Carbon	...	per ton	56 0 0	" Hydrate (76% C. Soda) (f.o.r.)	...	per ton	24 0 0
*Bleaching Powder, 35%	...	"	17 0 0	" " (74% C. Soda)	...	"	23 5 0
" Liquor, 7%	...	"	8 0 0	" " (70% C. Soda)	...	"	22 0 0
Casein (commercial)	...	"	90 0 0	" " (60% C. Soda)	...	"	21 0 0
Chromium Acetate (crystals)	...	per lb.	0 1 0	" " (pure liquid, 90° Tw.)	...	"	10 2 6
Calcium Chloride	...	per ton	8 0 0	" 77/78% Powdered (99%) Hydrate	...	"	24 10 0
China Clay (at Runcorn), in bulk	...	"	70/- to 90/-	" Hyposulphite (commercial)	...	"	19 0 0
Coal-tar Products and Dyes:—				" Manganate, 25%	...	"	65 0 0
Alizarine (artificial), 20%	...	per lb.	0 2 0	" Nitrate, 96%, refd., f.o.r., L'pool	...	"	21 0 0
Magenta	...	"	18/- to 35/-	" Nitrite, 100%	...	"	61 0 0
Anthracene, 40/50%-A, f.o.b., L'don,	...	per unit,	0 0 7	" Phosphate	...	"	32 0 0
Benzol, 90's (naked)	...	per gal.	0 2 0½	" Prussiate	...	per lb.	0 1 1½
" 50/90's	...	"	0 1 10½	" Silicate (glass) Alkaline	...	per ton	12 5 0
Carbolic Acid (crude, 60°)	...	"	0 2 3½	" " (liquid, 100° Tw.)	...	"	9 10 0
" (crystallised, 40°)	...	per lb.	0 0 10½	" Sulphate (Saltcake), delivered	...	"	3 10 0
" Acid (pale liquid, 97/98%)	...	per gal.	0 2 9	" " (Glauber's Salt)	...	"	4 0 0
*Creosote (ordinary), naked	...	"	0 0 6½	" Sulphide (conc.), 60/65% casks	...	"	26 0 0
*Crude Naphtha, 30% at 120°C.	...	"	0 0 9	" Sulphite	...	"	12 10 0
*Grease Oils, 18° Tw. (naked)	...	per ton	6 10 0	Sulphocyanide, Ammonium, 95%	...	per lb.	0 2 0
Pitch, f.o.b., Liverpool or Garston	...	"	3 12 6	" Barium, 95%	...	"	0 1 4
*Solvent Naphtha, 90% at 160°	...	per gal.	0 2 9½	" Potassium	...	"	0 2 4
Copper	...	per ton	103 10 0	" Alumina	...	"	0 0 9
" Sulphate	...	"	40 0 0	Sulphur, (Flowers)	...	Sicilian per ton	23 0 0
Dross Salts	...	"	40 0 0	" (Roll Brimstone)	...	"	22 10 0
*Glycerine (crude), 80%	...	"	72 0 0	" Brimstone (best thirds)	...	"	13 10 0
" (industrial, S.G. 1,260)	...	"	110 0 0	Tallow	...	"	105 0 0
*Iodine	...	per oz.	0 1 0	Tin Crystals	...	per lb.	0 2 2
*Iron Nitrate, 80° Tw.	...	per ton	12 0 0	" English Ingots	...	per ton	313 0 0
" Sulphate (copperas), delivered	...	"	4 5 0	Titanium, Potass. Oxalate	...	per lb.	0 1 6
" Sulphide	...	"	9 0 0	Titanous Chloride	...	per cwt.	4 10 0
Lead (Foreign Pig)	...	"	39 10 0	Zinc (Spelter)	...	per ton	52 15 0
" Litharge Flake	...	"	59 0 0	" Powder, 88/92%	...	"	75 0 0
" Acetate (white)	...	"	84 0 0	* " Chloride (solution, 102° Tw.)	...	"	23 0 0
" (brown)	...	"	67 0 0	" Sulphate, Crystal	...	"	21 0 0
Lead, Carbonate (White lead), pure	...	per ton	54 0 0				
" Nitrate	...	"	60 0 0				

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Readers are invited to forward items of intelligence, company reports and balance-sheets, or cuttings from local newspapers of interest to the trades concerned.

Articles, reports, and correspondence on all matters of interest to the chemical and allied industries, home and foreign, are solicited. Correspondents should condense their matter as much as possible, write on one side only of the paper, and in all cases give their names and addresses, not necessarily for publication. Sketches should be sent on separate sheets.

CURRENT TOPICS.

REVISED CHEMICAL STATISTICS.

IN February last the Board of Trade announced that they proposed at an early date to undertake the revision of the classification of goods entered for import into or export from the United Kingdom, with the object of determining whether the headings under which goods are grouped should be in any way modified for the purpose of increasing their utility to the trading community. The demand for such a revision had been insistent from many quarters for years before the war, the form of the statistics issued monthly by the Board of Trade being not nearly so useful as they could very easily have been. Just when we were thinking that the matter had been shelved came a more definite statement on the subject. The Board of Trade, it appears, has been kept busy for some months consulting with various bodies with reference to the appropriate classification of all the main groups of commodities. A new list has now been prepared embodying the revised classification, but as at the time of writing it is not available it is impossible to say whether or not it fully meets the requirements of the chemical and allied industries. The former separate import and export lists, it is said, have been combined, and the assimilation of import and export headings has been carried much further than before. The number of headings has been increased from 855 to 1,650 for imports and from 606 to 1,360 for exports, and the group relating to chemical products is the one to which the largest additions have been made. In this group the number of headings has been increased from 54 for imports and 42 for exports to 157 for both. In addition to the more detailed classification of commodities adopted, the record of foreign trade by quantity as well as by value is proposed in a considerable number of cases in which quantities have not hitherto been secured. In other cases the units of quantity prescribed have been reconsidered with a view to securing improved informa-

tion on matters the importance of which was thrown into relief during the war. So far as we are in a position to form an opinion on the information available, the proposed revision is in the right direction. That the reform is long overdue so far as the chemical trades are concerned we have already shown in these columns. In 1913, for example, the total value of the British imports of "Chemical Manufactures and Products (other than Drugs, Dyestuffs, and Manures)" amounted to £4,534,536. In the group as a whole, chemicals valued at £2,280,773., or 50.3 per cent., were grouped together as "unenumerated" or "other sorts." In the subgroup of potash compounds the proportion was 72.3 per cent., and in the case of soda compounds as much as 93.2 per cent. Many of the products whose identity has not hitherto been disclosed, at all events in the monthly trade returns, exceed in value those which have always been specially defined. In a lesser degree, a similar state of affairs exists in respect of the export trade. Unfortunately, for reasons given in the official announcement, the revision will not be attempted in the monthly returns for next year, though the information will be made available through the medium of Chambers of Commerce and other bodies.

BRITISH CHEMICAL TRADE WITH INDIA.

WE publish in this issue a continuation of that section of the report of Mr. Thomas M. Ainscough, O.B.E., H.M. Senior Trade Commissioner in India, which deals with the prospects of the British chemical trade in India. Mr. Ainscough's summary of the position and his recommendations are very interesting. The Indian trade in heavy chemicals of all kinds amounts, normally, to £675,000., of which the United Kingdom's share is in the region of £500,000. During the war, owing to an increased demand, but mainly owing to the large advances in prices, the imports advanced to £1,815,000. in 1917-18, of which more than two-thirds came from the United Kingdom and one-fifth from Japan. The share of the United States has also risen to 11 per cent. As regards acids, nitric and sulphuric, ammonia and salts thereof, aluminous sulphates, potassium compounds, disinfectants, etc., the trade is well organised in the hands of import merchants, and the goods are usually sold to them in London. There are few suggestions which can be offered. One British firm is manufacturing sulphuric acid in Bombay, and a further large works for this purpose is shortly to be erected near the iron and steel works at Jamshedpur (Sakchi). The imports from Japan are increasing considerably. In respect of alkalis in general, and soda compounds in particular, the United Kingdom is in a very strong position owing to the activity and excellent representation of the largest firm of British manufacturers of these products, who maintain their own staff and selling organisation throughout the country. A very large business is done in soda ash and soda crystals, caustic soda, etc., for use in dyehouses, paper-mills, glassworks, and also for domestic purposes. Competition is recently being met

with from the crude soda imported from the Magadi Lake in British East Africa, which is worked up in Calcutta by an Indian company. There is a fair trade (70,000cwt. a year) in bleaching materials, which, before the war, was almost entirely in British hands; but shipments from Japan are now four times the value of those from the United Kingdom. British makers of all these products should take steps to secure the services as agents of the few firms in India who specialise in chemicals. Regarding the trade in dyestuffs, the German manufacturers before the war had their own offices and laboratories in Bombay, where they made tests, trained Indian chemists and demonstrators, and from which they controlled their organisation throughout India. Depôts were established in the leading centres, such as Ahmedabad, Madura, Amritsar, and Cawnpore, and the market was effectively worked by European and Indian agents and travellers, who reached every village dyehouse in the country. German inspectors and demonstrators also constantly travelled throughout the field to study conditions, check the statements of their agents, and stimulate them to increased efforts. By this systematic distribution they obtained control not only of the trade with the mills, but also of the bazaar trade, which is by far the larger and more lucrative. The result of their efforts was that, out of a total import in 1913-14 of dyes obtained from coal tar, amounting to £707,000., Germany secured £541,000., and it is probable that of the £83,000. worth imported from Belgium the majority were of German origin. To these figures should be added £55,000. worth a year of synthetic indigo. The only sound and satisfactory method for British makers to adopt is to follow the German system, which, in the case of dyes, is the best system to meet the needs of the market. It is essential that they should open offices and laboratories in Bombay, that they should staff them with commercial men and also with one or two trained chemists, and that they should establish a network of depôts and Indian agencies throughout the market. The dyes should be shipped in bulk, and then made up to the strengths desired, tinned, and labelled on the spot. The larger firms should supervise their own distribution by means of depôts, sub-agents, and travelling European inspectors; but lesser makers may not be able to do this, in which case they should appoint the best firm, British or Indian, available in each district, and follow this up with constant visits by travellers. A head depôt in Bombay is essential in every case.

NEW ZEALAND FOOD AND DRUGS ACT AMENDMENTS.—An Order in Council of September 15, issued under the Sale of Food and Drugs Act, 1908, of New Zealand, provides that cream-of-tartar substitutes shall contain not more than 1 per cent. of sulphates, calculated as calcium sulphate (CaSO_4), not more than one-hundredth of a grain of arsenic, calculated as arsenious oxide, to the pound, and not more than one-seventh of a grain of lead to the pound. Baking-powder shall contain not more than 1.5 per cent. by weight of sulphates, calculated as calcium sulphate; it shall yield not less than 10 per cent. by weight of carbon dioxide on heating with water and it shall not contain any alum or compound of aluminium. Coloured baking-powder shall conform to this standard.

WAR EXPERIENCES IN THE MANUFACTURE OF NITRIC ACID.

BEFORE the Chemical Society, in London, on Thursday (December 18), Professor J. Walker, of Edinburgh University, delivered a lecture, entitled "War Experiences in the Manufacture of Nitric Acid and the Recovery of Nitrous Fumes." This is one of a series of three lectures connected with the war, and the lecture-room was filled to overflowing. Sir James Dobbie, the Government chemist, presided.

Professor Walker said the experiences which he was about to relate were more those of his immediate colleagues, because his own part was largely that of a spectator. At the same time, he realised that these experiences were probably the same as those of others who worked at the same problems in other factories. Not only did all those who were at work have the benefit of the experiences of all others elsewhere, but later they had the benefit of the experience of the Research Department at Woolwich and of the Munitions Inventions Department.

T.N.T.

In the spring of 1915, when the dearth of high explosives had become a matter of public outcry, they at the University of Edinburgh wondered if they could do anything to aid in the manufacture of these explosives. Dr. Alexander Cumming, lecturer in chemistry at the University, suggested that, as there were local supplies of concentrated sulphuric acid, toluene, and sodium nitrate—Leith being the port for receiving nitrate from South America,—the War Office might be approached on the matter. Lord Moulton, acting for the War Department, received the proposal most favourably; indeed, they were extremely grateful to Lord Moulton for his constant encouragement in this enterprise and for his help in many ways when they had little difficulties with various departments. Dr. Cumming supplied the energy and driving force of the concern, Mr. J. W. Romanes, a graduate of the University of Edinburgh, supplied the technical experience which he had gained in other lines from those upon which they were working, whilst his own personal part was that of the benevolent uncle. They undertook to produce 150 tons of T.N.T. before a certain date. They debated for some time whether they should start a factory in the old disused gasworks or in a disused chemical factory which had been used for the extraction of alkaloids and for the preparation of coffee essence, and finally they decided on the latter.

They began work in April, 1915, to reconstruct this factory; by September of the same year they had done their first nitration, and made their first despatch of T.N.T. in October, 1915. The first contract for 150 tons was completed before the date specified. They then secured a further contract, but as the factory was in a very populous district and also could not be greatly extended—at that time they were producing 17 tons per week instead of the five tons which they had originally contracted to do—they were asked if they would undertake the construction and management of a Government factory in the neighbourhood of Edinburgh, on the southern boundaries, and not in a populous district. This was called H.M. Factory, Craighleith, and they undertook to produce 30 tons per week, which was afterwards extended to 50 tons per week. Production was

started in March, 1917, and by the end of July they were making about 30 tons per week. At this point the original factory was stopped from making T.N.T. in view of the fires and explosions which had taken place in other factories in densely populated districts similar to it.

The first factory was then turned over to the manufacture of calcium nitrate by the catalytic oxidation of ammonia, but there were considerable delays in getting it started—delays for which he and his colleagues were not wholly responsible,—and they had only reached the stage of production on the large scale at the date of the armistice; it was only a few weeks before the signing of the armistice that they were able to produce calcium nitrate from nitric acid by catalytic oxidation of ammonia at the rate of 30 tons per week.

This brief account of the work they undertook brought him to the real subject of the lecture. This country was in many ways before the war in a disadvantageous position with regard to the supply of nitrates and nitric acid. All our nitrate had to be brought either from South America or, to a smaller extent, from Norway in the form of calcium nitrate prepared from nitric acid by the arc process.

NITRIC ACID.

Dealing with the experiences at Edinburgh in the manufacture of nitric acid, Professor Walker showed a number of slides of the plant, and in explaining the general working of it—for the elementary nature of which he apologised—said that we could take credit to ourselves in this country that the manufacture of nitric acid had been facilitated so much by the developments in the silicaware industry, which the Thermal Syndicate had taken up. Without these products there would have been much greater difficulties in the manufacture of nitric acid and many other substances. He specially drew attention to the spirals, which withstood the action of hot acid inside and cold water outside. One type of nitrating pot used in the work had a capacity of one ton whilst another had a capacity of $2\frac{1}{4}$ tons.

A number of photographs of the Craighleith plant were then shown, and it was explained that the nitric acid in the process of distillation was obtained partly as strong nitric acid (90 per cent.) and partly as weak (60 to 70 per cent.), and it was possible to charge into one pot or another at will by means of a three-way tap. Earthenware vessels were used for the weak nitric acid. This was the ordinary method for the preparation of nitric acid from nitrates. The sulphuric acid used was about 92 per cent. concentration, because their object was not to get the very strongest nitric acid possible, but to get as large a yield as possible, and they generally collected nitric acid varying from 94 per cent. strength on the one hand to 70 per cent. on the other. The plant was so arranged that they could obtain acid of any weakness or strength according to the purpose in view, depending on how the nitration was being conducted.

In September, 1918, they were collecting 90 per cent. of the acid as 90 per cent. acid, and 10 per cent. as 60 per cent. acid, instead of 70 per cent. as 94 per cent. acid, and 30 per cent. as 70 per cent. acid, because that suited the process of nitration which was being carried out at that time. The loss in the plant amounted to about 5

or 6 per cent. That was mostly in the fume, but there might also have been a slight loss in the fused cake which was run out at the end of the operation, but if necessary it could be reduced to practically nil. The time taken for the distillation of the complete charge of $2\frac{3}{4}$ tons of sulphuric acid and $2\frac{1}{2}$ tons of sodium nitrate was usually 16 hours, but it had been found that on special occasions, such as a holiday, the workpeople managed to get it through in eight hours. (Laughter.)

OXIDATION OF AMMONIA.

Professor Walker then came to the other process for the manufacture of nitric acid, of which, he said, they had had a little, but all too little, experience—viz., the catalytic oxidation of ammonia, which was carried out in the original factory after the production of T.N.T. there was abandoned. The process adopted was to get the nitrogen of the ammonia oxidised to nitric oxide, and thus avoid oxidation to nitrogen as far as possible. The concentration of ammonia in the mixture did not seem to matter very much, so far as the practical carrying out of the reaction was concerned, so long as it remained between 10 and 12 per cent. In that case the reaction went quite well and they got a yield on the small scale, and he had no doubt that they would have obtained the yield on the large scale also, after they had had more experience, of something like 97 per cent. of the ammonia converted into nitric oxide, so that the loss by the first reaction was comparatively slight.

The source of ammonia used was the strong 25 per cent. purified ammonia, which was first treated in steam-heated stills, the ammonia gas was passed through a cooler, then through an iron oxide purifier, as in a gas works, to remove sulphur compounds—though it was doubtful whether that was necessary,—and then was mixed with air, the air being produced by means of a blower and measured by a meter. The amount of ammonia was regulated by the feed of the ammonia liquor to the still. When the ammonia-air mixture had been made it was filtered through a box containing some form of wool—sometimes he used cotton wool and sometimes slag wool,—because if dust was carried forward to the platinum catalysts, the efficiency of the catalyst very soon became impaired.

The catalyst was the large type suggested by the Munitions Inventions Department. It consisted of an aluminium box square in section, the size of the square being one foot. Across this aluminium box was a diaphragm of platinum wire gauze, 80 meshes to the inch, the diameter of the platinum wire of which the gauze was made being four-thousandths of an inch, sometimes single gauge and sometimes two or three, but they had not decided which, on the whole, gave the best results when operations had to be stopped. It was found that this gauze had to be heated, as cold platinum was not a sufficiently active catalyst, and the gauze was heated in one spot by a flame. The leads to and from the box were also of aluminium, as anything that had any connection with iron or lead could not be allowed to come between the catalyst and the filter, iron oxide seeming to have a very detrimental effect upon the catalyst. This catalyst, once it was heated to a red heat, started the catalytic oxidation of the ammonia at the spot where it was heated, and the action gradually spread until the whole gauze became hot and all the ammonia that passed through was catalysed, and practically all of it was oxidised into nitric oxide. The time of the gases passing through one thickness of gauze was about a

thousandth of a second, and that represented the time of oxidation.

Fortunately, platinum when used at high temperatures was not susceptible to poisons in the same way as it was at normal temperature. The substances generally found as impurities in technical ammonia seemed to have very little effect on the catalytic activity of the platinum. Hydrocyanic acid or sulphuretted hydrogen seemed to be oxidised when they were mixed with the supply of air, and on coming to the gauze did not cause any trouble. A good deal of heat was given out in the oxidation, and the temperature of the gauze was from 650° to 700° , the gases which passed away from the converter having a temperature of about 400° .

The next operation was to oxidise and at the same time hydrate this nitric oxide and convert it into nitric acid, and that could only be done at a comparatively low temperature. One of the great difficulties was the cooling of the gases from the converter from 400° to from 20° to 30° . They were first passed through silica S-pipes and cooled by water running over the pipes, and then they were passed through pipes made of a metal which was not attacked by nitric acid, these pipes being completely immersed in water. It was found, however, that that was not quite enough cooling, and they found a difficulty in the further treatment to get the conversion of nitric oxide into nitric acid. A considerable amount of heat was given off by the union of nitric oxide with oxygen, and it was necessary to have extremely efficient cooling, this being effected by means of cooling towers.

The gases were first passed through acid towers and acid was obtained in that way, and finally, after a great deal of the oxides had been converted into nitric acid and there was only a comparatively small percentage left in the gases, they were passed through lime towers fed with milk of lime, which took out the rest of the nitrogen in the form of calcium nitrite and calcium nitrate. Calcium nitrite was not required, so the mixture of nitrate and nitrite which was produced in the final towers was supplied, instead of water, to the acid towers, and the nitric acid then produced acted on the calcium nitrite and liberated fumes which passed through these towers and converted the nitrite into nitrate, and in that way it was possible to get nitrate which was very nearly free from nitrite. Finally, the nitric acid, as free as possible from nitrous acid, was converted by neutralisation by means of milk of lime into calcium nitrate, and this solution of calcium nitrate was concentrated to the requisite extent by evaporation in pans.

All sorts of difficulties had been encountered on the large scale with this catalytic oxidation, and they certainly had not all been overcome when the plant was stopped, but if they could have had another three or four months' working he believed they would have got over all the difficulties. Not only had they chemical and mechanical difficulties, but they had acoustic troubles as well. The plant had the objectionable property that even at a distance of half a mile it produced what might be called a disagreeable whistle, but at close quarters it was a continuous piercing shriek, which came from the catalysts. The factory, as he had explained, was in a populous district, and the North British Railway Company, which had a number of sidings in the district, received numbers of complaints as to the nuisance of their engines continually whistling. At last the inhabitants traced the trouble to the proper source, and one day a mechanic came to the factory and demanded admittance, saying that there was no noise that he had not been able

to put right with a spanner. (Loud laughter.) In spite of that, however, they had to refuse the man admittance, and a day or two afterwards he received a postcard saying, "Why don't you oil the d— thing?" (Further laughter.) They had a difficulty in persuading people that it was not due to want of lubrication, and the trouble had not been stopped when they closed the factory.

RECOVERY OF NITROUS FUMES.

The lecturer then went on to a consideration of the conversion of nitrous fumes into nitric acid in connection with T.N.T. production and also the general question of economy of nitric acid in T.N.T. production. In the operations of the original factory, where there was no recovery of nitrous fumes from waste acid, for every ton of T.N.T. produced 1.27 tons of nitric acid were required. At the Government factory at Craigleith, where they started the recovery of nitrous fumes in December, 1917, the amount required was 1.19 tons, but in June, 1918, it had fallen to 1.05 tons, and in September, 1918, to 0.955 tons. Thus they produced a ton of T.N.T. for less than three-quarters of the amount of acid originally used when there was no recovery.

Describing the slides illustrating the plant, the lecturer said the first nitration yielded mononitrotoluene and waste acid, and this waste acid contained from 5 to 5.5 per cent. of nitric acid. In the original work, when time was more important than money and the production of T.N.T. was the only thing required, the recovery plant which had been set up was never used. The waste acid under the recovery process, however, was pumped up into a tank and allowed to flow into the waste acid tank, where some mononitrotoluene separated, particularly as the acid got colder, and floated on the top and was returned to the process. The waste acid went on to a denitrator, and the nitrous fumes contained in the original waste acid were expelled by means of steam and went to a large recovery plant, air being supplied at the same time, weak acid being obtained. At every one of these stages there was a possibility of loss of nitric acid, and the whole point was to obviate these losses as far as possible. Sodium nitrate was a comparatively expensive substance, and the Government were particularly anxious that the smallest amount possible of sodium nitrate should be used owing to the interference with the sodium nitrate supplies by the submarine campaign.

The first denitrators used—made by the Thermal Syndicate—were excellent, but rather small, and as the position of the denitrators was rather exposed, the first thing that happened was that there was a wild rain followed by a frost, and, the water solidifying, simply split the silica brick to pieces, and they could only patch up one denitrator out of three. Various other types were then tried, and the final one was practically of the same type as a rectifying still. The acid fell from the top on to earthenware plates with small holes in them. A steam jet came into the apparatus at the bottom, and the steam kept the acid from falling through the holes. Thus the acid had to collect on the surface of the plates and it overflowed through large pipes. Therefore, the acid was exposed to the action of steam bubbling through it and was completely denitrated in that way. To begin with, they used air with the steam, but found it quite unnecessary. Perfect nitration could be obtained with steam alone. The gases produced by the denitration went out at the top by a wide tube, and the sulphuric acid which had been denitrated went out below. These denitrators

were built of acid-resisting brick. The gases were delivered into fume-recovery towers, 3ft. in diameter, which were packed with earthenware rings for the proper distribution of the liquid flowing down, the gases passing upwards and the liquid flowing down, and, reacting with air all the time, giving a gradual conversion into nitric acid. These recovery towers were set on a high pedestal in order to make use of the colder air. A model of the air-lift recovery towers was shown and operated. By the operation of the apparatus, the liquid is thoroughly agitated and mixed with air. A continuous lift is maintained from one level to the other with very thorough mechanical agitation.

In dealing with this part of the plant Prof. Walker referred to the necessity for introducing greater flexibility into operations in chemical works in the same manner that the chemist in the laboratory was able to introduce flexibility into his tests. Usually, he said, plant was erected on the assumption that it would always go right, but it did not always do that, and he pointed out a few directions in which an attempt had been made to do that in connection with the work he and his colleagues had carried out. For instance, it was possible for the liquid to be pumped to the next tower or sent back to the same tower, and in this and other ways the plant had been rendered flexible in a manner not usually obtained.

With regard to the yield from the denitrating plant and towers, they were finally recovering over 93 per cent. of the nitrous fumes that were actually charged into the denitrators in solution in the waste acids as nitric acid. The strength of the recovered acid could be varied almost at will, but it could not be got much above 60 per cent. In September, 1918, they were collecting 54 per cent. acid, but at any time with the same towers they could alter the method of working so as to get up to 62 per cent. without difficulty, and according to the strength required for the particular nitration, so could it be altered. The fume recovery could be adjusted to meet the requirements. Of 100 parts of nitrogen supplied to the plant in sodium nitrate, 81.66 per cent. was sent out in the T.N.T., the remaining 18.34 per cent. being the loss. There was also some loss in handling the sodium nitrate, which he put at 0.98 per cent. of the original quantity, as sent into the works. This was caused through the sodium nitrate adhering to the bags in which it was delivered, and there was no washing plant at the works for recovering this. The loss in nitric-acid manufacture was about 5.14 per cent.; the loss in the nitration house, washing, and packing came to nearly 10 per cent., and the loss in denitration to 2 per cent. of the original nitrogen supplied as sodium nitrate.

Prof. Walker said they were extremely gratified to receive, after the works had stopped, a communication from the Ministry of Munitions congratulating them upon their work and also upon the fact that on the monthly returns for October, 1918, the nitric acid consumed per ton of T.N.T. was 0.968 ton, whilst in November, as far as they went, it was 0.955 ton.

ACADEMIC CHEMISTS AND CHEMICAL INDUSTRY.

After paying a tribute to the work of the chief chemist at Craigleith, Mr. Donald Grant, Prof. Walker said this brought him to the moral of the work which had been done. It was that the academic chemist need not fear to go into the chemical industry provided he had a competent knowledge of his subject, common sense, and energy, and was willing to work with people who had the technical experience and would take advice from

engineering experts. If, in addition, the academic chemist had the quality of far-sightedness and a spark of imagination he could enter into industries which even were not of a routine character. He was only, of course, speaking of the manufacturing side of the industry. There was the equally important commercial or business side. At Edinburgh there had been no difficulties on that account, because their supplies and their market were assured; there were no business troubles at all, although some knowledge of business was essential. There again, however, he thought the same qualities which made for success on the manufacturing side would also make for success on the business side.

METHYL ALCOHOL IN THE UNITED STATES.

THE future development of the methyl alcohol industry in the United States will, according to well-informed opinion in the industry, be rapid. According as the chemical industries fulfil the promises they are now giving, increased quantities of wood alcohol will be used.

Before the war an adequate supply could always be imported, but this became impossible later, and home production was thus stimulated. Large quantities of alcohol had been customarily discarded by manufacturers because they had been mixed with other bulky waste, and the work of separation presented difficulties. Within the last few years, however, there has been little grain or fruit available in any part of the world for conversion into ethyl alcohol. Even fruit waste, once an important source, has been largely curtailed; sugar beets and molasses also have been diverted to the food markets, so that the burden of the chemical industries that depend upon alcohol has been shifted to methyl wood alcohol.

Its production and purification are rapidly becoming one of the growing industries in America, and the principal source at present is black strap molasses. Only a few days ago the disposal of these molasses by the sugar mills was a serious item, but it is now largely used everywhere as a raw material for alcohol manufacture.

In other countries there are other raw materials which probably in time will become important sources for obtaining wood alcohol, of which the Nipa palm, found in the Far East, India, Africa, etc., can be used, and millions of gallons of alcohol can be obtained from the agave, from which the Mexicans brew a fiery beer. Considerable alcohol can also be found in the waste of gas works. A liberal source of supply must be found for whatever raw material is used, for one small plant of 100 gallons per day capacity will consume 200 gallons of molasses, or one ton of shelled corn, four tons of potatoes, or eight tons sweet apples per day.

There is, therefore, a great need for a concentrated supply to avoid prohibitive labour and transportation charges if cheap alcohol is to be supplied in quantities to meet the demands. This alcohol has appeared on the market in various new forms, of which may be mentioned solidified alcohol, which is consumed in great quantities for cooking on a small scale in the place of electricity, it being convenient to handle and economical. Another recent development is the use of alcohol for separating and purifying gum turpentine, and it also finds employment in the production of ethylene, a suggested substitute for acetylene; but probably its greatest significance attaches to its admixture with other fuels and for use in internal combustion engines.—*Board of Trade Journal.*

FRACTIONAL DISTILLATION.

AT the last meeting of the Bristol and South Wales Section of the Society of Chemical Industry, a paper was read by Mr. W. R. Bird on "Fractional Distillation in the Laboratory and in Practice." A number of forms of apparatus for laboratory fractionations were described and their efficiency compared. One very general fault was noted which very seriously impaired the utility of any column, giving rise to flooding. This fault consists in a reduction in diameter of the tube which enters the flask, this in some cases being the narrowest portion of the whole column, while it should be the widest. The plain tube filled with glass beads makes quite an efficient column if the beads are supported by a wire instead of constricting the tube for this purpose; the bottom end of the tube is thus kept full size. The wire is bent at the lower end to a small circle, a few beads threaded over it, then suspended by a hook in the side tube so that the wire hangs centrally when the rest of the beads are put in round the wire. An account of the results obtained using this form of column was given. Provided the apparatus (consisting of two concentric glass tubes, with a spiral wire occupying the annular space) is used with careful gas regulation and in a draught-free room, the separation is the most useful hitherto effected by laboratory apparatus.

Vacuum distillation did not, in the opinion of the speaker, have any effect in improved separation, only a general reduction in boiling point—a point to be considered very carefully where waste heat might be employed for distillation. Fractional distillation in the factory is easier than in the laboratory, even a plain still by careful regulation of speed yielding fair results. A plain tube with packing may be used, but whatever type of packing is used it must be uniform in size and supported at intervals to prevent crushing of the lower layers, and sufficient space must be provided for passage of vapour and liquid. In shelf or bubbling tray columns, instead of surface contact only, evaporation is made use of, a method leading to purer products. Columns provided with trays having vapour nozzles and hoods provide a very efficient fractionator. It is a mistake to make trays too shallow, as this leads to contamination by spraying; 1 ft. 6 in. was found to give very excellent results. The depth of seal may be greater than usually considered advisable—up to three inches may be used—and overflow pipes must be large. The retention of a considerable quantity of heavy product in the trays at the end of the distillation, if found to be disadvantageous, should be remedied by providing a trap for each tray. The best results are obtained by adding a dephlegmator to the column, which steadies the working, and, with efficient lagging of the column, allows of much greater speed of working. The apparatus should be thermometrically controlled at the base of the column and the outlet of the dephlegmator, which is, preferably, constructed in sections to permit of fractional condensation with return of the liquid to different trays in the column.

ZINC AND ZINC DUST PRICES.—The price of imported high-grade zinc dust has further advanced to £85. per ton, and the demand continues brisk. Supplies in consumers' hands are still short. Australian electrolytic zinc (99.95% purity) remains at £48. per ton, f.o.b. Australia, for direct shipment to New Zealand, India, South Africa, and the Far East.

THE HYDROGENATION OF OILS.

"THE Mechanism of the Hydrogenation of Oils in the Presence of Finely Divided Nickel" was the subject of a paper read before the Liverpool Section of the Society of Chemical Industry, by Mr. R. Thomas, on Friday (December 19). The meeting was held in the Adelphi Hotel, Liverpool, Dr. E. F. Armstrong presiding.

It was hardly necessary, perhaps, at that juncture, Mr. Thomas said, to explain what was meant by fat-hardening. Scientifically, it was the addition of hydrogen to the double bonds of unsaturated glycerides or fatty acids. Technically, it meant the conversion of liquid oils or fatty acids into solid products suitable for soap making. The reaction would only occur in the presence of a catalyst such as platinum, palladium, iron, copper, nickel, etc. On a manufacturing scale the one most commonly employed was nickel. There were two distinct systems of fat-hardening—the "open" system, in which the hydrogen was blown through a mixture of the oil and catalyst, the unabsorbed gas being collected, purified, and used again; and the "closed" system, in which the catalyst and oil mixture were circulated at great speed with the gas under pressure.

Both systems had certain advantages. Thus, in the first, the catalyst was not so easily poisoned; while the second, on account of the more intimate mixing of the reactants, proceeded more rapidly. The reaction was carried out at temperatures of from 150° to 220° C., and therefore, from a manufacturing point of view, the speed was of paramount importance with respect to heat losses, catalyst consumption, loss of gas by leakage, and output.

His object was to show how the speed of the reaction was governed by conditions; to explain what part, to his mind, the catalyst played, and to consider the effect of a few representative foreign gases in the hydrogen on the velocity. The experiments on which his remarks were based were carried out six or seven years ago at Port Sunlight. The start was made with olive oil, and a purification of the oil was effected by the use of caustic soda. This gave a liquid glyceride and 93 per cent. of olein and 7 per cent. of linolin. The catalyst was prepared by the precipitation of nickel sulphate with sodium hydroxide, care being taken to keep it out of contact with the air.

Gaseous impurities in the hydrogen were divided into three classes—those like nitrogen, which had purely a physical action; those like carbon monoxide, which united with one of the participants in the reaction—that was, hydrogen; and those like hydrogen sulphide, which united with the catalyst to form a stable compound under the conditions of the experiment. This classification was based on the experimental evidence produced and deduced mathematically.

Mr. Thomas at this stage proceeded to deal with the mathematical aspect of the subject, using a series of specially prepared charts, giving, in algebraic form, equations of successive changes obtained with different mixtures of oil, gas, and catalyst, under different pressures and temperatures, tracing the variations from point to point, and the relation of one to another. There might, he said, be a direct separation of the olein, and there might be a formation of iso-olein. A condition governing the reaction was the concentration of the catalyst.

Several theories had been formed to explain the action of the nickel. The first function of the catalyst was

absorption, the absorbed occluded gas being in a highly active condition through decomposition into atoms. The velocities at temperatures of 120°, 150°, and 180° C. in experiments carried out, using 1% of Ni, were in the ratio of 1 : 1.7 : 2.6. Practically identical ratios were found on using 0.5% and 0.2% Ni. After allowing for the increased solubility of hydrogen in nickel at 180° C. and the increase in the velocity on this account alone, the real ratio of 180° to 120° was 2.1 to 1. This gave an increase in velocity of only 1.13 times for an increase in temperature of 10° C. A low temperature co-efficient of this order of magnitude was generally associated either with diffusion catalysts or with a photo-chemical reaction. The first possibility was excluded on account of the vigorous shaking of oil and catalyst, and hence there was *prima-facie* evidence in favour of regarding the action as a photo-chemical one, due to heat waves or infra-red radiation.

Professor Lewis, of Liverpool, was the first to suggest that catalysis was a radiation phenomenon, and he and his collaborators had put forward a considerable amount of experimental evidence in favour of that view for homogeneous catalysis. In the remarks on temperature he had extended Lewis's conception to heterogeneous catalysis. The cause of the reactivity of the hydrogen had already been explained, so that he had shown how both the hydrogen and the oil might become active under the influence of the catalyst.

DISCUSSION.

Dr. Armstrong opened the discussion. As they were aware, he said, the subject of fat-hardening had been taken up and practised scientifically, and had been carried out in this country, but with the utmost secrecy. Everyone engaged in the industry had to be mute on the subject, but the work done in England had not been so put out as to show the part of British ingenuity in establishing it. They were fortunate in having a paper by Mr. Thomas showing them some of the very difficult work underlying the technical portion of the subject. In the first place, what Mr. Thomas had told them showed that the chemistry required to study the problem was chemistry of the most high order, requiring mathematical knowledge of no mean degree. It was only by mastering the velocity of the reaction, that they got a clue to the nature of the reaction. Roughly, there were two schools working in the most friendly rivalry. They preferred to differ, and yet to qualify their differences by their lines of investigation and their results. Progress was only made by the free-lance tilting against the theory, however great might be the man who initiated it, and showing that it did not wholly solve the problem. It would only stimulate those who upheld a theory to prove its correctness. In having two theories they were bound to have progress.

Dr. T. P. Hilditch said he had been engaged in dealing with the problem before them for a number of years, and, as a matter of fact, the results he had obtained in conjunction with Dr. Armstrong showed that for some time after the start, the course of the reaction between unsaturated oils and hydrogen followed a straight line, which was not in accordance with the reaction being monomolecular. The results would rather lead them to the position that the reaction was not a retarding one; that the saturation proceeded at a constant rate throughout the reaction. The view that they had of that action was probably not so different from Mr. Thomas's, but they imagined that the catalyst acted not only in virtue of its action with the hydrogen, but also that it entered into a loose state of combination with the unsaturated organic compound itself. He asked how Mr. Thomas's results explained what was known as selective hydrogenation. It was established that all the glycerides were hydrogenated before the olein came to be attacked. Dr. Armstrong had shown that not only oleic acid, but two derivatives were formed in the process.

Mr. Higgins suggested that the subject divided itself into two reactions: First, the action of the catalyst as such and the action of the oleic acid; there was the other half of the question as to the activity of the nickel itself. His explanation had been that the activity of the nickel was due to the

taking up of the hydrogen in the solution, but it had nothing to do with the other half. There were other catalysts that would produce hydrogen—as, for example, nickel oxide. It would be interesting if they could get some knowledge of the solubility of nickel oxides.

Dr. Salway thought that the catalyst used in the hydrogenation of fats might be likened to an incipient detonator which, by combining readily with the hydrogen, released sufficient energy to enable the unsaturated glyceride also to combine with the hydrogen. In this connection he thought that the theory of Erdmann, in which it was stated that nickel suboxide was the true catalyst, deserved consideration. He asked whether Mr. Thomas's experiments supported this theory or otherwise.

Mr. W. French asked whether if the very purest catalyst were taken, absolutely free from electrolyte, reaction would take place; would the electrolyte theory of Dr. Armstrong fit in such a case?

Mr. H. E. Potts thought he remembered that the theory was that the concentration on the surface of the catalyst was equal to the square root of the concentration of the bulk. If it were true that with a mixture of oleic and linolic acid results were got as stated, it seemed to him that the assumption of monomolecular action could not exist.

Dr. Moore thought the nickel entered into a loose combination with the oleic acid and then split off again.

Mr. Thomas, replying, pointed out that the first portion of a logarithmic curve differed but little from a straight line, and that up to a transformation of 20 per cent. it would be difficult to distinguish between the two curves from experimental observations. If he recollected correctly, the curves described by Dr. Hilditch were only straight at the start. His general experience confirmed Dr. Hilditch's observations on the recuperation of the catalyst on replacing gas containing carbon monoxide with pure hydrogen. He found it difficult with regard to selective hydrogenation to see how olein could remain inactive with linolin transformed, and then suddenly start to react when the linolin had all disappeared. It was more natural to expect that the olein would start to transform from the moment any of it was formed from linolin. With regard to the points raised by Mr. Higgins and Dr. Salway concerning oxide and suboxide catalysts respectively, it had been the lecturer's experience that hydrogenation with these catalysts was always accompanied by a reduction to metal through an easily reducible suboxide. With regard to the question whether the reaction would proceed in the absence of an electrolyte, he remarked that dry palladium did not absorb dry hydrogen, and possibly the same was true of spongy platinum, which would explain the results obtained by Mr. French on the lines put forward in the lecture as to the action of the nickel on the hydrogen. He agreed with Mr. Potts, that the dissociation of hydrogen molecules into atoms was not rigidly proved from the relation between the absorption and the pressure, but pointed out that the explanation fitted in well with the observed facts.

ZIRCONIA AND ITS DEVELOPMENT FOR INDUSTRIAL PURPOSES.

THE industrial position in relation to zirconia, the new refractory material, was discussed on Thursday, December 18, in a paper by Mr. H. E. Coley, London (which was read by Mr. Ramsden), at a meeting of the Birmingham Metallurgical Society. Mr. F. C. A. H. Lantsberry, M.Sc., F.I.C., presided.

The author said if one assumed that the earth zirconia had descended from the pedestal of the rare earth lists, that literature was correct, and that it was the almost ideal refractory material, why was it not largely used in the metal industry? The commercial man said the cost was too high; he was not, however, concerned with the statements that zirconia formed carbides and nitrides readily, and indulged in other complex reactions only seen within a chemist's beaker. There had not, as yet, been devised a process with a cost production figure low enough to warrant pure zirconia oxide being used for

refractory bricks. It was obvious that the ZrO_2 must be cheapened either by leaving some of the impurities with it, or adding other materials of an inoffensive character. Showing samples of zirconium material which had been through an operation for the removal of the iron and free silica (and which had a breaking-down point under heat at a temperature of $2,300^\circ C.$) the author said the whole question of the use of zirconia on a large scale and for heavy furnace work depended on the question of cost.

Zirconia was somewhat like a sharp sand, and the problem of plasticity had been largely solved. Zirconia, in common with most other refractories, could be influenced as to its shrinkage by the addition of grog—i.e., preburnt and ground zirconia. The essential point was that the grog should have been fired to the same temperature as that to which the bricks were to be fired. The firing temperature was not governed by the melting point of the material, but by the temperature of employment. The grog firing temperature was determined by the kiln firing temperature, and the kiln firing temperature was determined by the temperature of the furnace in which the zirconia shapes were going to be worked. The ground grog completely united the raw material, and a homogeneous and plain structure results which tended to strength. The gas furnace was suitable for the firing of zirconia brick shapes.

Much had been said, observed the author, about the formation of carbides of zirconia during firing, but there was no evidence that those carbides formed below fusion point. The mistake had probably arisen on account of the curious capacity of zirconia to absorb carbon. Black bricks could be obtained by firing the zirconia bricks in a strongly reducing atmosphere, carbon monoxide being freely available, with the result that carbon, deposited in the zirconia bricks, gave a black colour. That colour might be completely removed by firing in an oxidising atmosphere. The point had been raised: Could the zirconia material from which the various shapes were made be used *in situ*? If the material could be shaped to the furnace requirements on the spot without the manufacture of special shapes, the cost would be materially decreased. The answer was that that could be done, but it must not be expected that the zirconia material was going to set under such conditions without cracks appearing. No material would do it, and zirconia had a shrinkage greater than most. With adequate preparations a workable job could be obtained. A highly finished zirconia-built furnace must be properly designed in sections, made in those sections, baked separately, and accurately fitted together.

The position of zirconia—which the war brought forward and had held back—was to-day as follows: A zirconia material could be produced which, so treated, could be moulded into any suitable shape; the shapes could be baked to present a workmanlike finish and surface; and when so baked the shapes had a melting point of not less than $2,300^\circ C.$, a low coefficient of expansion, a low conductivity, a resistance to slags better than other refractories, the property of being heated and cooled alternatively and rapidly without deterioration, and a capacity to resist very great pressures cold and a greater pressure hot than other refractories.

PROSPECTS OF BRITISH CHEMICAL TRADE IN INDIA.*

(Concluded from page 714.)

DYEING AND TANNING MATERIALS.

THE prospects in India are remarkably promising for British dyestuff producers, and it is gratifying to notice that the leading firms are already making a close and detailed investigation of the market, and are perfecting their distributing organisation. I would emphasise the fact that success can be obtained only by following the German methods. A main dépôt, with laboratories and technical staff and a training organisation, should be opened in Bombay; sub-dépôts should be opened in important markets, such as Madura, Cawnpore, and Amritsar; and the bazaars and native dye houses should be canvassed by trained Indian salesmen and demonstrators under European supervision. The dyestuff should be shipped in bulk, and then made up to the required strengths and tinned in Bombay. All this will entail considerable expense and organising ability, but it is only by these means that the bazaar requirements can adequately be met; and it must always be remembered that whoever controls the bazaar trade holds the Indian market. The National Aniline and Chemical Company of New York already has an office in Bombay, and are offering dyes through Indian agents in all markets, while two or three other American export houses in New York and San Francisco are conducting a growing trade with Indian importers. American competition will be keen and insistent. As regards German competition in the future, much will depend on the fiscal treatment accorded to German goods in future—*i.e.*, whether they are penalised by tariff or not. British manufacturers should lose no time in establishing themselves firmly in the market, so that they may be in a position to meet any competitor.

There is another consideration which should be borne in mind. In order that the nascent dyestuffs industry in the United Kingdom should attain its full development, it is essential that it should obtain all the advantages of large-scale organisation in order to reduce costs of production. The home market is not sufficiently large to enable it to do this, and therefore a large export trade is essential. The two largest neutral markets in the world are China and India, and if only a large share of these countries can be permanently secured, the future of the industry is assured. Even for this reason alone, no time should be lost by our producers in establishing themselves firmly in Eastern markets.

PAINTS AND PAINTERS' MATERIALS.

India provides a large and important market for paints, colours, turpentine, and other materials used in

activities of all kinds in the country. Those British manufacturers not already represented in India either directly or by agents should take early steps to perfect their organisation in order to obtain a share of the trade. The following table shows the statistical position during the war:—

Japanese competition is becoming serious—particularly in white and red lead,—while the United States is supplying increasing quantities of all kinds of paints, but so far has given little attention to ingredients such as turpentine. The growth of the shipments from the Pacific coast is due to the activities of the Paraffin Paint Company, of San Francisco, whose "Pabco" paints are known throughout the East. The ground lost by British suppliers has been principally in red and white lead to Japan. In other types of paint they have held their own. So far as turpentine is concerned, the British product predominates, the only rival being America with £1,553. out of a total of £14,200. In other painters' materials the United Kingdom supplies 88 per cent. of the imports, her principal competitor being the United States with 4 per cent.

Mention should be made of the growing industry in turpentine paints and varnishes in India itself. This is, so far, in its infancy, but the success during recent years of one or two companies in Calcutta under European management is an earnest of what can be done. India produces immense quantities of linseed, which in the form of oil is the chief ingredient of most paints. Turpentine is being produced in increasing quantities, as will be seen from the following table:—

Years.	Imported.	Indian Output.	Total.
	Gallons.	Gallons.	Gallons.
1913-14	193,937	58,803	252,740
1914-15	142,138	78,489	220,627
1915-16	86,700	111,835	198,535
1916-17	80,000	125,663	205,663
1917-18	140,772	136,052	276,824

It has been estimated that the ultimate maximum annual production of Indian resin and turpentine may be placed at 600,000 maunds and 1,600,000 gallons respectively, but, of course, it will be many years before anything approaching these figures will be produced. Indian products include all that is necessary for the vehicles of ordinary paints, while mineral resources and established manufactures provide all the pigments necessary for some few paints and a large proportion of the pigments in other cases. Those pigments which seem unlikely to be made in India are, by reason of their comparatively small consumption, of no great importance, and if the projected new manufactures—particularly that of white lead—come into successful operation, India may become almost independent of imported materials.

SOAP.

Largely owing to the energy and initiative of the two largest soap-producing companies in the United Kingdom, who maintain active sales organisations in India, the soap import trade is almost exclusively in British hands.

The figures given in the table on the following page show the classes of soap imported from different countries.

It will be observed that the only serious competitor is Japan, and that her competition is largely confined to toilet soaps, although during the last year greatly increased quantities of household soaps were imported from Japan. The importation of Japanese floating soaps, in particular, is causing uneasiness among certain

Principal Countries of Consignment.	1913-14.	1914-15.	1915-16.	1916-17.	1917-18.
	£	£	£	£	£
United Kingdom	443,063	442,357	492,339	667,411	493,266
Hong Kong	12,445	8,308	4,853	11,243	13,632
Japan	6	55	16,052	21,243	82,265
United States:—					
Atlantic Coast	12,683	11,652	6,488	46,256	34,637
Pacific Coast	1,298	727	1,549	1,005	6,951
Germany	35,413	15,266	1,738	241	—
Belgium	22,788	10,413	1,534	4	—
Total imports	548,869	503,051	541,116	765,346	644,854

the colour trade, and the future expansion of this trade is certain to be got in view of the extension of industrial

* Report on "The Conditions and Prospects of British Trade in India at the Close of the War," by H. M. Senior Trade Commissioner in India and Ceylon (Mr. Thomas Ainscough, O.B.E.).

importers. Japanese cheap and meretricious toilet soaps have entirely taken the place of the German and Austrian article in the bazaar trade. The term "other soaps" covers textile, harness, soft soap, etc.

Class of Soap.	Countries of Consignment.	1913-14.	1914-15.	1915-16.	1916-17.	1917-18.
		Cwts.	Cwts.	Cwts.	Cwts.	Cwts.
Household & laundry (bars and tablets).	United Kingdom	300,215	351,456	311,459	316,593	300,272
	Rest of Empire..	341	713	1,844	9,893	7,021
	Foreign countries	813	805	1,984	232	4,225*
	Total	301,369	352,974	315,287	326,518	311,518
Toilet Soap..	United Kingdom	36,326	34,402	37,280	41,182	26,858
	Rest of Empire..	220	281	303	484	176
	Foreign countries	8,793	4,624	8,700†	5,601‡	4,710§
	Total	45,339	39,319	46,261	47,246	31,744
Other soaps ..	United Kingdom	14,162	10,862	11,924	6,310	7,938
	Rest of Empire..	31	33	8	16	183
	Foreign countries	1,959	1,297	771	71	551
	Total	16,152	12,192	12,703	6,397	8,672
	Grand total im'ts	362,860	404,485	374,251	380,161	351,944

From Japan, as follows:—* 4,181. † 5,355. ‡ 3,502. § 2,540.

The most serious competitor during the war is found to be soaps manufactured in India. The country possesses many advantages for soap production. There is an abundant and increasing supply of all oils and fats, except the palm oils and tallow. These are to be found in the freshest condition alongside the factory. Certain of these oils—notably cocoanut—lend themselves to simple and rapid manufacture of the cheaper grades of soap, for which there is a great demand. Price of land and taxation are both low. It is doubtful whether labour is as economical as would appear from the low rates of wages paid. There is a great market at the doors of the factories, and consequently many charges incidental to imported soaps are eliminated. On the other hand, there is an absence of the masses of cheap substitutes for tallow which are available for the European manufacturer. Caustic alkalis must be imported. Trained labour is not available, and the manufacturer must be prepared to carry on all the processes up to the manufacture of cases, cartons, etc., as there is no market on the spot for these products.

On the whole, however, the prospects for the large British soapmaker who will erect works in the country and manufacture on a large scale are very promising, and if the Government adheres to the policy of rendering the country independent of outside supplies of munitions of war there should be a demand for glycerine for munitions purposes.

In the "Indian Munitions Board Handbook" will be found a most informative article on "Soap in India," by Sir F. A. Nicholson, of the Madras Government Soap Works, Calicut. The following rough table giving the estimated production of soap in India is taken from this publication:—

Province.	Factories producing.		[Production in tons per annum.		
	Above 600 tons per annum.	Below 600 tons per annum.	Bar Soap including twin tablets.	Toilet Soap.	Other soaps.
			Tons.		
Bengal.....	2	1	14,800	Not stated	Trifling, except
Madras	—	1	240	350 tons	1,800 tons "Dhobi
Bombay	2	16	13,660	Not stated	Soaps" in Burma,
Sing	2	4	12,320	Not stated	which, however,
Punjab	—	1	64	Not stated	are priced at bar
Delhi	—	10	152	350 tons	soap rates and are
United Provinces	—	5	520	6 tons	probably similar.
Central Provinces	—	4	264	Trifling	
Burma.....	5	4	18,700	Not stated	
Total ...	11	46	20,720	706.	

These figures should be regarded as potential rather than actual. The quantity is rather what could be made at once if orders were given and time allowed than the regular output. However, they serve to show the strides which are being made in India in the production of soap and should be carefully studied by British makers. There appears to be little doubt that if they are to retain their commanding position in the trade, they will be forced to manufacture in the country.

Considerable trouble is experienced by British suppliers on account of the constant infringements of trade marks both by Indian and foreign competitors. It is not possible to register marks in India, but if priority of user can be proved an injunction with or without confiscation of the goods can usually be obtained from the courts. Considerable expense and trouble, however, is caused to the plaintiff, and it is frequently not until considerable damage has been done that the infringement is discovered.

FLAMELESS GUNPOWDER.

ONE of the problems which the Direction des Poudres set the French chemists in 1906 was to suppress the flame of gunpowders, notably the B.S.P. and B.G. 5, without impairing the ballistic power of the powder. The former object was soon attained with the aid of vaseline, Delpech reports in the *Comptes Rendus* of September 22 last, but it was only by a study of the firing trials that he became convinced that, when other materials were added to the powder, the powder charge had proportionately to be increased in order to secure the same ballistic effect as with the unmixed powder. The conclusion seems rather obvious that a powder containing a certain amount of a diluent non-explosive matter could not be so powerful as the pure powder; and it is also a little surprising perhaps, that Delpech speaks of the materials as "antithermiques" and of "cold powders." He does not mention any temperature determinations, and one might imagine a suppression of the flame without a material lowering of the explosion temperature. The first material tried was powdered charcoal; the effect was slight or nil. Then vaseline and other heavy petroleum greases were tried; these were successful, and it was found that about 3 per cent. of vaseline had to be used, and that in the 75mm. guns, the charge of B.S.P. had to be increased by 4 per cent. to obtain the same ballistic effect. In the 105mm. guns, and larger guns, the percentage of vaseline had to be raised to 6.5 and the powder charge to be increased by 6 per cent. or 8 per cent.; smaller vaseline percentages had in these cases hardly any effect. Naphthalene and mononitro-naphthalene, used in percentages of 10 and 15, suppressed the flame, but gave red to dense black smoke. Trinitro-xylylene (xylite) answers in the 75mm. guns, not in the larger guns, but 25 per cent. of this material was required in any case. Cellulose, both from cotton and wood, extinguished the flame when present in smaller percentages (from 4 to 10), even in the 155mm. guns; it proved difficult, however, to incorporate the filtered cellulose into the powder. Hydrocellulose, obtained as a fine powder, did not cause this trouble. But vaseline is on the whole considered the most suitable material for suppressing the flame, and it offers the further advantage that it stabilises the powder.—*Engineering*.

ZINC CORPORATION, LTD.—Dividend of 2s. per share on the preference shares.

THE AMERICAN GLASS INDUSTRY.

ALARGELY attended meeting of the Society of Glass Technology was held at the Institute of Chemistry, Russell Square, London, on December 17, under the chairmanship of Mr. B. N. Jenkinson.

The main purpose of the meeting was to hear an account of a visit to American glass manufactories by Dr. W. E. S. Turner and Mr. Connolly, but an interesting little ceremony took place first in the presentation of a silver loving-cup to Mr. W. F. J. Wood, the first president of the society, and a silver tea service to Dr. Turner. In making the presentations, the chairman pointed out how the society had been formed chiefly by Mr. Wood and Dr. Turner, whose work for the glass industry was not only appreciated in this country but in other countries. In regard to Mr. Wood, a cheque for £185. had also been presented to him, but he had placed it in the hands of the Sheffield University, and it had been decided to invest it, and the proceeds would be devoted to the purpose of an annual prize, to be known as the Wood prize, to be awarded to some student in the Glass Department.

A long and interesting report had been prepared by Dr. Turner upon his visit to America, which, however, owing to his state of health, he did not read. We give some details from it below.

Dr. Turner and his confrere visited some seventy factories in America and Canada, scattered over a wide area and engaged in the manufacture of a great diversity of products, including optical glass, table ware, illumination and general domestic glass, insulators, scientific apparatus made both at the furnace and the lamp, electric bulbs, window and plate glass, and bottles of all kinds. The American glass industry has now become diffused over a wide area. As yet, with a single exception, it is confined in Canada to the region of the great lakes—viz., Montreal, Toronto, Hamilton, Thorold, and Wallaceburg. In the United States, however, it has spread gradually into a large number of States. Only two of the New England States—viz., Massachusetts and Rhode Island—have any glass industries, but below these all the States east of the Mississippi River, except Georgia, Alabama, and Kentucky have some representative firm of the industry within their borders, whilst the Mississippi no longer forms an industrial dividing line, for a number of States west of it have important glass industries. Although the earliest glass works had no relation to the fuel-producing States, the development of the industry in America has followed very largely the discovery of natural gas wells.

To some extent, a segregation of the different branches of the industry appears from a study of the various factories. It is quite impossible to draw a hard and fast line, but this much may be said, that a very fine artistic glass is made in New York; most of the optical glass produced during the war has likewise come from this State; lamp-blown and graduated scientific apparatus making is largely concentrated in the southern portion of New Jersey; and the bulk of the window and plate glass is made in Pennsylvania and West Virginia. Illuminating and general domestic glassware is a widespread industry; bottles are made everywhere, and even the Pacific coast is already providing a home for several factories.

Much has already been written in regard to the excellence of the glass sands in America, and in this respect the country enjoys a great advantage over our

own. Besides her own deposits, however, America draws upon the same sources as those from which Great Britain to some extent relies, and shipment of Belgian sand at \$2.80. per ton has already been resumed to glass works in Brooklyn. In the matter of good colour the United States has made much greater progress than we have, or indeed any other country, and the subject of decolourising has been recognised as of prime importance, far more white glass now being made from tanks than green. American manufacturers almost everywhere have also learned not only the value but the absolute necessity of thorough mixing of the batch by mechanical means.

Machinery for the manufacture of glass tubing and rod is fast coming into use, and a good deal of progress has been made in the output of chemical and scientific glassware. The production of chemical glassware is not confined to one district, but is distributed in several works at widely distant places. In Vineland, in the south of New Jersey, there are factories producing all kinds of lamp-blown ware, including syringes, thermometers of special types, complex pieces of apparatus with stop cocks of various designs; there is also a large output of graduated glassware. One method deserving of attention for speeding up the output of certain types of lamp-working articles consists in the use of small sets of wheels on ball bearings between which glass tubes and simple articles can be rotated, either for the purpose of re-heating the ends or of annealing the ends after treatment. These small sets of wheels are provided on every bench and driven from light shaftings by cords which are connected to a pulley on the rotating wheels.

During the war supplies of optical glass were forthcoming from a number of American sources and also from special furnaces set up by the Bureau of Standards at its Pittsburgh station. Practically the whole output of optical glass made in America has been due to the efforts of the chemists and physicists who came from the Bureau of Standards and the Geophysical Laboratory at Washington. Another noteworthy feature of the work is that there has been no secrecy, and we have witnessed what has not taken place in any European country—viz., the publication, fully and freely, of all the details of the work performed. The future of the optical glass industry in America, however, is not quite clear, and at the moment it appears that, with the exception of the Spencer Lens Company's plant, all the other factories will be shut down.

In conclusion, the investigators point out that it may be a surprise to hear that glass manufacturers of America are considered to be just as much rule-of-thumb men as in this country. It appears that there were very few glass works there which, before the war, employed a staff of chemists or even a single chemist. As a result of their efforts during the war, however, the men who went from the Geophysical Laboratory and the Bureau of Standards have been induced in many cases to stay in the industry. Although there is as yet no movement amongst glass manufacturers to form a large research association, such as we now have the good fortune to possess, individual manufacturers are engaging chemists and physicists at a greater rate than is the case here, and in the view of the investigators it behoves our own manufacturers to think well ahead and to endeavour to realise that, as glass making is essentially a process in which chemical and physical changes are fundamentally considered, it is only common sense for some person who understands them to be in charge of them.

PRODUCTION OF PARAFFIN HYDROCARBONS IN BY-PRODUCT COKING.

At a meeting of the Coke Oven Managers' Association (Northern Section), held at Durham, on Saturday last, Mr. A. H. Middleton (Consett), in the course of a paper on the "Construction of Coke Ovens," remarked that during his investigations of a very curious experience at their Langley Park Coke Works (Consett Iron Company) he had collected some information that might be helpful to those who had to consider carbonising problems. The experience referred to was the presence of large quantities of paraffin hydrocarbons in the crude benzole and the rectified products made therefrom. Mr. Middleton discovered the cause to be the unusually low temperature at which some of the products of carbonisation were enabled to escape from the oven owing to a special feature in the construction of the oven and to the fact that the ovens were very fully loaded, so that the space between the top of the coke and the crown of the oven was very small, causing the gas to travel quickly through this empty space. The special feature in the construction of the oven was the exceptionally great distance between the top of the heating flues and the crown of the oven arch, which distance he had kept to a maximum when the ovens were built so as to obtain low top heats, particularly with a view to preventing the splitting up of ammonia. That it should be also responsible for obtaining some of the products of low-temperature carbonisation was an unlooked-for result.

As he could not, after careful investigation, attribute the paraffins to any external cause, he concluded that they must have been formed inside the ovens, and he decided that the best way to put that conclusion to the test was to raise the temperature of the top of the oven so that if low-temperature products were present they would be split up by the radiant heat from the oven roof. The quickest and most effective way to raise the temperature of the top of the oven for that purpose was to reduce the amount of coal charged into the oven. The load was, therefore, reduced by one-third, and the result was most marked. The paraffins immediately began to disappear as the gas from the lightly loaded ovens came under treatment, and by the time that all the ovens had been charged with light loads the paraffin content was reduced from 9 per cent. to 1.5 per cent.

That result was very interesting and satisfactory so far as it went, but they were not prepared to reduce the loads of the ovens in that way, so they set about to find some other solution. Mr. Middleton argued that, as they had got rid of the paraffins by subjecting the gas to a high temperature in the oven roof, the presence of those paraffin bodies when the ovens were heavily charged was due to the fact that some of the gas as it was given off from the coal had escaped from the oven without being subjected to a sufficient temperature to break up all the primary products of distillation, and that the preservation of those low-temperature products was due to the fact that the gas had travelled up the comparatively cool core of coal in the centre of the charge and so escaped splitting up, as the temperature in the roof of the oven was very low when the ovens were fully loaded. He further argued that if the gas could be prevented from travelling up the cool core of coal in the centre of the charge and forced to travel out-over through the hot coke, they could get rid of the paraffins without reducing the loads in the ovens, thus raising the temperature in the

roof of the oven and causing the splitting up in the hot empty space. They had, up to then, been charging with uncrushed small coal. By charging ovens with finely crushed coal instead of with uncrushed small the output of the ovens was reduced to an extent which was not generally realised. The improved coke obtained from the finely crushed coal in many cases, however, justified the large loss of output per oven.

Returning to the travel of the gas in the oven, Mr. Middleton said that if the passage for the gas up the core of coal in the centre of the charge was due to the presence of a certain amount of larger coal with the very fine coal, thus ensuring air spaces through which the gas could travel, he came to the conclusion that, if all the coal was crushed, the air pockets would be filled up and that the cool central passage for the gas might be blocked up. The gas would then be forced to travel out through the hot coke, and the low-temperature products of distillation would be split up and the paraffins consequently disappear from the benzole. All the ovens were, therefore, filled to the top with finely crushed coal, with the result that the paraffins in the benzole again disappeared.

In getting rid of the paraffins in the benzole by putting lighter charges into the ovens, they did not merely alter one condition—namely, the weight of coal put into the ovens,—but as a result of the smaller charge they sent up the temperature of the top of the oven. That was a change they wished to produce, but in bringing it about they altered another condition of carbonisation—*i.e.*, they ceased to carbonise any coal in the top portion of the oven, and it might very well be that the whole of the paraffins in the benzole were derived from the coal that had previously been carbonised in that portion of the oven, for when the oven was well filled the coal in that portion was probably carbonised at a lower temperature than the rest of the coal in the other portion of the oven, as there was no heating flue opposite the top portion. Similarly, there was an alternative explanation for the disappearance of the paraffins in the benzole in the second method that was successfully tried—namely, that their disappearance was not due to an alteration in the passage of the gas in the ovens, but to the fact that in changing from uncrushed small coal to crushed small coal they had not provided another passage for the gas as surmised, but that they had altered another of the conditions—namely, the temperature at which carbonisation took place, because it was a fact that the change from uncrushed small to crushed small resulted in a reduction of the charge carbonised by over 8 per cent., and it was quite possible that they did not reduce the gas for heating the ovens in the same proportion; and thereby raised the temperature of carbonisation, which would in itself account for the disappearance of the paraffins.

One of the most important of the phenomena mentioned earlier was the decreased yield of crude benzole per ton of coal. The yield varied inversely with the weight of the charge put into the oven. That was due to the fact that when the ovens were loaded very heavily the tops of the ovens were considerably colder than when the ovens were loaded less heavily, with the result that they were getting in the one case some low-temperature products and low benzole yields, and in the other case the low-temperature products were decomposed, and high benzole yields resulted. Another important result of the changes in conditions of carbonisation was the effect on the yield of ammonia. It was found that when their benzole yields were lowest, the ammonia yields were highest.

SOCIETY OF CHEMICAL INDUSTRY.

NEWCASTLE SECTION.

AT a meeting of the Newcastle Section of the Society of Chemical Industry last week, Professor P. P. Bedson presiding, a paper was read by Dr. J. H. Paterson on

"THE THEORY OF GAS-PRODUCER REACTIONS, WITH SPECIAL REFERENCE TO THE RATE OF GASIFICATION."

Dr. Paterson said his intention was merely to give an informal dissertation on the question. He commenced by describing the elementary principles of gas producers. For some inexplicable reason, all text-books on the subject invariably assumed that there was a certain series of reactions taking place in a gas producer. He did not at all agree with some of those assumptions. He held, despite the text-books, that the first product of the reaction between the carbon and the air was carbon monoxide alone. Economically speaking, a gas producer burning fuel at high rates—say from 50lb. to 100lb. per square foot of grate area per hour—was preferable to a low duty producer, in that the capital cost of the plant was less and the upkeep and labour cost was considerably reduced. High duty gas producers must of necessity be supplied with fuel of low ash content, and a problem of the immediate future was the economical production of an almost ash-free fuel. "The more I deal with coal," said Dr. Paterson, "the more am I convinced that the question of eliminating or reducing ash should not be dealt with when it reaches the furnaces, but at the colliery. I know of cases where it is costing 9s. to 10s. a ton to get rid of the ash, and under favourable circumstances, where the works are near the river, it is costing about 3s. per ton." Continuing, he said that if the ash could be got rid of at the colliery there would be an enormous saving in the cost of boilers, labour, and time. It could be proved without doubt that efficient washing machinery at the collieries would prove a saving and a benefit to the consumer. He believed the consumer could be educated up to the idea of paying more for coal almost free from ash.

Dr. Paterson created considerable interest by a description of a high-duty producer designed by Colonel J. D. Smith. The producer was intended to supply gas for the propulsion of vehicles having internal-combustion engines. He showed a photograph of a large motor-lorry fitted with the producer which had actually run thousands of miles. The producer, according to the photograph, was a very small, compact piece of machinery, occupying very little space. It was worked on the suction principle, with a high rate of fuel consumption, from 80lb. to 90lb. per square foot per hour. It was entirely automatic in action, and had a flat bar grate of the shaking type which had proved efficient under trial. It worked with an extremely shallow fire bed—sometimes as low as two inches thick,—and the designer claimed that when using bituminous coal the distillation zone entirely disappeared and a nearly tar-free gas was produced. It was obvious that if that producer could produce gas containing less than 7 per cent. of carbon dioxide with a fuel bed of an average of four inches thick, at a very high rate of combustion, there could be no room for the supposition that CO_2 was the first product of combustion followed by a subsequent reduction to carbon monoxide. He was of opinion that the time was not far distant when gas producers of that type would be quite common.

Dr. Paterson briefly replied to questions raised in the discussion. In reply to Mr. F. H. Walker, he said he would rather not say anything regarding the clinker problem, as it was worthy of a paper in itself. Clinker was not uniform in composition even when in the same coal. It depended whether the ash was in the body of the coal or was some extraneous substance. Replying to Mr. J. Duncan, he said that air was preheated in some types—the Mond, for instance. When using producers for furnace heating he did not think there was any object in it. He thought superheating the steam was a wise thing, which he would adopt in building a producer. He did not place much faith in adding lime to increase the ammonia yield. He mentioned that it was useful to remember a blast furnace was one of the most efficient gas producers, although the production of gas was not the primary object. He hoped, when his paper on the subject was completed, to deal very fully with many of the points which had to be dealt with very briefly on that occasion.

ANNUAL MEETING OF THE SOCIETY.

The Chairman announced that the invitation of the Newcastle Section to the Society of Chemical Industry to hold its annual meeting next July in Newcastle had been accepted.

BRITISH DYE INDUSTRY.

AT a meeting of the Ossett (Yorkshire) Chamber of Commerce, on Thursday (December 18), a long discussion was entered upon regarding the dye industry in this country. The discussion arose during the consideration of the provisions of the Imports and Exports Regulation Bill.

Mr. J. Ward proposed that the Chamber should support the Bill in its entirety. Touching on the need of protection for the dye industries, he expressed his conviction that, given the opportunity and if research work were carried out on proper lines, this country would be able in a very few years to produce dyes as well as Germany.

In seconding the resolution, Mr. W. A. Taylor observed that in creating a monopoly in the dye industry Germany had practically looked upon dyes as a by-product, and recouped herself by the valuable chemicals extracted in the process of dye-making.

Mr. B. P. Wilson characterised the Bill as the greatest instrument ever devised for the welfare of the country. It contained adequate safeguards for every contingency, and should be passed in its entirety.

Mr. H. Wade (president) supported the resolution, and in alluding to the importance of fostering the dye industry remarked that of the 400 tons of dyes recently imported from Germany 200 tons consisted of a colour which could be produced in large quantities within a few miles of Ossett.

Eventually a resolution in favour of supporting the Bill was carried by a large majority.

CHANGE OF ADDRESS.—Messrs. Bush, Borch, and Gent, Inc., advise us that on December 29 they are moving to larger premises, at 10, Union Court, Old Broad Street, London, E.C. 2. Their new telephone number will be notified, as soon as available, in their advertisements in the various trade journals.

SULPHATE OF AMMONIA PLANT.

DETAILS OF A RECONSTRUCTION.

MR. JOSEPH POULSON read a paper last week before the members of the Midland Junior Gas Association, at the Council House, Birmingham, on "The Reconstruction of a Sulphate of Ammonia Plant." Mr. Carrington Barber presided.

The sulphate house and store were erected in 1902 and built on pitch-pine piles, this being necessitated by the subsiding nature of the ground. There is a central dividing wall between the plant room and the store, and a cast-iron liquor tank composes the roof at the store end of the house. The saturator and dryer platform were four feet above the floor and on the same level as the store room, to which access was made through an arched opening in the dividing wall. This feature has been retained in the reconstruction of the plant.

The concrete floor of the old plant supporting the stills had fractured through settlement, causing the main still to be out of vertical by five inches. The efficiency of the still was thus impaired. The mother-liquor well had also suffered from the settlement of the ground, with the result that the strain caused fractures of the lead lining of the well. The floor of the sulphate store room had suffered.

As to the erection of the stills, the jointing material used consisted of two parts glazier's putty, one part 'Vulcan' cement, one part red lead, mixed with boiled linseed oil, and in this a soft cotton string was embedded. The liming still consists of cylindrical body, shallow domed top, conical bottom, and inlet and outlet pipes. A six-inch sludge outlet pipe and valve were fitted to the conical bottom and the pipe led into the spent liquor pits at the back of the house. The new heater is 3ft. diameter by 8ft. high, and is of cast iron throughout. It consists of flanged cylindrical body and fitted with flanged cap shaped ends. The waste gases pass around 5in. heavy cast-iron pipes, each end being jointed in sockets cast on a diaphragm plate, which is bolted between the end and body of the heater. The liquor is heated on its passage through the inside of the pipes.

The sulphate store was lead-lined—namely, bottom and sides, the latter to a height of 10 feet, all joints being well lead-burned as laid. The saturator pier was lead covered and the mother-liquor well lined, the latter with 10lb. lead. Around the other sides of the platform wooden rolls were made to a height of 10 inches and the lead sheeting of the floor worked over these. In this manner the floor of the stores and staging constituted a continuous tray, drained by means of the fall given to the floor and the channels into the mother-liquor well, which has a capacity of 150 cubic feet.

The saturator is of the open type, having a well for ejecting, the size being 4ft. 9in. by 3ft. 6in. by 3ft. 4in. deep, exclusive of well. The body is formed from plates $1\frac{1}{4}$ inches thick, with an apron of $1\frac{1}{2}$ inches, and the bottom and well of $1\frac{3}{4}$ inches lead. It is made of refined Pattinsonian process chemical plate lead, with a minimum of seams, special attention being given to the strengthening and webbing where needed to ensure its keeping shape, and all is securely timber-braced. The well is encased in a strongly bolted pitch-pine cradle. The saturator is fitted with double detachable ammonia pipes, detachable acid and steam pipes, detachable steam ejector, man-hole and lid, waste gas outlet and flange. With this type of saturator not only can the salt be ejected, but, being

of the open type, it can be adapted to hand fishing, should the ejector need repairs or renewal. The double ammonia pipes are advantageous both for long life and, being carried along the back and two sides, give that equalised distribution of the ammonia gases so desired. The perforated (leaden) steam pipe has proved useful for dissolving the crystals that form round the ammonia pipes and saturator sides after the plant has been shut down. A steam ejector lifts the mother-liquor from the mother-liquor well into the saturator.

The dryer is steam driven and has lead-lined steel shell, and perforated copper basket of 48in. diameter, 16in. deep, with hinged copper doors fitted in the bottom. Through these the sulphate is discharged into the shoot below. The dryer is suspended on cast-iron standards.

The increased efficiency of the heater and main still has resulted in an economy of steam; they got a waste liquor practically free from ammonia with a pressure of 10lb. on the steam branch to the stills, whereas they previously worked at 16lb. to 18lb. A substantial increase of mother-liquor has given a corresponding increase of sulphate made, and the larger-sized saturator has proved beneficial both for quantity and quality of the sulphate made. A process for making neutral dry sulphate is being proceeded with.

THE MICROSCOPE: ITS DESIGN, CONSTRUCTION, AND APPLICATION.

THE Faraday Society, the Royal Microscopical Society, the Optical Society, and the Photomicrographic Society, in co-operation with the Optical Committee of the British Science Guild, meeting in joint session, will hold a symposium and general discussion on "The Microscope: Its Design, Construction, and Applications," on Wednesday, January 14, 1920. The meeting will be held in the rooms of the Royal Society, Burlington House, London, and it will extend over two sessions—from 4.30 to 6.30, and from 8 to 10 p.m. During the afternoon preceding the meeting—from 2.30 to 4.30—an exhibition will be held in the Library of the Royal Society, which will illustrate recent developments in the science of microscopy and the latest applications of the microscope in all branches of industry.

The purposes of the discussion are: (1) To stimulate the study of and research in microscopical science in the United Kingdom by (a) indicating lines of progress in the mechanical and optical design of the instrument, (b) showing by means of exhibits recent improvements in the microscope and its technique, and (c) the varied uses to which the microscope can be applied as an instrument of research in the sciences, arts, and industries. (2) To encourage the manufacture in this country of the highest class of instrument and of the optical glass required for that purpose.

The meeting will be presided over by Sir Robert Hadfield, Bart., D.Sc., D.Met., F.R.S., president of the Faraday Society, who will deliver an opening address, and Mr. J. E. Barnard, president of the Royal Microscopical Society, will then give a general survey of the subject, and he will be followed by Sir Herbert Jackson, K.B.E., F.R.S. Professor F. C. Cheshire, C.B.E., will then speak on the mechanical design of microscopes, and a paper by Professor A. E. Conrady, on microscopical optics, will be presented.

ITEMS OF INTEREST.

ASBESTOS CORPORATION.—Dividends on preferred of $1\frac{1}{2}$ per cent. for quarter to December 31, as well as bonus of 2 per cent. for 1919 on each class of stock.

DERBYSHIRE LEAD MINES.—A remarkable development has occurred in the dispute at the Mill Close Lead Mine, Darley Dale, Derbyshire, which has been in progress for some months. Both the employers and the men on strike are obdurate, and this week the men have claimed three disused lead mines under the ancient Peak mining laws, which they will proceed to work as soon as the plant can be obtained, thus providing themselves with alternative employment. The strikers have now become mineowners by the simple expedient of staking out their claims in the Klondyke fashion, the old law providing that where a mineowner fails to work his property another claimant may take it over.

PACIFIC ISLANDS' PHOSPHATE RESERVES.—According to a Memorandum laid on the table of the New Zealand House of Representatives by the President of the Board of Agriculture, the reserves of phosphate of the Island of Nauru in the Pacific are sufficient to meet the demands of the world for 200 years at the rate of consumption in recent years. Information obtained from a very valuable source by the Board indicates that it might be reasonably assumed that anything from 80,000,000 to 100,000,000 tons are available, and possibly more. The quality of the phosphate is of the highest grade (85-86 per cent.), and it is claimed that this island contains the largest known quantities of high-grade phosphate in the world.

DYESTUFFS MANUFACTURE IN JAPAN.—H.M. Commercial Secretary at Yokohama states that the Japan Dyestuff Company, which was started by the Japanese Government in 1915, does not appear to have made any great impression in commercial circles. An official of the Department of Agriculture and Commerce, however, states that it is not true that the company has failed to make good. The company, he says, was organised for a special and important object, and does not produce dyestuffs, etc., in the same quantities as an ordinary commercial undertaking. At the same time, it is doing business on the lines on which it undertook to work, and is selling five sulphur, five basic, six acid, two acid mordant, eleven direct dyestuffs, and one other. There are under investigation sixteen other dyestuffs, two of which are in the factory stage, and fourteen in the laboratory.

CENSUS OF PRODUCTION.—Another census of production—the first was in 1908, and was in respect 1907—is to be taken in 1921. A Board of Trade Order states that the census will be taken in the following, among other, trades: Coal and ironstone mines under the Coal Mines Regulation Acts, coke works at collieries, oil shale mines and shale-oil works, iron mines under the Metalliferous Mines Regulations Act, and iron quarries, salt mines, brine pits, and salt works; tin-plate trade, galvanised sheet trade, copper, brass, and tin, zinc, and other metal trades (except the gold and silver refining trade); chemicals, coal-tar products and drug trades, seed crushing trade, fertiliser trade, soap and candle trades. Returns for the census will not be required from persons, companies, or firms who did not employ on the average more than five persons, exclusive of officers of the company or members of the firm, during the calendar year 1920.

GLYCEROL IN FATS.—A highly interesting paper on "The Direct Replacement of Glycerol in Fats by Higher Polyhydric Alcohols" is contributed to the *Biochemical Journal* for November by Prof. A. Lapworth and Mr. L. K. Pearson. The work described is the outcome of an endeavour to convert the large quantities of fatty acids produced during the war in the manufacture of glycerol into an edible foodstuff. These authors found that when oleine or stearine is distilled under reduced pressure with mannitol in the presence of a little sodium ethoxide, almost the whole of the glycerol present in the original fatty compound is expelled, the greatest yield being attained when the proportion of fat to mannitol corresponds with two molecules of the former to three of the latter. The other products of the reaction are chiefly water, a little alcohol, and a substance many properties of which are similar to those of the original fat. The composition of this latter substance corresponds with that of a mixture of the di-oleates (or distearates) of mannitan and isomannide.—*Nature*.

TRANSPORT DIFFICULTIES.—At a meeting of the Huddersfield Chamber of Commerce last Friday, a complaint was read from a local firm regarding its inability to get alkali delivered from Northwich by rail because of the shortage of trucks.

ELECTRIC HEATING OF ACIDS.—The heating of acids requires special precautions. The direct immersion of electric heaters in the acid is precluded owing to the fact that there are no suitable materials that will withstand the action of boiling acid. The special heaters described consist of a spiral of wire enclosed in quartz tubes. For high temperatures the spirals are wound of tungsten, while for lower temperatures nickel or nichrome may be used. The spiral touches the inner surface of the quartz tube. The tube is filled with an inert gas, such as hydrogen. Tubes of 1kw. capacity have an external diameter of 15mm. and a length of 400mm. They may be used for all electric heating purposes, and will stand being suddenly immersed in water or liquefied gas.—*Revue générale de l'Electricité*, through *Tech. Rev.*

NEW DEMURRAGE RATES.—The Advisory Committee on Railway Rates and Demurrage have presented their reports to the Minister of Transport. The report on rates is now being considered by the Minister. With regard to demurrage the Advisory Committee have made certain recommendations to the Minister, which he has accepted. As from January 1, the revised charges for demurrage on ordinary wagons will be 3s. per day for the first two days' detention after the free period and 5s. for each later day. The present charge is 1s. 6d. per day. It is complained that there has been a growing tendency of traders to detain wagons. Between January and June inclusive the demurrage incurred was £31,975. per month, representing a detention of 426,338 wagon days per month, as compared with £23,522. per month between November, 1917, and October, 1918, or 313,624 wagon days per month. The position in 1919 therefore was 36 per cent. worse than in 1918. From September, 1913, to August, 1914, inclusive, demurrage incurred averaged £12,972. per month, representing 172,960 wagon days.

FERTILISERS AND FEEDING STUFFS.—Devon County Council have forwarded to the Board of Agriculture the following suggestions with regard to the Fertilisers and Feeding Stuffs Act, 1906: (a) That Sec. 6 (1) and (2) of the Act should be amended, so that in the event of a seller claiming warranty from a manufacturer or a wholesale merchant, it should be possible, on the production of the written warranty, to proceed against the person who issued that warranty, provided that the seller who pleads the warranty can prove that he never had the article in his possession at any time. Sec. 3 (2) and (3) should also be amended so that notice of sampling and delivery of a part of the sample to the seller shall be held to apply to the person who issued the warranty. (b) That official samplers shall have power, on production of their authority, of taking samples from goods in process of delivery—e.g., in railway trucks or warehouses. (c) Official samplers should have power to spend money in the purchase of samples, whether formal or informal. (d) Where a sample is taken by an official sampler, the ten days' limit should be extended to twenty-eight days.

AMALGAMATION OF JAPANESE CELLULOSE MANUFACTURERS.—H.M. Acting Vice-Consul at Osaka states that for some time past negotiations have been in progress with the object of amalgamating the principal Japanese celluloid companies into one concern, to be called the Dai Nippon Celluloid Company. The amalgamation was finally effected on September 9 with the establishment of the Dai Nippon Celluloid Company, capitalised at yen 12,500,000 (£1,406,250.), under the presidency of the former president of the Sakai Celluloid Company. The firms which are entering the combination are Nippon Celluloid and Artificial Silk Yarn Company, Sakai Celluloid Company, Tokyo Celluloid Company, Mikuni Celluloid Company, Notoya Celluloid Company, Sokawa Celluloid Company, Osaka Seni Kogyo Company, and Toyo Celluloid Company. The object of this amalgamation is to effect a more economical use of the essential raw material, camphor, of which the celluloid factories are now unable to obtain sufficient supplies. The works of the Nippon Celluloid and Artificial Silk Yarn Company, the Sakai Celluloid Company, the Osaka Seni Kogyo Company, and the Tokyo Celluloid Company, will be retained in use, while the factories of the remaining four companies will be disposed of with a view to utilisation in other industries.

CORRESPONDENCE.

* * We do not hold ourselves responsible for the opinions expressed by our correspondents.

Fuel Economy.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—Reverting to your correspondence column of December 6, apparently Captain Goodwin resents my criticism of his recent paper on fuel economy, but as the matter is one of great importance for the chemical industry generally, I trust that you will kindly find room in your valuable paper for this my final reply to Captain Goodwin and to Mr. Harvey. To the latter gentleman I wish to convey my thanks for his eminently sensible and valuable letter.

I am indebted to Captain Goodwin for sending me, a few days ago, a copy of his complete paper, but I am sorry to say that reading through this has not altered my views at all, and only confirms my opinion that the abstract in your paper was a very good one, although it did not go into minor details. As regards what Captain Goodwin calls my "misstatements and misconceptions, of so glaring a nature, that it would be waste of paper to reply to them fully," I feel that I can do nothing better than ask your readers to consider with me a few of Captain Goodwin's statements and conceptions, with a view to forming a true opinion of their real value.

He talks about placing a tubular "waste-heat" boiler to work in conjunction with a continuously working vertical retort setting, the flue gases leaving the setting at a temperature of 700° C. (1,300° F.) for the benefit of the "waste-heat" boiler, and leaving this at 300° C. (572° F.). If that is done, what about the recuperator for pre-heating the air for the combustion? This most valuable apparatus, or rather part of the installation, must then be set out of action, which would immediately lower the temperature of the retorts, unless additional fuel is added for running the waste-heat boiler; it then becomes an ordinary boiler. Captain Goodwin leaves us uninformed as to how he would complete this installation.

He also makes the suggestion of placing a tubular or locomotive type boiler behind a coal-dust fired water-tube boiler. He airily allows the products of combustion to leave the water-tube boiler at about 200° C. to 300° C. higher than usual, utilising this heat in the tubular boiler for the generation of low-pressure steam. Now, what is the object of doing this? In order to get the full rated output from the water-tube boiler a certain number of B.T.U.'s must be generated under this particular boiler. If some of the available B.T.U.'s are allowed to escape into the waste-heat boiler the output in steam of the first boiler must drop, or else more B.T.U.'s must be added if this boiler is to maintain its full output and the waste-heat boiler also generate steam. In this case the latter is not trading under its real name; it only assumes the name of "waste-heat" boiler.

A certain number of B.T.U.'s produce only a certain amount of steam, and to generate the steam in two places will certainly not show an increased efficiency worth anything over a water-tube boiler of an up-to-date type, properly operated. I think that Captain Goodwin is very wise not to go too deeply into calculations of relative efficiencies; he says they are outside the scope of his paper! It seems to me that he has lost sight of the primary objects for the benefit of the secondary objects. No doubt his paper would be of great interest as a newspaper article, but for the man who is called upon to design heating plants there are no suggestions of value beyond what is common knowledge.

Captain Goodwin says he has also devised a method for breaking up the hot core of gas—i.e., inside tubes, consisting of spirals placed inside the tubes at intervals of about six feet, the spirals being made with a pitch "decreasing" in the direction of the gas flow (Eng. Pat. 14,165). I take the liberty of reminding him of a conversation we had on this subject early in 1915, if I remember rightly. He then asked me for permission to place some of my twisted propeller tower-filling elements inside some nitric-acid condensing tubes in order to break up the core of the gas: he even offered me a small royalty. I mentioned to him that I had used the same principle in 1911 and 1912 on the Continent for ammonia condensers with great success, and I freely gave him full permission to do as he liked, and also waived the question of royalty.

To revert to the main question—pulverised fuel,—it is a thousand pities that Captain Goodwin did not say a single word about the possible dangers of using pulverised fuel, such as, for instance, Mr. Harvey refers to in his letter, which, when we bear in mind the difference in physical properties, etc., between English and American coals, and the somewhat different climatic conditions of the two countries, practically confirms my views. One is therefore led to conclude that he did not know that there were any such dangers. Such papers do more harm than good, and leave me, and I think others of your readers, wondering why they are written.—Yours, etc.,

HARALD NIELSEN.

Westminster, S.W. 1., Dec. 16, 1919.

What is a Catalyst?

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—When a chemical reaction between two or more bodies is only rendered possible by the "stimulus" of a third body, the third body being apparently unaltered and retaining its activity indefinitely (unless rendered impure), then such a reaction is called a catalytic action and the "stimulant" is called a "catalyst."

It has been proved that dry hydrogen and dry oxygen do not react even in presence of dry spongy platinum, but they do react when traces of moisture are present (*Chem. News*, 6, 22, 1910). This reaction was suggested as due to so-called surface action, but the result of more recent investigation attributes the combination, and others of a similar nature, as due to the presence of an "electrolyte."

It is therefore possible to assume that catalytic reactions take place only in the presence of an electrolyte, and that the stimulus is the E.M.F. set up between the catalyst and one or both of the interacting bodies. It is also quite possible that the "hydrogenating process" would be futile if all traces of moisture or other electrolyte were absent. This is a problem which might not present great difficulties to solve. We might then extend our definition to include an electrolyte—i.e., a catalytic reaction is only rendered possible by the catalyst, except in presence of an electrolyte. The fact that in some catalytic reactions an intermediate product can be isolated does not theoretically appear to affect the above.—Yours, etc.,

"F."

December 19, 1919.

Chemists and Income-tax Abatement.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—May I trespass on your space to call attention to what appeals to me as a very feasible suggestion. The subscriptions for technical periodicals, either directly or indirectly through membership of a society, are surely necessities in the chemical profession, especially from the technical chemist's point of view. Is it not fair to reason, therefore, that some exemption on income-tax should be made on this score? Naturally, I am especially speaking from the point of view of the chemist whose subscriptions for such societies and journals represent no inconsiderable part of his income.—Yours, etc.,

"TECHNICAL CHEMIST."

Thames Haven, Essex, December 20, 1919.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

(SPECIALLY CONTRIBUTED.)

The by-product coke ovens are now working five days a week, and two of the plants which supply local steelworks on ordinary iron are working at full capacity. This is a welcome change from the state of affairs a few weeks ago, and it is mainly attributable to the growing demand from the Continent. It is not doubted that by the middle of January needs may be so large as to justify all the ovens working at full capacity. The local demand also promises to become stronger. Basic iron is being smelted as an experiment at Workington, and if it is successful more furnaces may be put on that brand of iron, in which case a larger proportion of the production of coke would have to be reserved for the steelworks.

BRITISH ASSOCIATION OF CHEMISTS.

"If we don't hang together we shall assuredly all hang separately."
—JOHN HANCOCK, when signing the Declaration of Independence.

Hon. General Secretary: Mr. S. E. PRICE, Bedford House, 8, York Place, London, W. 1.

Hon. Registrar: Dr. FRANCIS W. KAY, The Chemical Department, The University, Liverpool.

Hon. Treasurer: Mr. A. G. C. PATERSON, The Pastures, Spondon, near Derby.

Hon. Editor: Dr. E. H. RODD, 7, Mauldeth Road West, Withington, Manchester.

NOTICES.

ALL correspondence for these pages, articles, and reports of meetings to be sent to the Hon. Editor. Annual subscriptions should be sent to the Hon. Treasurer, and all other correspondence relating to the general business of the B.A.C., including applications for membership, to the Hon. General Secretary.

Annual Subscriptions.

Members are reminded that the subscription for 1919-1920 (one guinea) is now due, and should be forwarded to the Hon. Treasurer.

PROCEEDINGS OF THE ASSOCIATION.

The Council.

The 27th meeting of the Council was held on December 13 at the St. James' Hotel, Derby. Owing to the unavoidable absence of Professor Hinchley through illness, the chair was taken by Mr. W. E. Kay.

Nominations Committee.—A list of 20 candidates recommended by the Nominations Committee for election to full membership under the "A" qualification was read and their election confirmed. The Registrar then brought to the notice of the Council the cases of a number of candidates who, although not strictly eligible for full membership, yet had such exceptional qualifications that it would be against the spirit of the regulations to reject them. After careful consideration of each individual case, the Council recommended seven of these cases to the Nominations Committee for full membership.

Registration.—The draft rules of the Association having now been considered by most of the sections, it is necessary to submit them to a reliable solicitor to have legal opinion on them before proceeding to register the Association as a trade union. Mr. Millington (Liverpool) undertook to institute inquiries for a suitable solicitor to undertake the work of the Association.

Income-tax Rebate.—Mr. Zeally (London) outlined the information he had obtained on the income-tax question. It appears that there will be no difficulty in getting rebate on the subscription to the B.A.C. if the formalities required by the Inland Revenue authorities of Somerset House are complied with. The authorities must have a copy of the regulations and a list of members, and the Association must pay income-tax on the excess of its income over its expenditure. Under these conditions the members can claim a rebate on their subscriptions. With regard to rebate on other necessary expenses of chemists, the position is less clear at present, but it is hoped that it may be possible for a claim to be made for rebate on a definite percentage of income for necessary expenses. The matter is receiving further attention.

Appointments Bureau.—This matter is in the hands of the London Section, and a scheme is to be presented for consideration at the next Council meeting.

Patent Office Library.—It is generally felt that the usefulness of the Patent Office library in London, which contains the best collection of scientific and technical literature in the country, is seriously limited on account of the early closing hours of the library. It was accordingly resolved to support a petition to the Board of Trade urging that the hours of opening be extended to 10 p.m. daily, Saturdays included.

A number of other matters were dealt with, including propaganda work, which is receiving constant attention, and the relation of the B.A.C. to other organisations having similar aims.

The next Council meeting will be held at Derby on Saturday, January 17, 1920, at the St. James' Hotel, at 2.30 p.m.

Leeds and Bradford Section.

Since last Spring this section has passed through a very critical phase of its existence, from which it has emerged with renewed vigour, thanks to the unshakable faith and

steady perseverance of a few members. On March 14 last a general meeting of the Section was held, at which the chairman put before the members an extremely pessimistic picture of the present state and future prospects of the Association. The committee, in a body, tendered their resignations, which were accepted. Thereupon a provisional committee was elected, consisting of Messrs. Wilkinson (chairman), Scafe, Hulse, Remy, Vickers, and Professor Watson. A resolution was then passed: "That the members of this Section desire to have placed before them a statement as to the financial and general position of the B.A.C., and that a general ballot be taken as to whether a general levy should be made in order to carry on the B.A.C."

The sequel to the above unfortunate proceedings is given in a report circulated among the members of the Leeds and Bradford Section by the provisional committee. After careful investigation, including attending Council meetings and the examination of the financial position of the Association, the opinion was formed that, far from being moribund, the B.A.C. was, as far as some Sections were concerned, extremely active. Some Sections were failing to do their share of the work, it is true, and were being carried by the more active Sections, thereby retarding progress to some extent. No doubt was left in the minds of the committee that the Association was doing most important work, and that it would be the greatest possible mistake to allow the Section to lapse.

Following the publication of this report, a general meeting of the section was held in Leeds on November 28, 1919, at which Dr. Hedley (the former treasurer of the B.A.C.) and Dr. Forster spoke. Dr. Hedley, after outlining the history of the Association, asserted that our main object should be Unity, not £. s. d., as so many imagined. We cannot hope to hold our own against big combinations of both Capital and Labour without unity. We must make the B.A.C. a solid body to protect the middle class. The Association is run by the voluntary work of the Council, but every member must take an active part. The Council meets but once a month, and all proposals should come before the Council well thought out, or there would be delay, for the voluntary workers have not too much time. He mentioned that the Guarantee Fund had grown from £500. to £600. in a week. Dr. Forster spoke of the work of the Whitley Councils Sub-committee (Manchester Section), and explained how it had become necessary, to attain our aims with regard to the representation of the brain worker on those Councils, to become registered as a trade union. He also pointed out the necessity for a strong organisation of our own to protect ourselves from the penetration of German chemists, who were already beginning to exploit Italy and Russia. With regard to the Whitley Councils, the B.A.C. alone would probably be powerless, and it was considered desirable that all scientific and technical workers should join together to press their claims to recognition. A conference was held at which thirteen different societies were represented, and, as a result, seven of these banded together to form a federation. Mr. Wilkinson pointed out that, if the Leeds and Bradford Section were to go on, all members must be prepared to work. A motion that the Section be continued was then carried unanimously, the provisional committee resigned, and a new committee of twelve was elected, including Mr. Wilkinson as chairman and Mr. Jennison as secretary. Mr. Hudson, who was elected to the committee, said that he was one of the few members who voted against registration as a trade union, and that he had also expressed his intention to resign. He was strongly averse to the methods employed by trade unionism; but in view of the fact that only by registering in this way could chemists hope to obtain representation on the Whitley Councils, he was prepared to carry on, and await developments before he made a decision. In reply, Dr. Hedley agreed that the majority of chemists were opposed to trade-union methods—such as "direct action" or "curtailment of production,"—but it should be realised that trade unionism affords the only legal means of gaining our ends.

London Section.

A successful meeting of the London Section was held at the General Offices on November 24. Owing to the indisposition of the president, the chair was taken by Dr. P. Haas. In accordance with the convening notice, the opening speakers gave a brief outline of the events at the annual general meeting held in Manchester on November 15.

The Chairman, in his opening words, spoke of the necessity emphasised at the general meeting for strict adherence to the

standard set up for membership of the B.A.C. He announced that in future a reprint of the matter published in the *Chemical Trade Journal and Chemical Engineer* would be sent to every member of the Association. The Chairman afterwards, in speaking of the Whitley Council work, gave a brief outline of the formation of the Federation of Technical, Scientific, and Professional Associations, and of the adherence of the B.A.C. to that body.

Mr. J. B. P. Harrison, dealing with the financial questions, spoke of the satisfactory situation at the end of the last financial year, and called attention to the fact that next year's subscriptions were now due, and should be forwarded to the Hon. Treasurer.

Professor Hinchley, who was unable to be present the whole of the time, spoke of the progress made on the question of registration under the Trade Union Acts and the general progress made by the Association during the past year. He announced that the Leeds and Bradford Section, after a lapse of several months, was in process of re-formation, and that a rally was being held in Leeds the following evening, at which he hoped to speak. He had every hope of new and increasing vitality in this Section.

The remainder of the evening was given up to general discussion. Messrs. Gatehouse and Rowell spoke of the necessity for the attention of the immediate employer being drawn to cases of underpayment of technical staffs, and suggested that a courteous letter from the Association would often have the desired effect. Mr. S. R. Price spoke on the various suggestions put forward with regard to Section meetings, and emphasised the need for occasional meetings confined strictly to members of the Association.

Speaking on the proposal for the distribution of reprints, Mr. Dunk suggested that, in order to economise labour and postage, the reprint should not be sent to members who are already subscribers to the *Chemical Trade Journal and Chemical Engineer*, and that such members should forward their names for reference to the Hon. General Secretary. *

CORRESPONDENCE.

(The Hon. Editor is not responsible for the views of correspondents, which are not necessarily the official views of the B.A.C.)

To the Hon. Editor, *British Association of Chemists*.

Dear Sir,—The question of chemist's agreements was discussed at the annual general meeting. It would be interesting to learn the validity of that most general clause, "That the employee shall not enter the employment of any firm manufacturing similar products for a certain (variable) number of years after the termination of the agreement with his present employer." In some cases this applies only within a radius of a certain number of miles. This is a serious handicap to a young chemist, or even a more experienced one, who wishes to obtain another post. Most advertisers demand of applicants that they "must have had similar experience." or, say, "one experienced in the manufacture of such and such an article essential." This seriously limits the field of experience of a chemist, and necessitates his specialising in his first subject. An all-round chemist, with works, research, and analytical experience, stands little chance of obtaining a post when a life-long devotee of the subject is being considered for the same post, although the former may be a better man. I do not know whether the remedy is within the scope of the B.A.C., but it seems to me to require attention. I hope the £350. minimum will become an established fact, for it is little enough for a married man in these days of high prices.—Yours, etc.,

WELFARE ENTHUSIAST.

[Our correspondent appears to have two distinct grievances in mind: Firstly, that employers always demand previous experience in an employee; and, secondly, having secured him, they bind him down, so far as they can, never again to go into similar work elsewhere. Obviously the employer cannot have it both ways, and young chemists must gain their experience somewhere, for experience is not heaven-born. We should be pleased to have the views of other members on this matter. The question of the legality of the usual form of agreement which a chemist is called upon to sign is at present engaging the attention of the Council.—Ed.]

Leeds and Bradford Section. Secretary: H. Jennison, Esq., Marlborough House, Marlborough Road, Idle, Bradford. A smoking concert will be held at the Midland Hotel, Bradford, on Saturday, January 10, 1920, at 7 p.m. During the evening a discussion will be held on the future policy of the Section.

PARLIAMENTARY NEWS.

Cornish Tin Mines.

In the House of Commons Mr. W. Thorne asked the President of the Board of Trade whether the Non-Ferrous Metals Act gives any power to regulate metal imports in such a way as to prevent the constant degradation of the standard of living of Cornish tin miners and other classes of British non-ferrous metal miners; is he aware that the average wage of the Cornish tin miner is only £8. or £9. per month; and can he state the amount annually of the present production of tin in Cornwall and the total number of men at present employed in the industry, both underground and in and about?

The Parliamentary Secretary to the Board of Trade (Mr. Bridgeman): The Non-Ferrous Metal Industry Act, 1918, does not give any power to regulate metal imports. I understand that the average wage of the Cornish tin miner is approximately as stated in the question. At the present time the production of tin in Cornwall is at the rate of approximately 4,000 tons a year, and the total number of men employed is about 5,000.

Metal Mines.

Mr. W. Thorne asked the President of the Board of Trade whether at various times in the last 100 years in the county of Cardigan over 260 metal mines have been in operation, and how many are working now; in Derbyshire over 194 mines in the production of lead ore, and how many are working now; in Cornwall as many as 259 mines for tin, lead, copper, and zinc, and how many are working now; whether in nine cases out of ten the cessation of the industry is due to the rent and royalty paid to landlords; whether the Non-Ferrous Metals Committee is inquiring into this aspect of the question; whether in their report they will give reasons why the recommendations of the Mining Royalties Commission of 1893 were never adopted; what is the reason for holding the Non-Ferrous Metals Inquiry in secret and excluding the Press; and when may either their report or an interim report with minutes of evidence to date be expected?

Mr. Bridgeman: I understand that the number of mines which have been worked in the last 100 years in Cardigan, Derbyshire, and Cornwall are approximately as stated, and that there are now working four mines in Cardigan, two in Derbyshire, and about fifty in Cornwall. The decline in the industry is due to a variety of causes now under investigation by a Departmental Committee which for some time has been taking evidence on three days of each week. I understand that the Committee decided that in view of the nature of the inquiry it was advisable that its sittings should be private. I am unable to anticipate the contents of their report, or to say when it will be presented, but the committee are proceeding with the inquiry as rapidly as possible.

Industrial Alcohol.

Mr. A. J. Balfour, in reply to Mr. R. McNeill, said: The recommendations of the report of the Interdepartmental Committee have been under consideration by the Department of Scientific and Industrial Research, and I am taking preliminary steps, in consultation with the Director of Fuel Research, to enable the Department to deal with the alcohol question in an effective manner.

Fertilisers.

Mr. Holier asked the Parliamentary Secretary to the Ministry of Munitions whether his Department receives, or has received, any and what difference in price per ton for phosphate rock, pyrites, or sulphate of ammonia, respectively, over the price per ton which his Department paid for it; and, if so, for what work done by his Department has this difference in price been received?

Mr. James Hope: I regret to say that there is no profit on these transactions; the second part of the question does not therefore arise.

Sir Arthur Boscawen, in reply to Sir J. Norton-Griffiths, said: The Fertiliser Prices Order, 1918, ceased to operate on May 31, 1919. Since that date maximum delivered prices of basic slag and sulphate of ammonia for home deliveries have been fixed by agreement between manufacturers and the Board of Agriculture. No maximum prices have been arranged for superphosphate on account of the varying cost of importing phosphate rock. Apart from these arrangements the production, distribution, and prices for home consumption

of these fertilisers are now free from control. Control of export of fertilisers is still maintained in order to secure sufficient supplies to meet home requirements. Export licences for any surplus are, however, freely granted. This control will be discontinued as soon as practicable, consistent with meeting the needs of British agriculture.

Matches.

Mr. J. Davison asked the President of the Board of Trade whether any restrictions on the import of matches into this country are still in force?

Sir A. Geddes: No, sir.

Cement.

Mr. Bridgeman, replying to Mr. J. Davison, said: I understand that prohibitions on the export of cement are in force both in Germany and Denmark. According to my information there are ample supplies of cement available in this country, and there should be no necessity to import it.

LEGAL INTELLIGENCE.

Sulphate of Copper Cargo and Ship's Plates.

Judgment was delivered by Mr. Justice Hill in the Admiralty Court in an action brought by the owners of a chemical cargo on the steamship *Yorkshire*, sailing out of Liverpool, against the owners of the vessel, in which the chemical action was discussed of a cargo of sulphate of copper on the keel plates of the vessel.

His Lordship said this was a claim against the owners of the steamship *Yorkshire*, under bills of lading of sulphate of copper and other goods shipped for a voyage from Liverpool to St. Malmo in October, 1917, for loss of or damage to the goods. A great part of the shipment was either not delivered at all or delivered damaged after the voyage had been broken up at Falmouth. The defence was perils of the sea. The plaintiffs' answer to that was unseaworthiness of the ship. Minor defences pleaded were not open to defendants in that court and would only become material if "perils of the sea" failed. The damage was caused by incursion of sea water into the hold during the voyage. The case turned on whether the ship was unseaworthy, and the onus of establishing that was upon the plaintiffs. Unseaworthiness was alleged in two respects—one allegation went to the whole of the damage, the other to part, and it might be the greater part of the damage. First, plaintiffs said that at the beginning of the voyage a lead pipe conducted through the hold to an opening in the ship's side was defective, and also that the storm valve to the opening in the ship's side was defective. By reason of these defects they said sea water entered the hold and, dissolving the sulphate of copper, produced an acid and highly corrosive solution which damaged more of the sulphate and other cargo. In the second place they said that some of the bottom plates of the ship were before the voyage thin and corroded, whereby the acid ate right through them and caused most serious leaks in two plates, which resulted in the hold being flooded and further damage being done, nearly the whole of the sulphate of copper being dissolved and other cargo being seriously damaged or destroyed. Defendants replied, first, that the pipe was sound and was cracked by sea perils during the voyage, and that the valve, though not absolutely watertight, was reasonably fit for its purpose, and, in the second place, that the bottom plates were sound and that the corrosion was entirely due to the acid and wholly caused during the voyage.

His Lordship, after a lengthy review of the evidence, said that the defence of perils of the sea succeeded and there must be judgment for the defendants with costs.

Chemical Merchant's Failure.

At the London Bankruptcy Court on Friday of last week, before Mr. Registrar Francke, the public examination was appointed to be held of George Edward Ellis Newton, chemical merchant, 203, St. James' Road, Croydon, and 74, Gt. Tower Street, E.C.1, who alleged his failure to have been caused through loss of business through shipping restrictions, the Government control of chemicals, and stagnation in trade following the Armistice. The Receiving Order was made against the debtor on October 29 last.

He commenced business as G. E. Newton and Co. in November, 1916, with a borrowed capital of £50. For the first 18 months the business was very successful, and yielded a net profit of £3,000, but in the middle of 1918, owing to the increasing restrictions on exports and the Government control over chemicals, his business fell away considerably, and on the signing of the Armistice had practically ceased. He returned his liabilities at £2,000, and the assets consisted of 10 tons of arsenic powder and 313 tons of a special vacuum salt held by creditors.

The Official Receiver said the debtor had not yet completed his statement of affairs, and he was not in attendance that day. He had attended for his preliminary examination, and although several letters had been sent to him he had never replied. The letters had, however, not been returned through the Post Office, therefore he presumed that debtor must have received them. He asked that the debtor be ordered to complete his statement of affairs within three weeks, and the examination was adjourned until February 13.

Acetic Acid Contract Dispute.

Lord Justice Bankes, sitting as an additional judge of the King's Bench Division last week, heard the case of *Reeve v. Hambrook*, an action by the plaintiff, a vinegar manufacturer, to recover damages against the defendant, a manufacturer of acetic acid, for the alleged breach of contract by the defendant in failing to supply in October and November, 1917, certain quantities of the acid, thereby preventing the plaintiff from making vinegar with it and thereby losing the profit thereon which he otherwise would have made. Plaintiff also claimed damages upon the ground that in consequence of not being able to make the vinegar he had lost customers.

The defence was a denial of liability.

It appeared that the difficulties arose through the Government, in October, 1917, taking control of the acid. Plaintiff, however, obtained permits from the Government Department for supplies of a certain quantity of the acid, and defendant made certain deliveries of the acid under them, and the main question in the case was whether or not the deliveries of the acid made by the defendant to the plaintiff on October 13 and 17, 1917, ought to be accounted as part of the contract quantity.

After hearing evidence Lord Justice Bankes held that under the contract there was a balance of about 2cwt. of the acid due to the plaintiff, and he awarded him £23. 3s. damages.

Judgment was entered accordingly.

THIRTY YEARS AGO.

From the "Chemical Trade Journal" of December 28, 1889.

Railway Rates.—The Railway Rates Inquiry is still dragging on its weary existence before the Board of Trade, and anyone with half an eye can see that without the traders make a desperate effort the companies and the lawyers will have the oysters, while the traders will be left with the shells. As we have said before in these columns, the whole question as far as the traders are concerned, hangs on the classification, and if they had combined to produce a natural classification of merchandise (which might easily have been done), the present difficulties would not have arisen. A very simple instance may be given to show how high railway charges will strangle and divert the course of trade, ruin manufacturers, and produce all manner of evil. We refer to the carriage of ammoniacal liquor, the waste water of the gas works. Three or four years ago we knew of several instances where, through being remote from the manufacturer, gas water was yielding to the producer of it but five shillings per thousand gallons, or about one shilling per ton. The railway charges on a ton of this liquor amounted to *seven and sixpence per ton*, or seven and a half times that which the producer of it was receiving. This led to the producers working it up on their own premises, which, of course, was the most sensible thing to do under the circumstances. Gas water is, we think, one of the most easily carried substances a railway company has to handle. The purchaser finds his own tank wagons, and keeps them in repair, so that the company's work is mere haulage, yet, in spite of this, in the new classification proposed by the railway companies, ammoniacal water has been placed in class —. There is no doubt its place is in Class A; will it find its way there?

FERTILISER NEWS.

(SPECIALLY CONTRIBUTED.)

Nitrate of Soda.—There is no official confirmation of the enhancement of the selling price in Chili by the Producers' Association to 11s. per quintal f.o.b., the latest version being, in fact, that this body is out of the market for the present "for fear of congestion at the shipping ports." The reason seems somewhat far-fetched, considering that tonnage is so scarce that, as already stated in these columns, there is little chance of exporting this season—January to March, 1920—all the nitrate sold for such delivery. For forward positions freights have come down, 120s. to 150s. per ton being quoted for steamers to load in the second half of next year; but they are still extremely high for early boats, 207s. 6d. having just been paid to the United Kingdom. The average rate before the war was about 25s. per ton, and British steamers carried a large share of the "season" nitrate, whereas they are now shut out of the trade by a benevolent Government, foreign owners getting the benefit of the fancy rates offered by shippers. When the Chilean fertiliser itself is also much dearer on the spot, its cost "delivered in Europe" may readily be imagined, as also the reluctance of the British farmer and the country dealers to make forward purchases; they will wait till next spring to see if prices come down, and if not they will buy nitrate of lime for top-dressing backward crops. For ordinary purposes, sulphate of ammonia is more effective and cheaper. Nitrate of soda is said to be in good demand on the Continent, but the depreciation of the French, Belgian, and Italian currencies has pushed prices up to a positively fantastic level, and it remains to be seen whether the actual consumers will pay these when the time comes for use. In spite of the renewed valiant attempts to hearten holders of nitrate shares, the outlook for the industry is by no means clear.

Continental Phosphate Position.—In a review of the position of phosphates after the war, a French journal says that whilst the demand for phosphate tends to rise very considerably in Europe, the supply on the other hand continues very reduced. The importation of phosphates into Europe, which came before the war to the extent of two-fifths from the United States and the Pacific Islands, is now seriously handicapped by the heavy freights. North African phosphates, therefore, appear to be the only ones available for the supply of Europe. That is to say, that the producers have an almost unlimited market. There is every reason for expecting a great increase in the production of the North African mines, so that the phosphate interests in that region must become of increasing value.

The Reconstructed German Potash Syndicate.—The new association agreement of the German Potash Syndicate was made on October 10, accepted by the Government on October 21, and signed by State Secretary Richter on December 6. After the elimination of the Alsace works, and the adhesion of the previously so-called Sonderwerke, the Association now numbers 139 members (which is not identical with the number of shafts and factories). The previous separate works that are now in the Association are the Mercksche Guanowerke, Hamburg; the Stassfurter Chemische Fabrik-Vorster and Grünberg; the United Leopoldshall Concordia Chem. Fabrik, Leopoldshall Chem. Fabrik, Friedrichshütte, in Leopoldshall; Reit and Co., Stassfurt; Chemische Fabrik, Harburg-Stassfurt, Thörl and Heidtmann, Schachnow and Wolff, Leopoldshall.

Sulphate of Ammonia.—There is very little sulphate of ammonia available for export, and the values mentioned are showing a very wide range, being on one side as low as £28. and on the other as high as £35. per ton, net cash, f.o.b., British ports, in double bags. The prices fixed for home agriculture are £21. for the current month, £21. 7s. 6d. for January, £21. 15s. for February, and £22. for March delivery next year, net cash, delivered destination required by buyers in Great Britain. The present position of sulphate of ammonia here is that it is going into use almost as quickly as it can be produced. The amount for export is small, and the export trade generally inclined to diminish.

Basic Slag.—This material is having a good sale both at Hull and in Staffordshire. Orders from farmers, it is reported, will suffice to keep manufacturers busy for the first three months of the New Year. A further increase in the output is being urgently asked for.

Potash.—So far as potash is concerned, the market here is still very short of stocks, and in view of Continental buying

a further increase in prices would not be surprising. German potash producers apparently desire an understanding with the Alsatian producers and, it is declared, have made proposals to that effect through the most unexpected channels.

Bone Meals.—Stocks of bone meal on hand continue to be small, and again there is no immediate prospect of any substantial increase. Demand, however, at present is not great. Representative quotations are: Pure steamed 1 per cent. and 60 per cent. bone meal, in bags, £13. 10s. to £14.; and pure dissolved bones, 3 per cent. ammonia and 32 per cent. phosphate, £15. to £15. 10s., both ex works.

Meat Meal, Blood, and Tankage.—The market for meat meal is very firm, but again only small stocks are available. The nominal value is now given as 35s. per unit of ammonia. In tankage and dried blood also there is a shortage of available stocks, and prices as the year ends are firming up.

Other Fertilisers.—In the odds and ends of the manure market, castor bean cake unfit for food has been mentioned as likely to find a useful outlet as a fertiliser. The price, however, would apparently have to be much lower than the present figure of £18. per ton.

SOUTH WALES NOTES.

(SPECIALLY CONTRIBUTED.)

The pressure in the tinplate trade continues, and it is gratifying to record that the outputs have slightly increased. Shipments are getting easier, and there is much less talk among manufacturers of American competition. The Far Eastern markets are being closely watched by the home makers, and so far they have been able to supply these without much trouble. Early next year more mills will be restarted.

Shipments in the patent fuel trade are practically normal. The Italians are taking large quantities of briquettes. Some large cargoes have left Swansea during the week, including one of 6,000 tons to Venice, 5,319 tons to Marseilles, 3,000 tons to Rouen, besides small cargoes to La Pallice, Havre, St. Brieux, and La Rochelle.

The coke ovens are working well, and the foreign demand for coke remains good, many cargoes having left Newport and Cardiff for Rouen, Oporto, and St. Malo. It is expected that during the early weeks of the New Year some 200 or more new coke ovens and by-product plants will be started. The output of sulphate of ammonia remains very good, and there is scarcely any difficulty in getting rid of it, so great is the home demand, and little or none is available for export.

The spelter trade is very active, and as there is now a good call for galvanised sheets the metal is required for this purpose locally in much greater quantities than at any time during the last six years. A direct consignment of Australian concentrates has reached Swansea, and 2,500 tons of zinc ore came in on Monday from Port Pirie.

The Swansea Technical College has obtained the status of a university, a charter having been granted to it, and it thus becomes a constituent college of the University of Wales. Local manufacturers who have interested themselves in the matter are to be congratulated upon the attainment of their efforts.

NEW COMPANIES.

Anglo-Eastern Oil and Mining Syndicate, Ltd.—Capital £3,000., in 2,500 ordinary shares of £1. each and 10,000 deferred shares of 1s. each. Registered office: 62, London Wall, E.C.

Colonial Oilfields, Ltd.—Capital £50,000., £1. shares. Registered office: 11, Queen Victoria Street, E.C.

West Hensbarrow China Clay, Ltd.—Private company. Capital £22,000., £1. shares. Registered office: 7, Birchin Lane, E.C.

Callose Tin Mines Alluvials, Ltd.—Capital £185,000., in 5s. shares. Objects: To acquire an interest in certain tin mining properties in Cornwall, and to enter into an agreement with the General Exploration and Finance Syndicate, Ltd. Registered office: Boston House, 63-4, New Broad Street, E.C.

National Dyes, Ltd.—Capital £350,000., in £1. shares (100,000 preference). Object: To carry on the business of manufacturers of dyes and intermediate and refined products, chemists, manufacturers of coal tar, oils, paints, pigments and varnishes, etc. Solicitors: Birkbeck, Yeo and Company, 20, Coptall Avenue, E.C.

IMPORTS OF CHEMICALS AND ALLIED PRODUCTS.

(Concluded from page 684.)

ARTICLES.	QUANTITIES.		VALUE.		ARTICLES.	QUANTITIES.		VALUE.		
	Month ended Nov. 30th.		Month ended Nov. 30th.			Month ended Nov. 30th.		Month ended Nov. 30th.		
	1919.	1918.	1919.	1918.		1919.	1918.	1919.	1918.	
OILS :										
Fish : Train, Blubber, and Sperm	tuns		£	£	SOAP : Soft Soap	cwts.	76	43	£	£
C'nut, Unrefined	cwts.	1,420	4,406	115,275	Household & Laundry				150	197
Olive	tuns	134,592	255,748	630,509	Soap, in bars or tablets.....	cwts.	12,956	—	36,346	—
Palm (not including Palm Kernel Oil), Unrefined	cwts.	72	19	9,645	Polish'g & Scour'g	"	—	—	—	—
Palm Kernel Oil, Unrefined	"	157,188	186,365	636,678	Powder	"	9	—	25	—
Unrefined	"	460	—	2,231	Toilet	"	1,404	144	8,810	2,346
					Unenumerated	"	16,268	—	36,254	—
Total	"	157,648	186,365	638,909	STARCH, DEXTRINE, AND FARINA OR POTATO FLOUR :					
Petroleum :					Rice Starch	 cwts.	3,676	272	11,007	1,254
Crude	gals.	—	—	—	Other kinds Starch	"	98,423	1,889	176,173	7,510
Lamp Oils	"	8,916,395	8,013,589	384,798	Dextrine and Farina or Potato Flour	"	46,502	19,668	100,523	79,845
Motor Spirit	"	11,589,012	18,373,511	913,719	Total	"	148,601	21,829	287,703	88,609
Spirit, other than motor spirit	"	174,998	—	14,555	COPPER :					
Lubricating Oils	"	5,122,577	9,597,630	439,677	Regulus & Precipitate :					
Gas Oil	"	5,238,841	3,046,059	156,281	From Portugal..	tons	218	—	21,300	—
Fuel Oil	"	27,427,862	98,314,750	603,261	" Spain	"	1,455	1,724	113,302	199,838
Total of Petroleum	"	58,469,685	137,345,539	2,512,291	" U.S.A.	"	—	—	—	—
Seed Oil :					" Mexico	"	—	—	—	—
Castor Oil	tons	52	580	4,720	" Peru	"	—	20	216	840
Cotton Seed Oil, Unrefined	"	497	2	43,288	" Chile	"	132	—	6,400	—
Linseed Oil : Pure	"	134	—	13,284	" Cape of Good Hope	"	—	—	—	—
" Not Pure	"	—	—	—	" Other C'tries	"	119	363	12,293	35,920
Rape-seed Oil	"	85	—	8,350	Total	"	1,928	2,107	153,511	236,598
Soya Bean Oil	"	5,191	—	425,154	COPPER ORE :					
Other Seed Oils	"	1,162	412	108,600	From Spain	 tons	—	—	—	—
Turpentine	 cwts.	16,002	7,250	92,962	" Chile	"	67	—	2,430	—
SOAP STOCK	"	10,649	20	46,691	" Cape of Good Hope	"	—	—	—	—
STEARINE :					" Australia	"	—	—	—	—
From Belgium	"	330	—	2,025	" Other C'tries	"	1,003	8,282	31,710	514,996
" Other C'tries	"	5,671	4,375	33,183	Total	"	1,070	8,282	34,140	514,996
Total	"	6,001	4,375	35,208	MANGANESE ORE	tons	13,220	47,335	90,259	436,499
TALLOW (including VEG-ETABLE TALLOW), Unrefined :					PYRITES of Iron and Copper		33,323	45,497	92,364	186,869
From China	 cwts.	31,177	—	144,815	SILVER ORE	 val. f	—	—	97,570	41,300
" U.S.A.	"	4,810	—	21,982	TIN ORE :					
" Uruguay	"	24,498	—	126,774	From S. America	tons	2,482	1,077	363,840	182,215
" Argentine Republic	"	56,604	13,906	283,415	" Brit. S.A.	"	—	—	—	—
" Australia	"	22,963	31,152	112,285	" Other C'tries	"	362	455	52,681	61,862
" New Zealand	"	30,024	7,037	141,253	Total	"	2,844	1,532	416,521	244,077
" Other C'tries	"	3,112	872	13,376	LEAD, PIG and SHEET :					
Total	"	173,188	52,967	843,900	From Spain	 tons	200	7,450	6,500	298,000
GUM :					" U.S.A.	"	280	7,322	7,012	262,179
Arabic	 cwts.	14,898	2,013	51,330	" Mexico	"	95	—	2,216	—
Kauri	"	6,611	81	20,137	" Australia	"	2,104	2,205	62,760	65,732
Lac-dye, Seedlac, Shellac, and Sticklac	cwts.	8,508	19,929	151,816	" Other C'tries	"	—	921	—	25,410
ROSIN	"	175,328	93,003	414,519	Total	"	2,679	17,898	78,488	651,321
CEMENT for Building and Engin'ing purp'ses	tons	94	—	839	QUICKSILVER	 lbs.	—	—	—	—
GLUE, SIZE, and GELATINE	 cwts.	6,263	5,454	56,369	TIN, in Blocks, Ingots, Bars and Slabs :					
OIL-SEED CAKE, not sweetened :					From Straits Settlements	.. tons	1,150	1,735	320,568	578,890
Cotton-seed Cake	tons	13,141	—	279,122	" Australia	"	80	—	22,480	—
Linseed Cake	"	5,879	105	139,935	" Other C'tries	"	965	—	265,620	—
Rape-seed Cake	"	—	—	—	Total	"	2,195	1,735	608,668	578,890
Unenumerated	"	3,213	—	65,949	ZINC :					
Total	"	22,233	105	485,006	Crude in cakes	"	8,099	4,901	342,218	252,520
PARAFFIN WAX	cwts.	67,418	114,050	134,373						
				347,177						

REPORTS OF COMPANIES.

Sapon Soaps, Ltd.

The secondary ordinary general meeting was held last week in London at Cannon Street Hotel, E.C., the Right Hon. the Earl of Denbigh, C.V.O. (chairman of the company), presiding.

The Chairman said: I think you will agree that the second year's trading, under the circumstances, is quite satisfactory, and the dividends which your directors recommend will, I hope, meet with your approval. The gross profit amounts to the sum of £26,614., which, I hope you will agree, is an excellent return on the amount of what I may describe as the productive part of our capital—equal to over 60 per cent. The at present non-productive portion will, I am confident, become remunerative as we proceed, and all new capital now introduced will be equally productive, and should show an even higher rate of earning power. During our second year we have added very considerably to our plant, and are now about to place on the market an entirely new form of our product, which we believe will find a ready sale amongst textile mills and laundries, as it contains in a remarkable degree the maximum of cleansing power and, at the same time, the maximum of lathering properties. After the Armistice orders from the Government rapidly ceased, due to the large stocks of soap they held. I am glad that the home demand has, since the Armistice, rapidly grown. As we can and are producing a soap of greater value in cleansing properties at a lower price—the saving in valuable fats and oils alone being over 50 per cent. and over 75 per cent. in the consumption of coal per ton of soap produced—it must inevitably follow that the waste and extravagance in the use of fats, oils, and coal in soap-making by the old and world-wide method will be greatly lessened as time goes on, and the advantages to be gained by the general use of "Sapon" soaps recognised. The raw material used by us has been more abundant during the year than during the previous year, but prices have enormously increased—oils and fats well over 100 per cent. This increase of that material has not affected us in anything like the same ratio that it has done the ordinary soap-maker, but he has the means of compensating this increase in cost by the addition of water to his boiled soap, with the result, however, that the value of his soap is greatly reduced as a cleansing agent.

At an extraordinary general meeting subsequently held a resolution was passed increasing the capital of the company to £300,000.; and a further resolution was approved offering new ordinary shares to the members in proportion of five such new shares for every two of the preference shares held by them respectively, and one such new share for every two of the existing ordinary shares held by them respectively.

British Cotton and Wool Dyers' Association, Ltd.

An extraordinary general meeting was held at Manchester on Friday of last week, Mr. Adolph Hoegger (the chairman) presiding. The requisite alteration of the articles of association was duly confirmed providing for the capitalisation of reserves, distribution of additional shares in accordance with the scheme outlined at the gathering on December 3, under which the Association's nominal share capital was raised from half a million sterling, in 5s. shares, to one million sterling of the same denomination. It was now resolved that £193,541., part of the Association's undivided profits at the credit of the reserve fund, be capitalised, and that a bonus in the shape of approximately one new ordinary share to every two ordinary shares now held to be distributed, the balance of the new capital powers remaining unissued for future requirements or developments.

Egyptian Salt and Soda Company, Ltd.

The net profits for the year ended August 31 were £(E)219,819, after providing for debenture interest, and £(E)141,847. was brought forward. A dividend of 45 per cent. (9s. per share) is proposed, adding £(E)19,304. to the depreciation fund, and carrying forward £(E)123,957. The net profits for 1917-18 were £(E)391,104., and the distribution was 60 per cent., £(E)29,520. being set aside.

DIVIDENDS.

AMERICAN CYANAMID COMPANY.—Dividend of 3 per cent. (£3. per share) on preferred stock in respect of six months to December 31.

LAURARO NITRATE COMPANY, LTD.—No interim dividend will be paid.

GAZETTE NEWS.

LIMITED COMPANIES.—Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions. Orders, and Official and Other Notices.

Grays Chemical Works, Ltd., London, E.C.—Resolved December 8: That the company be wound up. A. N. Harper, 8, Queen Street, E.C., A.C.A., liquidator. Meeting of creditors, Institute of Chartered Accountants, Moorgate Place, E.C., December 29, at 2.30 p.m. Claims to liquidator by January 15.

Ildokani Oil Syndicate, Ltd.—Resolved November 19, confirmed December 5: That the company be wound up. F. F. Fuller, liquidator. Meeting of creditors, 638, Salisbury House, E.C., December 22.

Kemball, Bishop and Co., Ltd.—Resolved November 25, confirmed December 10: That the company be wound up. Lieut.-Col. A. C. Bishop, 61, Rutland Gate, S.W.; and J. E. Whitehall, Crown Chemical Works, Three Mill Lane, Bromley-by-Bow, liquidators, who are authorised to consent to the registration of a new company to be named Kemball, Bishop and Co., Ltd. Meeting of creditors, Crown Chemical Works, Three Mill Lane, Bromley, E., December 29, at 11.30 a.m.

North Brazilian Sugar Factories, Ltd., London, E.C.—Resolved November 13, confirmed December 1: That the company be wound up.

Trinidad Oilfields, Ltd.—Resolved November 25, confirmed December 10: That this company be wound up. R. G. Longcroft, 2, Broad Street Place, E.C., C.A., liquidator. Meeting of creditors at liquidator's, December 31, at 10 a.m. Claims to liquidator by December 31.

DISSOLUTIONS OF PARTNERSHIP.

(Note.—When two dates are given in the following announcements, the first is the date of the dissolution. The date in parentheses is that of the official advertisement.)

Victory Boot Polish Company (Sidney Clarkson and Raymond Bellamy), Victory Works, Old Foundry Wharf, High Street, Rochester, manufacturers of boot and other polishes. December 2. Debts by S. Clarkson. (December 9.)

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 4, Queen Anne's Gate Buildings, London, S.W. 1, whence, unless otherwise stated, further information may be obtained:—

Germany.

A firm in Frankfurt-on-Main desire to represent United Kingdom firms for the sale of chemical products and drugs of every kind, fats and oils, ore and metals. (Reference No. 1260.)

A German inquirer in Cologne desires to secure the agency of United Kingdom manufacturers or exporters of soap. (Reference No. 1261.)

Morocco.

A firm of commission agents established at Fez desire to represent, in Morocco, British firms exporting chemicals. (Reference No. 1271.)

A firm of wholesale manufacturers of boot polishes in Casablanca desire to be placed in touch with United Kingdom manufacturers of ceresine, ozokerit and carnauba wax, turpentine and turpentine substitute or white spirit. (Reference No. 1270.)

BOOKS RECEIVED.

"Small Dwellings." Booklet containing points of interest regarding their lighting. Quite a useful guide to firms contemplating the erection of workmen's cottages. W. T. Henley's Telegraph Works Company, Ltd., Blomfield Street, London, E.C. 2.

Bradford Chamber of Commerce Year Book. Officially issued in the interests of the trade and commerce of Bradford and district, with classified trade index in English, Russian, and Spanish. Contains a mass of attractively displayed and well-compiled matter. Bemrose Publicity Company, Ltd.

Annual Report (1918) Metropolitan Borough of Poplar. By Fredk. Wm. Alexander, Medical Officer of Health. Leading feature being statistics of the very efficient Electrolytic Disinfecting Fluid produced by this municipality.

THE PATENT LIST.

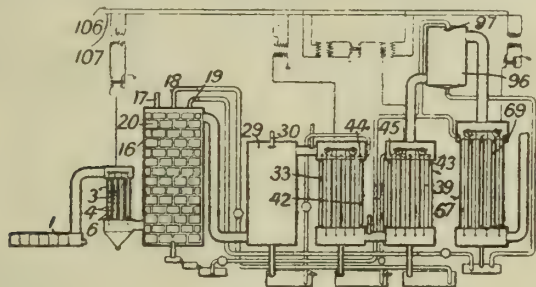
ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Concentrating Ores. E. C. R. Marks, London. (A communication from Luckenbach Processes Incorporated, San Francisco, U.S.A.) British Patent, 133,498, of 1918.

An agent for use in concentrating ores by flotation is obtained from greasewood. The plant is macerated, and treated preferably with caustic soda, or with water or acid, or with steam followed by alkali. The agent may be used alone or with a mineral, vegetable, or animal oil, such as oleic acid, or a solution of rubber such as is described in Specification 133,277.

Sulphuric Acid. H. V. Welch, Los Angeles, California, U.S.A. British Patent, 134,015, of 1918.

In the production of sulphuric acid by the chamber process, sulphur dioxide gases from a source 1 are passed through an electric precipitator 3 having a number of tubular collecting-electrodes 6 extending between upper and lower headers and containing axial wire electrodes 4, thence into a Glover tower 16 with packing 20 supplied at 17 with nitric acid, and at 18, 19 with chamber acid and nitrous vitriol respectively, thence to a lead chamber 29 supplied with a water spray at 30, thence through electric precipitators 33, 39 having plate electrodes 42, 43 over which sulphuric acid of suitable temperature to keep the reactions going at the optimum temperature is distributed from perforated pipes 44, 45, thence to a lead chamber 96 supplied with a sulphuric acid spray 97, and finally to an electric precipitator 67, the tubular electrodes



69 of which are supplied with sulphuric acid to serve the purpose of a Gay-Lussac tower. Liquid collecting at the bottom of each tower and precipitator is collected in a suitable tank, that from the Glover tower 16 being used for the chamber 96 and precipitator 67, that from the chamber 29 for the precipitator 33, that from the precipitator 33 for the precipitator 39, and that from the precipitators 39, 67 and from the chamber 96 for the Glover tower 16. The precipitators are supplied with current from alternating mains 106, 107 through step-up transformers, and the current supplied may be unidirectional or alternating, or both superposed, as shown by the connections. The electric precipitator tubes may be of circular, square, rectangular, or polygonal section, and may be of frusto-conical or frusto-pyramidal form.

Aminophenol and Aminonaphthol Derivatives. O. Imray, London. (A communication from the Society of Chemical Industry in Basle; Basle, Switzerland.) British Patent, 133,433, of 1918.

Esters of N-monoarylsulphomonoalkylaminoxyaryl compounds of the general formula $R^2O.R.NR^1R^3$ where R =aryl, R =arylsulphonyl, R^2 =acydyl, including arylsulphonyl, and R^3 =alkyl, and the corresponding compounds in which R^3 is allyl or aralkyl, are prepared by treating bodies of the general formula $R^2O.RNHR^1$ with the usual alkylating-agents (alkyl chlorides, dialkyl sulphates, arylsulphoalkyl esters), or allyl or benzyl halides. According to examples, N-*p*-toluenesulpho-*p*-aminophenol-*p*-toluenesulphoester is methylated by means of methyl chloride or dimethyl sulphate; the properties of the corresponding ethyl, benzyl, and allyl compounds are also described. The corresponding derivatives of *o*- or *m*-aminophenol or aminonaphthols are also referred to. Alkyl-, allyl-, or aralkyl-aminoxyaryl compounds are prepared by the complete saponification of the sulphonamide esters described above—e.g., by hot strong sulphuric acid; an example is given of the production of *p*-methylaminophenol. Arylsul-

phonic esters of aminoxyaryl compounds are prepared by partial saponification by means of acids of sulphonamide esters of the general formula $R^2O.R.NR^1X$, where R =aryl, R^1 and R^2 =arylsulphonyl, X =hydrogen, alkyl, allyl, or aralkyl; according to examples, the *p*-toluenesulphonic ester of *p*-methylaminophenol is prepared from N-*p*-toluenesulphomethyl-*p*-aminophenol-*p*-toluenesulphonic ester, and the benzenesulphonic ester of 1 : 8 : 3 : 6-aminonaphthol disulphonic acid is prepared from 1-N-benzenesulphamido-3 : 6-disulpho-8-oxynaphthalene benzenesulphonic ester; the corresponding derivatives of other aminonaphthol sulphonic acids are also referred to.

Decolorising-carbon. R. W. Mumford, Baltimore, U.S.A. British Patent, 133,759, of 1918.

A vegetable carbon having great decolorising power and great rapidity of action, and capable also of removing finely divided suspended materials from solutions or liquids, is prepared by slowly heating an intimate mixture of moist vegetable matter, colloid material, and a mineral spacing agent, so as first to dry the material and set the colloid, and thereafter slowly to char it, the temperature finally being raised to above 800° C. The mineral spacing agent is selected so that during the charring process gas is slowly evolved, and this has the effect of cleaning the pores of the charred material, the object being to obtain a carbon of open cellular structure corresponding more or less closely to that of the vegetable matter originally taken. As vegetable matter, the following examples are given: Sawdust, peat, lignite, wood pulp, peat moss, bark, maize cobs, residues of alcohol distillation, and brown coal; as colloid material: Solutions of gelatine, potato or rice flour, cornflour, starch and gluten, and inorganic colloidal material such as clay, hydrated colloidal silicates, oxides and phosphates—for example, gelatinous tricalcium phosphate; as a mineral spacing agent: Dolomite, manganese dioxide, and a mixture of magnesium carbonate and phosphatic rock. In an example of the process, the vegetable matter is comminuted, washed with hot water, mixed with gelatinous tricalcium phosphate or boiled with potato flour or starch so as to form a paste, and finely mixed with finely powdered dolomite; the mass is then heated in a retort which can be slowly rotated; the temperature remains for some time at 100° C. until all the water is expelled and the colloid is set, after which it rises slowly until at 250° C. the mass is completely charred; the temperature is then raised to decompose the dolomite which evolves carbon dioxide gas, and this continues until a temperature of 800–900° C. is reached; the material is then dumped into water with the exclusion of air, and the product freed from mineral matters either by sedimentation or centrifuging, or by treatment with an acid; the product is dried and, if desired, ground. In order to control the temperature during the charring process it is convenient to use a reverberatory furnace heated on the surface combustion principle, the material to be charred being spread in relatively thin layers in metal trays which are placed on the sole or hearth of the furnace. Usually it is detrimental to the product to conduct the charring in the presence of steam or products of combustion from any other source, since these cause the carbon to waste away; but in the case of material of less open texture, such as lignite or brown coal, the introduction of steam is in certain cases advantageous. After use, the carbon can be revived by treatment with hydrochloric acid alone, or by washing first with hot water, then with caustic soda solution, again with hot water, and finally with hydrochloric acid; after drying, the product is ready for re-use, and heating in retorts is unnecessary.

Nitronaphthalene. E. de B. Barnett, London. British Patent, 133,918, of 1919.

Naphthalene, prior to nitration by treatment with a mixture of nitric and sulphuric acids, is suspended in sulphuric acid, which may contain 60–70 per cent. H_2SO_4 , or in spent nitrating acid, or in a mixture.

Refractory Materials. R. D. Pike, San Francisco, U.S.A. British Patent, 133,753, of 1918.

Magnesite is mixed with a small quantity of a deodoriser in the form of an iron alloy, such as ferro-manganese or ferro-silicon, and then heated to a temperature such as to cause a reaction reducing the total quantity of oxygen associated with the iron and more or less liberating the metallic iron. The magnesite is ground with water and with the powdered alloy and ferric oxide, and the moulded composition fired to

form refractory articles. The oxide of iron may be omitted in cases where it exists in sufficient quantity in the natural magnesite. Calcined magnesite can be used instead of the raw mineral, preferably with addition of the latter when making the mixture for moulding and firing.

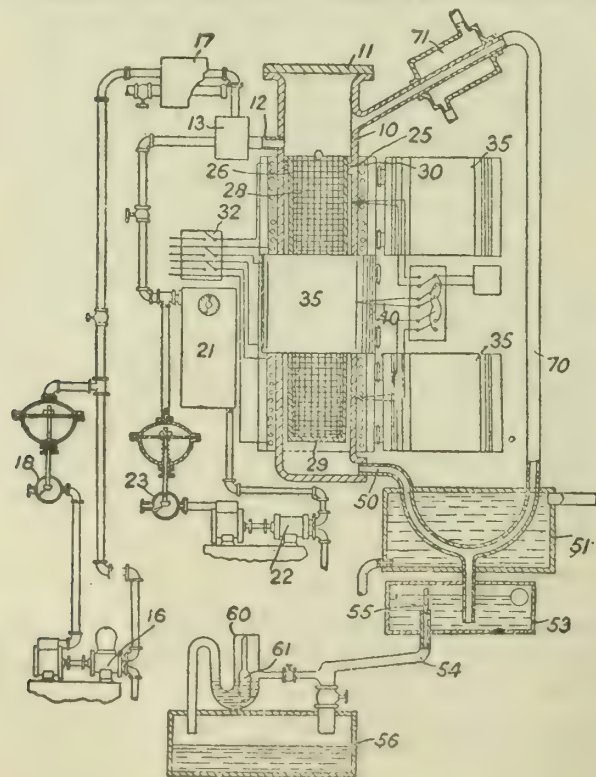
Extracting Paraffin Waxes, Etc. K. H. V. von Porat, Stockholm. British Patent, 133,989.

Paraffin, waxes, oils, and fats are extracted from peat, straw, mosses, lichens, algae, grass, pine-needles, etc., by treatment with terpenes or derivatives thereof, such as turpentine oil and its higher fractions, preferably under heat and pressure.

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Catalytic Hydrogenation. Dayton Metal Products Company, Dayton, Ohio, U.S.A. British Patent, 133,666. Convention date, October 5, 1918.

Relates to improvements in apparatus for the hydrogenation of unsaturated hydrocarbons, of the kind in which a mixture of the vapourised hydrocarbon and hydrogen is passed, in a continuous manner and under pressure, over a catalyst maintained at a regulable temperature. The improvements comprise: (1) A reaction chamber surrounded by a number of heating devices separately controlled; (2) arrangements for heat-insulating the whole or a part of the reaction chamber; and (3) a removable cartridge for carrying the catalyst. The apparatus is stated to be specially applicable to the production of cyclohexane from benzene. The hydrocarbon vapour and hydrogen are mixed in a chamber 13 and introduced through the pipe 12 into the reaction chamber 10 containing the catalyst 28. The products of the reaction escape by the pipe 50 to a condenser 51, unconverted hydrogen being returned to the reaction chamber by the pipe 70. A condenser 71 is fitted to the pipe 70 to prevent any loss of the starting-material. The catalyst is contained in a cartridge 26, provided with a flange which rests on a shelf

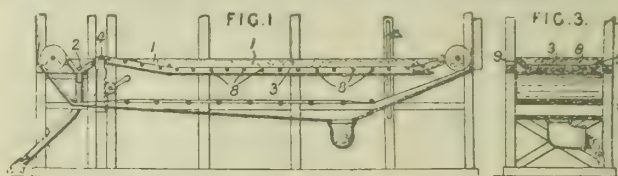


25 on the inner wall of the reaction chamber 10. As the top 11 of the reaction chamber is detachable, replacement of the cartridge 26 can readily be effected when the catalytic material becomes spent. Surrounding the reaction chamber are a number of electric heating coils 30, separately controlled by the switches 32. Each coil can be encased by heat-

insulating material, constructed in the form of semicylindrical sections 35 hinged together. The hydrogen is introduced into the mixing-chamber 13 from the reservoir 21, the pressure in which is maintained by a pump 22 automatically controlled by the pressure-valve 23. The material to be hydrogenised is forced into the chamber 13 by the pump 16, automatically controlled by the pressure-valve 18, and is vapourised by passage through a heater 17. The hydrogenised material falls from the condenser 51 into a vessel 53, and thence through a tube 54 fitted with a float-operated valve 55 to the tank 56. Some of the product may be diverted into a sampling tube 60 containing a hydrometer 61. A modification of the apparatus is described, in which the catalyst cartridge is withdrawn through the bottom of the reaction chamber, the heating of which is effected by an external steam-coil.

Washing Phosphates, Ores, Etc. C. Poupart, Seine-et-Oise, France. British Patent, 133,320. Convention date, June 20, 1917.

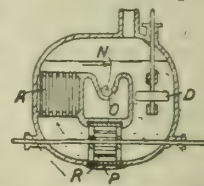
In an apparatus for separating phosphates or other ores or materials from fine matter or gangue of the kind comprising a number of vertically shaken travelling endless belts



on which the material is successively washed, each belt 3 comprises a portion 1 running on rollers 8, 9 so that its edges are upturned, and a discharge portion 2 running over straight rollers. A roller 4 between the two portions is vertically adjustable to vary the water level.

Evaporation and Crystallisation. Aktieskapet De Norske Saltverker, Bergen, Norway. British Patent, 132,787. Convention date, September 16, 1918.

Large crystals are obtained from solutions by ensuring the presence of comparatively large crystals in the zones of highest concentration. In one form of evaporating-apparatus comprising a tubular heater A over which the liquid is circulated upwards by a turbo-pump D, the large crystals settle out in a funnel N and are removed by a conveyor O, and the crystals of somewhat smaller dimensions remain in suspension and are circulated over the heating-surfaces. A rotating drum P with lifting-blades R may be used to restore any crystals that may be deposited to a state of suspension. Alternatively, the whole of the crystals may be deposited and removed from the apparatus, the large crystals being then separated, and the remaining crystals dropped into the evaporator immediately above the heating-surfaces. In another form of apparatus, the liquid is circulated downwards through the heater, and upwards through a separating chamber where the large crystals alone are allowed to deposit.



Purifying Liquids and Gases. P. H. A. Gaillet, Cysoing, Nord, France. British Patent, 133,971. Convention date, October 18, 1918.

Diaphragms built up of pyramidal surfaces are used in apparatus for separating impurities from liquids and gases—for example, for the purification of water, the removal of oil or water from steam, or of dust from coke-oven or blast-furnace gases. According to one method, a diaphragm element is formed by bending over the four corners of a square or rectangular metal sheet along lines parallel to the diagonals, the sheet itself being finally bent along one of its mid-lines. Elements so constructed, when arranged in rows along parallel horizontal supports and combined with another series on supports at right-angles to the first but at a slightly lower level, form a diaphragm of approximately pyramidal surfaces. Chambers through which the liquids or gases are passed are packed with these diaphragms. The diaphragms may be moulded or cast, and glass and porcelain are mentioned as possible materials.

MARKET REPORTS.

TAR AND AMMONIA PRODUCTS.

WEDNESDAY.

Benzole: London, 90%, 2s. to 2s. 1d.; North, 1s. 11d. to 2s.; 50%, 1s. 10d. to 1s. 11d.; North, 1s. 9d. to 1s. 10d., naked; pure, 2s. 9d. to 3s., naked at works. Carboic acid, crude, 60%, East and West Coast, nominally 2s. 3d. to 2s. 4d.; crystals, 39-40%, 10d. to 11d., f.o.b. Crude tar, London, 50s. to 55s.; Midlands, 50s.; North, 50s. per ton, ex works. Refined tar, 35s. per barrel. Pitch, 85s.; East Coast, 82s. 6d. to 85s.; f.o.b.; West Coast, 72s. 6d. to 75s. f.a.s. Solvent naphtha, naked, London, 90-190%, 2s. 5d.; North, 2s. 3d. to 2s. 4d.; 95-160%, naked, London, 2s. 9d. to 2s. 10d.; North, 2s. 8d. to 2s. 9d. Crude naphtha, naked, 30%, 9d.; North, 8d. to 8½d. Refined naphthalene, £18. to £22.; salts, £6. to £7. Toluol, naked, London, 2s. 6d.; North, 2s. 5d. Cresote, naked, London, 6½d.; North, 5½d. to 6d.; heavy oil, 6½d. Anthracene, 40-45%, 7d. per unit. Cresylic acid, 95%, 2s. 5d. to 2s. 6d.; 97-99%, 2s. 8d., ex works, London, and f.o.b. other ports. Sulphate of ammonia: home trade, December, £21., basis 24½%. Nitrate of soda, £22. 10s. to £22. 15s.

FERTILISER MATERIALS

LIVERPOOL, WEDNESDAY.

Nitrate of soda is very steady, the quotation on spot for 95-96% quality remaining at £20. 17s. 6d. per ton, net cash, prompt delivery. East Indian bone meal: There is no change to report in this market, the quotation for January-March shipment being £15. per ton, net cash, ex ship Liverpool, for 1½% ammonia and 52% phosphates. On spot Liverpool, holders ask £16. per ton, net cash, for 4½% and 25% quality. Mineral phosphates are without alteration, and values at present are only nominal. Dried blood is scarce, and full prices are being paid for any parcels offering, the value being about 35s. per unit of ammonia per ton.

LONDON METAL MARKET.

WEDNESDAY.

Copper: Standard brands, £104. 5s. to £104. 10s., cash; £105. 15s. to £106., three months; electrolytic, £115. to £118. Tin: Standard, £324. 5s. to £324. 10s., cash; £325. 15s. to £326., three months; Straits, £324. 10s.; English £323. to £324. Lead: Soft foreign, £44.; English, £44. 10s. Spelter, £54. 5s.; hard, £39. Antimony English regulus, 90%, £47 10s. Aluminium, £150. Nickel, £215., ex warehouse. Quicksilver, £24. Bismuth, 12s. 6d. Platinum, 502s. per oz. Wolfram, 32s. 6d. per unit.

SWANSEA MARKET REPORT.

WEDNESDAY.

Tinplate prices have advanced, and are very firm at 47s. per box, f.o.b. Copper more active at £104. 15s. per ton prompt, and £105. 15s. forward. Tin prices are more regular and steady at £315. cash, and £316. 10s. three months. Lead, £39. 12s. 6d. for Spanish, and £40. 10s. English. Spelter very active at £51. 10s. Antimony, English regulus, 90%, £47. 10s. Nickel in better inquiry at £215., including free delivery London or equal. Zinc sheets remain firm at £73. for English, and £68. for American, f.o.b. New York. Aluminium, £150. Quicksilver, £24. per bottle. Arsenic in moderate demand; white powdered £65. per ton, f.o.b. Sulphate of copper steady, with small export trade, at £41. 10s. per ton, f.o.b. Sulphate of ammonia steady at £21. prompt, and £22. forward. Nitrate of soda firm, with strong demand for export, at £21. 10s. to £22. 10s. per ton, f.o.b. Turpentine firm at £6. 19s. per cwt. net. Oxalic acid selling better at 1s. 3½d. per lb. Pitch has advanced to £3 12s. 6d. per ton, ex ship.

MANCHESTER CHEMICAL MARKET.

WEDNESDAY.

Owing to the approaching holiday and preparations for stocktaking, business generally has a quieter tone, but values all round are firmly maintained, and makers well engaged with orders. For resale lots of caustic soda, 70%, £27. is quoted. Refined bicarbonate of soda £11. to £11. 10s. per ton, and 58% alkali £15. 10s. per ton. Bleaching powder in short supply, and price steady at £17. per ton, softwood casks. Chlorate of soda easy at 5d. per lb. Potash 1s. per lb. Roasted saltcake firm at 70s. per ton, carriage paid. Soda crystals unchanged. Sulphate of copper continues quiet, and quotation nominal at £40. per ton, f.o.b. Liverpool. Nitrate of soda still scarce and dear at £62. per ton. Phosphate of soda £32. per ton. Commercial hyposulphite of soda, bags, £19. per ton. Concentrated sodium sulphide has advanced to £26. 10s., in casks, with only small supplies

offering. White powdered arsenic is unaltered in position or value. Yellow prussiate of potash firm for English make at 2s. 1d. per lb. Soda 1s. 1½d. per lb. Makers are well sold ahead for the latter article. Carbonate of potash steady at £105. per ton, basis 85%. Lead salts are higher: White acetate at £84. 10s.; brown £67.; and nitrate £60. per ton. English brown and grey acetate of lime are scarce, and quotations firm at £15. 10s. and £26. 10s. per ton respectively. Acetate of soda in fair request at £51. per ton delivered. Miscible naphtha 10s. 6d. per gallon. Commencing with the New Year, salammioniac prices have advanced to £95. and £90. for firsts and seconds respectively. Oxalic acid dull at 1s. 5d. per lb.

LIVERPOOL CHEMICAL MARKET.

WEDNESDAY.

The inquiry for chemicals was well maintained until the closing of markets and offices for the Christmas holidays. The business done was mainly on 1920 account, and is reported to have been on a fairly large scale. The demand on export account improved, but the shortage of facilities for railway transport and shipment have latterly impeded the movement of consignments in this branch of the trade. Bleaching powder has again been in moderately active demand, but has been in short supply. For the home trade, £17. per ton, f.o.r. or conveyance, in buyers' packages; and for export, £15. to £18. per ton, are the quotations. Chloride of calcium has had a slow sale, and is £8. to £10. per ton, in casks, f.o.r. Caustic soda continues to meet with a good inquiry and has been scarce. Prices are £24. per ton for 76%; £22. per ton for 70 to 72%, and £21. per ton for 60%. Nitrate of soda has sold more readily, and is £21. 10s. to £22. 10s. per ton. Saltcake has again been in very fair demand, and is £7. 15s. per ton, in casks, f.o.b. Soda crystals have been well inquired for, and are £5. 10s. per ton, in 2cwt. bags, f.o.r. at works. Bicarbonate of soda has been much in request, but has been in short supply. From £8. 5s. to £10. per ton, according to terms of delivery, are the quotations. Borax has been steadily called for. Ordinary is £39. per ton, and powdered, £40. per ton, in bags, less 3% for lots of not less than 50 tons. Ammonia alkali has met with an active inquiry, and is £6. 10s. to £6. 15s. per ton, f.o.r. Hyposulphite has been but little called for, and is £18. 10s. per ton for ordinary, and £22. per ton for pea crystals, in 1cwt. kegs. Sulphite of sodium has had a slow sale, and is £11. per ton for ordinary, and £16. to £18. per ton for pea crystals, in 1cwt. kegs. Sulphide of sodium has been in quietly steady demand, and is £23. per ton in barrels, and £24. per ton in drums. Prussiate of soda has been but little in request, and is 1s. 0½d. per lb. Bichromate of soda has sold rather more freely, and is 10½d. per lb. Phosphate of soda has had a somewhat freer inquiry, and is £30. per ton. Chlorate of potash has been quieter, and is 1s. to 1s. 1d. per lb. Permanganate of potash has moved but slowly, and is 3s. 6d. per lb. Sulphate of potash has been but little in request, and is £23. per ton. Carbonate of potash has sold rather more freely, and is £95. to £100. per ton, for 80 to 85%. Caustic potash has met with a rather brisk inquiry, and is £110. per ton. Nitrate of potash has been in very fair request, and is £60. to £62. per ton for refined, and £40. per ton for ordinary. Canadian potashes have been inactive. Montreal first quality are £200. to £220. per ton, and second quality £190. to £210. per ton. Bichromate of potash has been in fair demand, and is 1s. 6d. per lb. Yellow prussiate of potash has been steadily called for, and is 1s. 10d. to 2s. 1d. per lb. Salammioniac has been in very fair request, and is £90. per ton for first quality lump; £85. per ton for second quality, and £5. per ton extra for crushed. Sulphate of ammonia has been rather more inquired for, and is £21. 7s. 6d. for January, 1920; £21. 15s. for February, and £22. per ton for March to May, 1920. Carbonate of ammonia has again been in very fair demand, and is 7½d. per lb. Muriate of ammonia has been very quiet, and is £45. to £50. per ton. Magnesia has been in quietly steady demand. Carbonate is £2. 5s. per cwt., and sulphate £11. to £16. per ton, according to quality. Alum has been in good request, but has been scarce. Prices are, for home trade uses £18. 10s. per ton, and for export £18. 10s. to £19. 10s. per ton. Aluminoferric has had a very limited sale, and is £8. 10s. to £12. per ton, according to quality. Sulphate of alumina has moved but slowly, and is £12. to £17. per ton, according to grade. Sulphur has been in good request. In English sorts flowers are £32. per ton; roll is £28. per ton, and rock £22. per ton,

in bags, f.o.r. In Sicilian, flowers are £28. per ton; roll is £22. 10s. per ton, and rock £17. 15s. per ton. Cream of tartar has met with a steady inquiry, and is £12. 15s. to £13. per cwt. Tartaric acid has sold more freely, and is 3s. 2d. to 3s. 3d. per lb. Boracic acid has had a moderate sale, and is £72. per ton for crystals; £74. per ton for powdered, and £2. to £3. more in casks. Oxalic acid has had a rather slow sale, and is 1s. 2d. to 1s. 3d. per lb. Citric acid has sold more readily, and is 4s. 4d. per lb. White acetate of lead has had a quietly steady sale, and is £84. to £85. per ton. Arsenic has been in slightly better request, white powdered being £65. per ton. Sulphate of copper has received rather more attention, but the business done in it for home trade purposes has been very small. The price for the home trade is £41. per ton, and for export £41. to £42. per ton, less 5%, in casks, f.o.b. at Liverpool.

TYNE CHEMICAL REPORT.

TUESDAY.

Heavy chemicals are in good demand for both home and export trade, caustic soda and bleaching powder in particular being in strong request. Soda crystals locally are scarce and firm at £5. 10s. per ton, 2cwt. bags. Rock sulphur firm at £24. to £25. per ton.

The following prices are per ton net: Bleaching powder, softs and hards, £17.; caustic soda, 76-77%, £26.; do., 74-76%, £25.; do., 70%, £24.; do., 60%, £23.; recovered sulphur, 2cwt. bags, £25.; hyposulphite of soda, 5-7cwt. casks, £19.; do., 1cwt. kegs, £25.; sulphite of soda, 5-7cwt. casks, £12.; do., 1cwt. kegs, £20.; silicate of soda, 75° Tw., £9. 12s. 6d.; do., 100° Tw., £10.; do., 140° Tw., £10. 10s.; soda crystals, 2cwt. bags, £5. 10s.; sulphate of soda (salt-cake), £4. 10s.; pure white sulphate of alumina, £19. 10s.; blanc fixe, £22.; sulphide of sodium, crystals, £18.; do., refined concentrated solid, 60-62%, £25.

COALS.—Market is exceptionally firm, and with the prospect of short supply over the holidays very little new business is being transacted. The demand for home trade is enormous. To-day's export quotations, nominally: Best Northumbrian steam, 95s. to 100s. per ton; do., second qualities, 90s. to 92s. 6d.; Northumberland small coal, 75s. to 80s.; do., seconds, 70s. to 72s. 6d.; best Durham gas coals, 83s. to 85s.; do., seconds, 75s. to 77s. 6d.; Durham bunker coals, 70s. to 80s.; do., seconds, 65s. to 67s. 6d.; foundry coke, firm, 105s. to 110s.; gas coke, 105s. to 110s.

WEST OF SCOTLAND CHEMICALS.

GLASGOW, WEDNESDAY.

During the past week there has again been strong demand for all classes of heavy chemicals, and a feature of the market is the pronounced activity of both the home and the export trade. Prices, generally speaking, are showing considerable firming up, and some chemicals are to the short side as far as supply is concerned. As compared with the previous week, arsenic has advanced from £65. to £67. per ton; caustic soda from £27. to £27. 5s. per ton; cream of tartar from £12. to £12. 10s. per cwt.; salammmoniac (second lump) from £90. to £99.; and salammmoniac crystals from £70. to £72. Current prices (including the above-noted variations) are now as follows: Arsenic, £67. per ton, net, Glasgow; bicarbonate of soda, £10. 10s. and £12. 10s. per ton for 6-8 cwt. casks and 1cwt. kegs, net, Liverpool; boracic acid crystals, English refined, £72. for 2cwt. bags; and borax crystals, £39. for 2cwt. bags, carriage paid; caustic soda, white, 70-72%, £27. 5s. per ton, net, Glasgow; chlorate of potash, 1s. 2d. per lb., net, Glasgow; chlorate of soda, 8d. per lb., net, Glasgow; citric acid, 4s. 2d. per lb., 5%, Glasgow; cream of tartar, 98%, £12. 10s. per cwt., net, Glasgow; paraffin wax, U.K. deliveries, 125°, 6½d. to 6½d.; 121-3°, 5½d to 5½d.; 118-20°, 5d.; 110-12°, 4d. to 4½d.; and 98-102°, 4d. to 4½d.; salammmoniac, £95. and £99. per ton, net, any port, for first and second lump respectively; salammmoniac crystals, £72. per ton, net, Glasgow; saltpetre, £3. 4s. per cwt., net, Glasgow; tartaric acid, 3s. 3d. per lb., 5%, Glasgow.

Among the sea oils the demand is also well sustained, and the year is closing as far as this market is concerned sharply and strongly. Dealings in whale oils are well up to the average, and the quotations for two of the varieties (brown and black) have respectively advanced from 78s. to 80s. and from 77s. to 79s. Yellow is still unobtainable, and pale keeps to its newest level of 98s. Newfoundland cod is still attracting buyers at 82s.; pale seal continues to go into consumption at 98s.; while Menhaden is in the forefront at 82s.—all these quotations being appreciably higher than a month ago.

Conditions are unchanged in the coal trade, and the year is finishing with a strong demand both from industrial and domestic consumers. There are no particular features at the moment calling for special attention, and it is largely the old story of the demand being more than equal to the supply.

IMPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LIST OF CONTRACTIONS USED IN THE IMPORT AND EXPORT LIST.

Blns.	Balloons.	Cbys.	Carboys.	Gals., Gls.	Qty.	Quantity (otherwise undeclared).	gr.	Quarters.
Bls.	Bales.	Css. or Cs.	Cases.	or Glns.			lb.	Pounds.
Brls.	Barrels.	Cks.	Casks.	Hf. pps.	Gallons.			
Bgs.	Bags.	Chts.	Chests.	Hhds.	Half pipes.	Rults.		
Btls.	Bottles.	Cylds.	Cylinders.	Kgs.	Hogsheads.	Sks.	Runlets.	
Bdls.	Bundles.	Dms. Drs.	Drums.	Ozs.	Kegs.	Slbs.	Sacks.	
Bskts.	Baskets.	Djns.	Demijohns.	Pks.	Ounces.	Tcs.	Slabs.	
Bxs.	Boxes.	Fkns.	Firkins.	Pns. Puns.	Packages.	t. c.	Tierces.	
					Puncheons.		Tons. Cwts.	

Note.—There is no information available as to the net weights of the various items, nor do we recognise in them any standard.

BRISTOL.

Publication of Official Returns Suspended.

GLASGOW.

Week ending December 20.

BARIUM SULPHATE—
Antwerp, 150 bgs.
BORATE—
New Orleans, 17,000 cks.
CALCIUM CARBIDE—
Odda, 21,997 drms.
CYANAMIDE—
Odda, 250 bgs., 100 drms.
DYESTUFFS—
Chestnut Extract
Genoa, 24 brls.
Myrabolans
Bombay, 3,700 bgs.
GLUE—
Genoa, 120 brls.
PHOSPHATE ROCK—
Boca Grande, 7,150 t.

TAR—

Gothenburg, 11 brls.

TAR (WOOD)—

Gothenburg, 200 brls.

ULTRAMARINE BLUE—

Antwerp, 4 cks.

GOOLE.

Week ending December 20.

CARBON—

Amsterdam, 350 bgs.

PHOSPHATE OF LIME—

Antwerp, 2,128 bgs.

PITCH—

Rotterdam, 24 cks.

GRANGEMOUTH.

Week ending December 20.

DYESTUFFS—

Aniline Colour

Antwerp, 285 cks.

Dyewood

Antwerp, 4 cks.

TANNIC ACID—

Antwerp, 7 cks.

GRIMSBY.

Week ending December 20.

DYESTUFFS—

Dyewood Extract

Antwerp, 6 cks.

ROSIN—

Hermosand, 477 brls.

HULL.

Week ending December 20.

ACETIC ACID—

New York, 444 brls.

BARYTES—

Antwerp, 100 bgs.; Rotterdam, 136 cks.

CRYOLITE

Copenhagen, 900 bgs.

DYESTUFFS—

Logwood Extract

New York, 75 brls.

Myrabolans

Bombay, 992 bgs.

FORMIC ACID—

Rotterdam, 195 crbys.

FULLER'S EARTH—

Rotterdam, 3 bgs.

HEMATINE CRYSTALS—

New York, 25 brls.

LITHOPONE—

Antwerp, 40 brls.; Rotterdam, 391 cks.

MANGANESE ORE—

Bombay, 2,000 t.

PARAFFIN SCALE—

New York, 665 brls.

PYRALIN—

New York, 103 cs.

RESORCIN—

New York, 18 brls.

SODIUM SILICATE—

New York, 40 kgs.

LEITH.

Week ending December 20.

NIL.

LIVERPOOL.

Week ending December 20.

ARSENIC—

Hamburg, 85 cks.

BARIUM SULPHATE—
Antwerp, 300 brls.

BEEWAX—
Alexandria, 32 bgs.

BORATE OF LIME—
Mejillones, 3,982 bgs.

CALCIUM ACETATE—
Boston, 3,623 sks.

CARNAUBA WAX—
Pernambuco, 12 bgs.

COPPER PRECIPITATE—
Huelva, 158 bgs.

DYESTUFFS—
Cutch
Rangoon, 200 bxs.
Sumac
Palermo, 250 bgs.

GLUE—
Boston, 125 bgs.

PYRITES—
Huelva, 3,790 t.

SOAP—
Boston, 153 cs.; Gibraltar, 315 bxs.; Marseilles, 20 cs., 20 cks.; W.C. Africa, 3 brls.

SODIUM NITRATE—
Mejillones, 10,307 bgs.

STEARINE—
St. John's, N.F., a qty.

SULPHUR—
Catania, 4,856 bgs., 7 cks., 168 brls.

TALLOW—
Shanghai, 765 bgs.

WOOD OIL—
Hong Kong, 2,410 cs.; Shanghai, 201 brls.

LONDON.

Week ending December 20.

ACETIC ACID—
Canada, 938 pkgs.

ACID (otherwise undescribed)—
France, 10 t.

AMIDOPYRINE—
Belgium, £119.

AMMONIUM NITRATE—
Norway, 18 t.

ARSENIC—
Belgium, 2 t.; Germany, 10 t.; Japan, 10 t.

ANTHRACENE—
Belgium, £44.

BARYTES—
Belgium, 300 bgs.

BEEWAX—
British India, 316 pkgs.

CALCIUM LACTATE—
Canada, 8 t.

CAMPHOR—
China, 50 cs.; France, 20 cs.

CARBON BLACK—
U.S.A., 212 cs.

CAUSTIC POTASH—
Holland, 167 drms.

CITRATE OF LIME—
British Guiana, £65.; Italy, £600.

COAL PRODUCTS—
Naphthalene
U.S.A., £300.

CREAM OF TARTAR—
Italy, 120 pkgs.

DYESTUFFS—
Aniline Dye
Switzerland, 33 pkgs.
Argols
Italy, 200 bgs.
Dye Wood
Jamaica, 23 t.
Gambier
Straits, 2,210 cs.
Logwood Extract
U.S.A., 40 bxs.
Myrobalans
British India, 2,366 pkts., 212 bgs.
Sumac
Italy, 1,100 bgs.
Sumac Extract
Switzerland, 23 cks.
Tanner's Bark
Natal, 294 t.
Valonia
Turkey, 40 t.

FISH OIL—
Japan, 200 cs.

GELATINE—
Belgium, £11,690.; France, £2,361.; Holland, £1,320.

GLUE—
Belgium, £1,0 0.; Denmark, £30.; Holland, £19.; Spain, £650.; U.S.A., £2,778.

HEMATINE CRYSTALS—
U.S.A., 10 brls.

HYDROQUINONE—
U.S.A., £560.

IRON OXIDE—
France, 3 cs.

LACTIC ACID—
Canada, 9 t. 10 c.

LITHOPONE—
Holland, 1,000 cks.

MERCURY BICHLORIDE—
Italy, £1,750.

OGHRE—
France, 89 cks.

PARAFFIN WAX—
U.S.A., 729 t. 10 c.

PHOSPHATE—
Belgium, 145 t.; Cuba, 3,850 t.

PHOSPHORIC ACID—
Canada, £92.

PLUMBAGO—
Ceylon, 204 brls.; Japan, 151 cks.; U.S.A., 70 brls., 17 cs.

POTASSIUM BROMIDE—
Holland, £75.; Switzerland, 7 cs.

POTASSIUM IODIDE—
Japan, 20 cs.

QUININE—
Holland, 5,460 ozs.

ROSIN—
Denmark, 2 cs.; France, 100 cks.; Sweden, 28 brls.

SHEEP DIP—
U.S.A., £8.

SOAP—
Belgium, £5.; Germany, £90.; Holland, £2,020.; U.S.A., £14.

SODA—
Norway, 3 t. 4 c.; U.S.A., 5 c.

SPERMACEETI WAX—
Japan, 140 cs.

STEARINE—
Holland, 41 bgs.

TALLOW—
Belgium, 132 t. 10 c.; China, 68 t. 18 c.; N.S.W., 107 t. 12 c.; N.Z., 635 t. 13 c.; Uruguay, 216 t. 12 c.

TAR—
N. Russia, 200 brls.

TARTARIC ACID—
Italy, 50 cks.

VEGETABLE WAX—
Japan, 98 bgs.

WAX—
U.S.A., 45 kgs.

WHITE LEAD—
Belgium, 113 cks., 57 brls.

WOOD OIL—
China, 90 cks., 686 pkgs., 327 brls.

ZINC OXIDE—
Belgium, 400 brls.

MANCHESTER.

Week ending December 20.

ANTIMONY SALT—
Rouen, 9 pkgs.

CARBIDE—
Montreal, 1,000 drms.

CARBONATE (otherwise undescribed)—
New York, 1 kg.

MINERAL WAX—
New York, 53 bgs.

PHOSPHORUS—
Montreal, 500 cs.

POTASH—
Montreal, 3 brls.

PTHALIC ANHYDRIDE—
New York, 10 brls.

ROSIN—
Gothenburg, 187 cks.

SOAP—
Jaffa, 2 cs.; New York, 26 crts.

SODIUM CHLORATE—
Gothenburg, 200 cs.

TALLOW—
Wanganui, 240 cks.; Wellington, 70 cks.

TARTAR EMETIC—
New York, 66 cks.; Rouen, 19 cks.

MIDDLESBROUGH.

Week ending December 20.

NIL.

NEWCASTLE-ON-TYNE

Week ending December 20.

MAGNESITE—
Christiania, 608 bgs.

POTASH—
Rotterdam, 1,830 bgs.

SODIUM PEROXIDE—
Christiania, 50 cs.

N. & S. SHIELDS.

Week ending December 20.

NIL.

SWANSEA.

Week ending December 20.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

BRISTOL.

Publication of Official Returns Suspended.

GLASGOW.

Week ending December 20.

AMMONIUM CARBONATE—
Cape Town, 2 c.; Calcutta, 10 c.; Lisbon, 1 t.; Rangoon, 18 c.

CHEMICALS (otherwise undescribed)
Algoa Bay, 6 pkgs.; Auckland, 250 pkgs.; Bombay, 7 pkgs.; Genoa, 142 pkgs.; Huelva, 4 pkgs.; Lyttleton, 17 pkgs.; Leghorn, 154 pkgs.; Lisbon, 23 pkgs.; Mossel Bay, 5 pkgs.; Rangoon, 100 pkgs.; St. John, N.B., 320 pkgs.; Wellington, 31 pkgs.

COAL PRODUCTS (otherwise undes.)
Bombay, £563.; Cape Town, £145.; Genoa, £186.; L'Orient, £3,193.; Lisbon, £294.; Pt. Sudan, £87.; Rangoon, £403.

DEXTRENE—
Bombay, 1 t.

DISINFECTANTS (otherwise undes.)
Algoa Bay, £56.; Cape Town, £507.; Calcutta, £170.

DYESTUFFS (otherwise undescribed)
Lisbon, £105.

DYESTUFFS—
Logwood Extract
Dunedin, £853.

PARAFFIN WAX—
Genoa, 87 t. 4 c.; Leghorn, 200 bgs.

PITCH (STOCKHOLM)—
L'Orient, 404 t. 8 c.

SHEEP DIP—
Auckland, £306.; Cape Town, £459.; Algoa Bay, £1,255.; Callao, £3,275.; East London, £1,729.; Dunedin, £375.; Lyttleton, £1,807.; Mossel Bay, £53.; Punta Arenas, £8,777.; Santa Cruz, £2,964.; Wellington, £1,212

SOAP—
Cape Town, 3 bxs.; Auckland, 40 drms.; Rangoon, 260 bxs.; Valparaiso, 30 bxs.

SODA ASH—
Bombay, 1 t.; Genoa, 1,410 bgs.; Lisbon, 1 t.

SODIUM BICHRIMATE—
Lisbon, 8 cks.

SODIUM CHROMATE—
Bombay, 6 cks.

STEARINE—
Lisbon, 4 c.

SULPHURIC ACID—
Aden, 10 c.; Puerto Mexico, 1,429 drms.

TALLOW—
Pt. Sudan, 1 t. 2 c.

TAR (STOCKHOLM)—
Cape Town, £42.

TARTARIC ACID—
Cape Town, 11 c.

GOOLE.

Week ending December 20.

NIL.

GRANGEMOUTH.

Week ending December 20.

CHEMICALS (otherwise undescribed)
Rotterdam, £290.

CHROME ORE—
Rotterdam, 99 t.

COAL PRODUCTS—
Naphtha
Nantes, 2,534 galls.

DYESTUFFS—
Chestnut Extract
Nantes, 300 bgs.

FATTY ACID—
Nantes, 10 t.

OGHRE—
Rotterdam, 4 t.

PITCH—
Nantes, 259 t.; Rotterdam, 502 t.

GRIMSBY.

Week ending December 20.

NIL.

HULL.

Week ending December 16.

ALUM—
Mantyluoto, 3 cks.

AMMONIA—
Lisbon, 50 bgs., 20 kgs.

ANTIMONY—
Genoa, 16 cks.; Helsingfors, 9 cks.

BORAX—
Antwerp, 1 cs., 4 cts.; Rotterdam, 290 bgs.

CHEMICALS (otherwise undescribed)
Amsterdam, 750 bgs.; Antwerp, 140 cs., 1 ck., 40 bxs. 6 drms.;

CHEMICALS (*otherwise undescribed*)
 Catania, 30 drms.; Christiania, 11 cs., 3 drms., 13 cks., 50 kgs., 726 slbs.; Christiansund, 8 drms., 918 slbs., 8 cks.; Genoa, 614 drms., 612 bgs., 260 kgs.; Gothenburg, 15 cks., 4 kgs.; Helsingfors, 1 cs., 5 brls., 209 cks., 1 sk., 349 drms.; Leghorn, 50 kgs.; Melbourne Wharf, 40 kgs., 20 drms.; Malmö, 5 cks.; Novorossisk, 500 drms.; Naples, 143 drms.; Raumo, 6 cs.; Rotterdam, 104 cks., 260 bgs.; Sydney, 36 cks.

COAL PRODUCTS

Benzole
 Rotterdam, 59 drms.
 Carbolle Acid
 Helsingfors, 12 brls.
 Creosote
 Genoa, 180 cks.

DISINFECTANTS (*otherwise undes.*)
 Antwerp, 108 drms.; Sydney, 51 cs.

DYESTUFFS (*otherwise undescribed*)
 Antwerp, 1 cs.

FERRO MANGANESE—
 Rotterdam, 150 t.

GLUE

Antwerp, 20 brls.; Christiania, 100 sks.; Rotterdam, 60 bgs.

MINERAL WHITE—
 Rotterdam, 6 cks.

PARAFFIN WAX—
 Genoa, 16 brls.; Helsingfors, 510 bgs.

PITCH

Antwerp, 2 brls.; Leghorn, 4 cs.; Naples, 4 cs.; Piraeus, 175 brls.; Rotterdam, 430 t.

SALT

Amsterdam, 250 cs.; Copenhagen, 30 c.

SHEEP DIP

Christiania, 1 cs., 7 cks., 20 cts.

SOAP

Antwerp, 353 bxs.; Genoa, 10 cs.; Gothenburg, 10 cs.; Helsingfors, 1,510 cs.; Palermo, 5 cs.

STEARINE

Antwerp, 56 bgs.

TAR

Amsterdam, 10 brls.; Antwerp, 6 kgs.; Christiania, 60 brls.

TURPENTINE

Rotterdam, 70 brls.

WAX

Helsingfors, 1 cs.

LEITH.

Week ending December 20.

ALUM

Faroe Islands, 2 c., £15.

AMMONIUM CARBONATE

Aalesund, 15 c., £48.; Bergen, 2 t. 18 c., £226.; Bilbao, 1 t. 3 c., £65.; Trondhjem, 3 t., £202.

AMMONIUM SULPHATE

Kobe, 595 t., £11,900.

BARIIUM BINOXIDE

Montreal, 5 t. 4 c., £593.

BORAX

Amsterdam, 3 t., £120.; Gothenburg, 9 t. 18 c., £390.; Rotterdam, 1 t. 12 c., £66.

BORIC ACID

Dunkirk, 20 t., £1,480.; Gothenburg, 4 t. 10 c., £372.; Rotterdam, 11 t. 9 c., £777.

CALCIUM CHLORIDE

Iceland, 1 t. 1 c., £12.

CALCIUM PHOSPHATE

Bergen, 9 c., £25.

CARBIDE

Faroe Islands, 2 c., £3.

CAUSTIC SODA

Amsterdam, 25 t. 3 c., £485.

COAL PRODUCTS

 (*otherwise undes.*)

Antwerp, 1 t. 18 c., £33.; Gothenburg, £300.

COAL PRODUCTS

Creosote Oil
 New York, 21 t., £175.

COAL PRODUCTS

Cresylic Acid
 New York, 33 t. 8 c., £1,250.

Pitch

Faroe Islands, £17.; Gothenburg, £260.

CREAM OF TARTAR

Faroe Islands, 6 c., £71.; Rotterdam, 2 c., £259.; Stavanger, 1 t., £50.

GLYCERINE

Iceland, 1 c., £8.

IODINE

Copenhagen, 1 t., £1,795.

MAGNESIA

Montreal, 4 t., £170.; Portland, Maine, 6 t., £397.

MAGNESITE

Rouen, 5 t., £143.

MAGNESIUM OXIDE

Amsterdam, 2 t. 19 c., £255.; Rouen, 10 t., £370.

POTASSIUM BICARBONATE

Copenhagen, 4 t. 6 c., £698.; Gothenburg, 3 t. 17 c., £565.; Rotterdam, 20 t. 8 c., £230.; Rouen, 5 t. 2 c., £812.

POTASSIUM NITRATE

Iceland, 1 c., £3.

SODA

Faroe Islands, 4 c., £29.

SODA ASH

Gothenburg, 45 t., £340.; Rotterdam, 13 t.

SODIUM BICARBONATE

Faroe Islands, 2 c., £20.; Rotterdam, 6 t., £80.

SODIUM BICHRONATE

Rotterdam, 2 t.; Rouen, 58 t. 4 c., £3,386.

SODIUM CHROMATE

Gothenburg, 1 t. 1 c., £92.

SODIUM SULPHITE

Iceland, 1 c., £1.

SULPHUR

Iceland, 1 c.

SULPHUR (ROCK)

Faroe Islands, 10 lbs.

TARTARIC ACID

Rotterdam, 1 c., £17.

LIVERPOOL.

Week ending December 18.

ACETIC ACID

Auckland, 1 c., £10.; Genoa, 20 t., £1,405.; Malta, 3 c., £36.; Secondee, 6 c., £18.

ACETO SALICYLIC ACID

Stockholm, 1 c., £23.

ACID

 (*otherwise undescribed*)—

Para, 8 c., £25.

ALUM

Bilbao, 1 t. 2 c., £54.; Bordeaux, 10 t., £170.; Constantinople, 1 c., £10.; Corinto, 1 c., £2.; Galatz, 5 t. 1 c., £89.; Kano, 2 c., £6.; Madras, 10 t. 14 c., £155.; Oporto, 4 c., £136.; Piraeus, 1 t. 9 c., £26.; Patras, 2 t. 9 c., £53.; Porto Alegre, 1 t., £22.; Salonica, 5 t., £92.; Smyrna, 6 c., £12.; Tampico, 8 c., £12.; Wellington, 11 c., £11.

ALUMINA SULPHATE

Antwerp, 25 t. 16 c., £312.; Amsterdam, 25 t., £275.; Barcelona, 12 t. 19 c., £221.; Bombay, 18 t. 18 c., £249.; Calcutta, 9 t. 19 c., £140.; Bilbao, 25 t., £450.; Pasages, 10 t., £148.

ALUMINO FERRIC

Wellington, 10 c., £5.

AMMONIA

Accra, 3 c., £21.

AMMONIUM CARBONATE

Barcelona, 1 t., £69.; Bilbao, 1 t., £54.; Bahia, 18 c., £96.; Calcutta, 10 c., £35.; Genoa, 24 t. 11 c., £1,324.; Kobe, 10 t., £585.; Leghorn, 2 t. 19 c., £180.; Natal, 2 c., £7.; New York, 3 t. 15 c., £224.; Ovalle, 2 c., £10.; Piraeus, 11 t. 8 c., £742.; Smyrna, 10 c., £34.; Sao Paulo, 9 c., £39.

AMMONIUM MURIATE

Alexandria, 1 t. 3 c., £72.; Antwerp, 4 t. 18 c., £269.; Barcelona, 11 t. 9 c., £630.; Calcutta, 2 t. 10 c., £116.; Constantinople, 10 t. 16 c., £701.; Lisbon, 2 t., £102.; Natal, 1 c., £2.; New York, 26 t. 12 c., £1,202.; Philadelphia, 19 t. 16 c., £832.; Patras, 2 t. 4 c., £102.; Stamboul, 7 t. 9 c., £473.

AMMONIUM NITRATE

James Is., 83 t. 18 c., £2,310.

ANTIMONY SULPHIDE

Bordeaux, 3 t. 5 c., £325.; Copenhagen, 2 c., £10.; Rio de Janeiro, 3 c., £16.; Warsaw, 2 c., £40.

ARSENIC

Bahia, 1 t. 10 c., £204.; Karachi, 9 t., £594.; Lisbon, 10 c., £34.

ARSENIC ACID

Rouen, 1 t. 10 c., £152.

BARIIUM CHLORIDE

Galatz, 10 t., £140.; Valencia, 2 t. 13 c., £56.; Vigo, 5 c., £37.

BLEACHING POWDER

Antofagasta, 2 t. 10 c., £35.; Barcelona, 15 t. 2 c., £214.; Calcutta, 29 t. 9 c., £397.; Cadiz, 1 t. 1 c., £16.; Genoa, 1 t., £15.; Monte Video, 10 t. 5 c., £150.; Nantes, 36 t. 17 c., £433.; Patras, 1 t. 10 c., £34.; Rouen, 10 t. 10 c., £125.; Valencia, 10 t. 1 c., £148.; Valparaiso, 3 t. 15 c., £46.; Vigo, 10 t. 9 c., £166.

BORAX

Braila, 1 qr., £1.; Constantinople, 2 t. 9 c., £125.; Duala, 1 c., £9.; Galatz, 3 t., £150.; Havre, 2 t. 10 c., £160.; Secondee, 15 c., £75.; Stamboul, 1 t., £52.; Warsaw, 3 t. 3 c., £126.

BORIC ACID

Auckland, 5 c., £21.

CALCIUM CARBIDE

Opobo, 2 c., £7.

CALCIUM CARBONATE

Cape Coast Castle, 6 c., £2.; Freetown, 2 c., £4.; Kaduna, 2 c., £6.

CALCIUM CHLORIDE

Buenos Ayres, 26 t. 17 c., £184.; Genoa, 9 t. 7 c., £60.; Helsingfors, 5 t. 1 c., £35.; Naples, 4 t. 1 c., £40.; Rangoon, 4 t. 4 c.; Zarate, 10 t., £84.

CAUSTIC SODA

Adelaide, 20 pkgs.; Auckland, 32 pkgs.; Bahia, 250 drms.; Bari, 533 drms.; Batoum, 65 drms.; Brisbane, 30 drms.; Campinas, 50 pkgs.; Ceara, 57 pkgs.; Christiania, 5 pkgs.; Christchurch, 10 pkgs.; Darien, 105 pkgs.; Durban, 36 drms.; Florianopolis, 175 pkgs.; Genoa, 326 drms.; Kobe, 84 pkgs.; La Guaira, 69 pkgs.; Leghorn, 70 pkgs.; Lisbon, 126 pkgs.; Manaoas, 11 pkgs.; Melbourne, 393 drms.; Naples, 78 drms.; Napier, 17 pkgs.; Piraeus, 200 drms.; Porto Alegre, 330 drms.; Rio de Janeiro, 480 drms.; Rangoon, 40 drms.; Pt. Said, 10 drms.; Patras, 15 drms.; Rouen, 61 drms.; Salonica, 210 drms.; Stockholm, 56 drms.; Smyrna, 19 drms.; Timaru, 10 drms.; Yokohama, 616 drms.; Volo, 8 drms.

CHEMICALS

 (*otherwise undescribed*)

Auckland, 5 c., £10.; Naples, 25 t., £416.; Rio de Janeiro, 2 t. 14 c., £107.

CHINA CLAY

Calcutta, 80 t.

CITRIC ACID

Odessa, 1 c., £26.; Valparaiso, 1 c., £32.; Warsaw, 1 t., £500.

COAL PRODUCTS

Carbolle Acid
 Buenos Ayres, 2 c., £14.; Durban, 2 c., £8.; Genoa, 1 t., £55.; Kobe, 10 t. 3 c., £520.; Lodz, 15 t. 3 c., £5,362.; Natal, 1 c., £4.; Piraeus, 2 c., £15.; Singapore, 8 c., £13.; Toronto, 18 c., £86.; Volo, 3 c., £3.

COAH PRODUCTS

Creosote

Antwerp, 2 t. 7 c., £90.; Buenos Ayres, 14 t. 4 c., £231.; San Francisco, 2 t., £50.

Naphthalene

Accra, 1 c., £4.; Djibante, 10 t., £185.; Lagos, 5 t. 19 c., £126.

Tar

Accra, 3 t. 18 c., £67.; Adjuah, 8 c., £13.; Burutu, 2 t., £18.; Bathurst, 2 t. 9 c., £29.; Cotonon, 2,000 galls., 5 c., £111.; Lome, 4 t., £36.; Monrovia, 4 c., £5.; Sapele, 4 t. 1 c., £10.; Saltpond, 11 c., £6.; Singapore, 8 c., £38.; Sierra Leone, 10 c., £12.; Warri, 1 t. 2 c., £14.

COPPER SULPHATE

Algiers, 146 t., £584.; Bordeaux, 5,184 t., £30,304.; Buenos Ayres, 10 c., £25.; Bombay, 18 t., £735.; Delagoa Bay, 3 c., £6.; Karachi, 2 t. 10 c., £110.; Lagos, 10 c., £20.; Madras, 2 t. 12 c., £584.; Piraeus, 4 t., £162.; Syria, 1 t., £41.

COPPERAS

Amritsar, 12 t., £108.; Bombay, 25 t. 3 c., £225.; Karachi, 49 t. 18 c., £158.; Natal, 1 t., £10.; Salonica, 2 t., £19.

CREAM OF TARTAR

Bombay, 1 t. 1 c., £262.; Kobe, 2 t., £421.; Valparaiso, 1 c., £15.

DISINFECTANTS

 (*otherwise undes.*)

Accra, 5 c., £20.; Barcelona, 12 c., £39.; Bombay, 10 t. 9 c., £122.; Bilbao, 6 c., £52.; Benguella, 1 c., £4.; Casablanca, 1 t. 15 c., £29.; Colombo, 4 t. 14 c., £182.; Dunedin, 3 t. 4 c., £491.; Durban, 1 qr., £1.; Iddo, 18 c., £31.; Lisbon, 1 t., £274.; Lyttleton, 1 t. 18 c., £116.; Lome, 5 c., £25.; Mombasa, 7 c., £15.; Opobo, 12 lbs., £1.; Piraeus, 2 c., £20.; Pt. Harcourt, 14 c., £30.; Rome, 5 c., £32.; Sydney, 5 t., £95.; Sierra Leone, 2 qrs., £30.; Sao Paulo, 2 c., £5.; Valparaiso, 9 c., £25.

DYESTUFFS

 (*otherwise undescribed*)

Alexandria, 21 t. 17 c., £6,616.; Antwerp, 6 t. 4 c., £2,759.; Barcelona, 61 t. 14 c., £12,885.; Bombay, 13 t. 9 c., £6,396.; Bilbao, 2 t. 1 c., £1,720.; Boston, 18 t. 6 c., £13,056.; Constantinople, 1 t. 11 c., £248.; Genoa, 1 t., £336.; Guimarcies, 1 t. 11 c., £822.; Halifax, 3 t. 16 c., £1,137.; Havre, 2 t. 17 c., £806.; Helsingfors, 1 c., £47.; Kobe, 14 t. 11 c., £4,505.; Lisbon, 1 t. 13 c., £252.; Lodz, 10 t., £2,000.; Montreal, 3 t. 14 c., £651.; Malaga, 22 lbs., £9.; Madras, 1 t. 3 c., £283.; Monte Video, 4 c., £90.; Natal, 1 c., £20.; New York, 5 t. 1 c., £974.; Oporto, 1 t., £151.; Osaka, 5 t., £1,750.; Patras, 1 t. 5 c., £130.; Rio de Janeiro, 2 t. 18 c., £1,150.; Smyrna, 15 c., £125.; St. John, N.B., 14 t., £3,691.; Shanghai, 7 t. 14 c., £1,605.; Tokio, 1 t., £1,008.; Valencia, 2 c., £40.; Valparaiso, 1 c., £25.

FERRO MANGANESE

Baltimore, 437 t.; Rotterdam, 5 t.; San Francisco, 39 t.

GLUE

Auckland, 35 pkgs.

GLUE, SIZE, AND GELATINE

Barcelona, 40 pkgs.; Barranquilla, 1 pkg.; Kingston, 4 pkgs.; Nassau, 1 pkg.; Oporto, 12 pkgs.; Shanghai, 42 pkgs.; Tetuan, 1 pkg.; Tientsin, 84 pkgs.; Yokohama, 1 pkg.

GLYCERINE

Valparaiso, 2 c., £20.

HEMATINE CRYSTALS

Rotterdam, 6 c., £80.

HYDROCHLORIC ACID

Demerara, 2 c., £2.

IODELITE

Singapore, 3 t. 8 c., £83.

IRON SULPHATE

Patras, 8 t. 17 c., £58.

LACTIC ACID

Rouen, 10 c., £65.

LEAD ACETATE

Smyrna, 18 c., £79.

MAGNESITE (CALCINED)

Lisbon, 5 t., £130.

MAGNESIUM CARBONATE

Lisbon, 5 c., £18.

MAGNESIUM CHLORIDE

Bombay, 1 t. 16 c., £36.; Hong Kong, 6 c., £8.; Porto Alegre, 1 t., £21.; Santos, 2 t. 17 c., £51.

MAGNESIUM SULPHATE

Abonema, 8 c., £21.; Antwerp, 10 t., £105.; Bombay, 8 c., £14.; Bahia, 1 t., £30.; Galatz, 9 t. 18 c. £252.; Keforidua, 1 c., £5.; Lagos, 1 c., £3.; Madras, 4 c., £9.; Rouen, 60 t., £650.; Sierra Leone, 1 c., £5.; Tumaco, 2 c., £15.; Valparaiso, 2 t. 5 c., £32.

MANGANESE

Adelaide, 1 t.; Antofagasta, 3 t.

NICKEL SULPHATE

Bilbao, 10 t., £25.; Rouen, 2 t., £120.; Stockholm, 1 t. 5 c., £74.

NITRIC ACID

Auckland, 2 c., £14.; Demerara, £1.; Natal, 2 c., £45.

OXALIC ACID

Odessa, 2 c., £25.; Valparaiso, 1 c., £10.

PARAFFIN WAX

Trieste, 266 bgs.

PHOSPHORIC ACID

Boston, 5 c., £84.

PITCH

Antwerp, 9 c., £5.; Burutu, 1 t. 2 c., £13.; Punta Arenas, 5 c., £12.; Taltal, 3 t. 9 c., £72.; Warri, 12 c., £6.; Yokohama, 15 c., £11.

POTASH AND ALUM CHROME

Barcelona, 3 t. 16 c., £394.; Oporto, 1 t., £100.

POTASSIUM BICHRONATE

Antwerp, 15 c., £73.; Constantinople, 1 t. 16 c., £282.; Galatz, 3 t., £9.; Oporto, 12 c., £47.; Smyrna, 19 c., £155.; Stamboul, 10 c., £78.

POTASSIUM CARBONATE

Lome, 9 c., £12.

POTASSIUM CHLORIDE

Patras, 8 c., £48.; Vigo, 2 t., £93.

POTASSIUM PERMANGANATE

Lisbon, 12 c., £10.; Oporto, 1 c., £28.; Stockholm, 5 c., £156.

POTASSIUM PRUSSATE

Calcutta, 19 c., £195.; Lisbon, 12 c., £10.; Rio de Janeiro, £20.

POTASSIUM SULPHATE

Las Palmas, 5 t. 14 c., £234.; Orata, 7 t. 6 c., £300.; Teneriffe, 37 t., £1,516.

PYRIDINE

Durban, 10 c., £23.

SALAMMONIAC

Auckland, 2 c., £8.; Constantinople, 8 c., £27.; Genoa, 6 t., £329.; Karachi, 2 t. 5 c., £162.; Melbourne, 5 c., £19.; New York, 10 t. 6 c., £463.; Piraeus, 2 t., £153.; Rangoon, 1 t. 1 c., £74.; Rouen, 2 t. 11 c., £188.; Smyrna, 10 c., £40.; Tangiers, 3 c., £11.; Wellington, 4 c., £17.

SALICYLIC ACID

Genoa, 5 c., £60.; Lisbon, 5 c., £35.; Odessa, 1 c., £76.; Oporto, 2 c., £15.

SALT

Bathurst, 2 t.; Burutu, 30 t.; Calabar, 89 t.; Grand Bassa, 9 t.; Koko, 9 t.; New Orleans, 190 t.; Port of Spain, 50 t.; Sapele, 13 t. 7 c.

SALTCAKE

Barcelona, 50 pkgs.

SALTPETRE

Freetown, 2 c., £10.; Oporto, 5 t., £152.; Sherbro, 2 c., £9.; Trinidad, 1 c., £5.; Tumaco, 6 c., £17.

SHEEP DIP

Barranquilla, 5 c., £19.; Buenos Ayres, 5 t. 16 c., £225.; Bahal, 2 t. 10 c., £221.; Curacao, 8 c., £29.; Delagoa Bay, 11 t. 12 c., £485.

SHEEP DIP

Durban, 13 t. 17 c., £643.

Montreal, 4 c., £10.

Pasto, 6 c., £17.

SOAP

Abidjan, Bassam, 50 bxs.; Aboisso, 12 bxs.; Acera, 2,291 bxs.; Alexandria, 6 bxs.; Algiers, 2 bxs.; Amboina, 350 bxs.; Amoenang, 200 bxs.; Antigua, 2 bxs.; Antwerp, 30,294 bxs.; Athens, 300 bxs.; Axim, 100 bxs.; Bangkok, 1,502 bxs.; Barbados, 1,261 bxs.; Barranquilla, 84 bxs.; Burutu, 85 bxs.; Bathurst, 321 bxs.; Belawan, 250 bxs.; Bombay, 50 bxs.; Braila, 42 bxs.; Callao, 335 bxs.; Calabar, 1,405 bxs.; Calcutta, 5 bxs.; Chama, 150 bxs.; Canea, 20 bxs.; Champerico, 1 b.; Cape Coast, 150 bxs.; Cartagena, 21 bxs.; Casablanca, 675 bxs.; Catania, 79 bxs.; Cayenne, 750 bxs.; Chittagong, 15 bxs.; Christiantia, 5,317 bxs.; Cochín, 10 bxs.; Constantinople, 420 bxs.; Colombo, 351 bxs.; Coquimbo, 3 bxs.; Cotonou, 440 bxs.; Dakar, 25 bxs.; Demerara, 332 bxs.; Djambi, 100 bxs.; Dominica, 20 bxs.; Dongala, 100 bxs.; Duala, 328 bxs.; Dunedin, 20 bxs.; Dunkirk, 120 bxs.; Durban, 407 bxs.; Eket, 50 bxs.; Famagusta, 1,108 bxs.; Funchal, 43 bxs.; Focani, 87 bxs.; Galatz, 5,727 bxs.; Genoa, 3,557 bxs.; Gibraltar, 1,425 bxs.; Gorontalo, 200 bxs.; Gothenburg, 3,363 bxs.; Guatemala, 26 bxs.; Grand Bassam, 200 bxs.; Half Assinee, 120 bxs.; Hamburg, 10 bxs.; Helsingfors, 2,464 bxs.; Hong Kong, 1,000 bxs.; Iquitos, 2,036 bxs.; Kingston, 99 bxs.; Koko, 101 bxs.; Kuala Lumpur, 330 bxs.; Lagos, 672 bxs.; Larache, 425 bxs.; Larnaca, 244 bxs.; Las Palmas, 1,289 bxs.; Leghorn, 750 bxs.; Livorno, 50 bxs.; Lytleton, 1 pkg.; Madras, 10 bxs.; Malta, 325 bxs.; Maranham, 5 bxs.; Martinique, 100 bxs.; Mauritius, 200 bxs.; Mogador, 100 bxs.; Montreal, 123 bxs.; Monte Video, 1 b.; Nantes, 1,200 bxs.; Opobo, 300 bxs.; Oran, 3,350 bxs.; Palma, 300 bxs.; Panaroeken, 250 bxs.; Pasir, 15 bxs.; Penang, 25 c.; Petta, 150 bxs.; Pontianak, 200 bxs.; Prestea, 50 bxs.; Porto Alegre, 1 c.; Pt. Harcourt, 10 c.; Porto Novo, 25 c.; Pt. Said, 1,836 bxs.; Port of Spain, 2,883 c., 500 bxs.; Pt. Sudan, 110 bxs.; Pt. Swettenham, 404 bxs.; Quittah, 60 bxs.; Rouen, 5 c.; Rangoon, 50 drms., 1,274 c., 3,515 bxs.; Rio de Janeiro, 3 c.; Rosario, 100 c.; Rotterdam, 13 bxs., 2,037 c.; Rufisque, 100 bxs.; Rustchuk, 3,000 c.; St. Kitts, 75 pkgs.; St. Lucia, 65 pkgs.; Salonica, 610 bxs.; San Salvador, 10 pkgs.; Santos, 2 pkgs.; Sapele, 100 bxs.; Shanghai, 10 bxs.; Singapore, 3 bxs.; Surinam, 10 bxs.; Smyrna, 121 bxs.; Tangiers, 100 bxs.; Teneriffe, 3,015 bxs.; Trondhjem, 163 bxs.; Valparaiso, 1,680 bxs.; Varna, 3,100 bxs.

SODA ASH

Bahia, 20 pkgs.; Calcutta, 9,237 pkgs.; Batavia, 239 pkgs.; Buenos Ayres, 2,992 pkgs.; Chefoo, 2,640 pkgs.; Dalny, 3,864 pkgs.; Genoa, 400 pkgs.; Hong Kong, 3,820 pkgs.; La Guaira, 10 pkgs.; Patras, 110 pkgs.; Madras, 25 pkgs.; Melbourne, 237 pkgs.; Pts. Columbia, 50 pkgs.; Rio de Janeiro, 200 pkgs.; Vera Cruz, 470 pkgs.; Sundsvall, 2,534 pkgs.; Yokohama, 2,595 pkgs.; Tampico, 1,170 pkgs.; Volo, 70 pkgs.

SODA CRYSTALS

Alexandria, 20 pkgs.; Casablanca, 20 pkgs.; Galatz, 367 pkgs.; Patras, 23 pkgs.; Penang, 20 pkgs.; Piraeus, 21 pkgs.; Pt. Swettenham, 45 pkgs.; Punta Arenas, 80 pkgs.; Salonica, 100 pkgs.

SODA CRYSTALS

Volo, 50 pkgs.

SODIUM BICARBONATE

Bahia, 10 pkgs.; Barcelona, 2 pkgs.; Brisbane, 124 pkgs.; Buenos Ayres, 11 pkgs.; Cologne, 450 pkgs.; Constantinople, 240 pkgs.; Galatz, 20 pkgs.; Genoa, 950 pkgs.; Hamburg, 90 pkgs.; Hong Kong, 168 pkgs.; Leghorn, 870 pkgs.; Lisbon, 16 pkgs.; Piraeus, 20 pkgs.; Pt. Sudan, 40 pkgs.; Pt. Swettenham, 100 pkgs.; Port of Spain, 100 pkgs.; Rio de Janeiro, 425 pkgs.; Rotterdam, 250 pkgs.; Stockholm, 200 pkgs.; Smyrna, 20 pkgs.; Valencia, 20 pkgs.; Vera Cruz, 10 pkgs.; Volo, 5 pkgs.; Yokohama, 1,025 pkgs.

SODIUM CYANIDE

Mazatlan, 265 pkgs.

SODIUM HYPO

Oporto, 18 c., £18.

SODIUM NITRATE

Syra, 12 pkgs.

SODIUM SILICATE

Adelaide, 114 bgs.; Auckland, 32 bgs.; Barcelona, 207 pkgs.; Barranquilla, 50 pkgs.; Bilbao, 20 pkgs.; Fremantle, 116 pkgs.; Melbourne, 140 pkgs.; Metelin, 64 pkgs.; Porto Alegre, 10 pkgs.; Montreal, 82 pkgs.; New Orleans, 1,000 pkgs.; Rosario, 100 pkgs.; Rio de Janeiro, 83 pkgs.; Victoria, W.C.A., 22 pkgs.

SODIUM SULPHIDE

Galatz, 2 t. 18 c., £140.; Madras, 2 c., £6.; Rio de Janeiro, 2 t. 14 c., £107.; Rouen, 20 t., £600.

STRONTIUM CARBONATE

Lisbon, 2 c., £3.; Oporto, 2 c., £3.

SULPHOCYANIDE

Barcelona, 2 c., £15.

SULPHURIC ACID

Auckland, 3 c., £15.; Demerara, 1 c., £1.; Falklands, 3 c., £2.; Hong Kong, 10 c., £40.; Suez, 42 t. 18 c., £660.

TANNIC ACID

Barcelona, 4 c., £104.; Helsingfors, 10 c., £210.; Odessa, 2 c., £125.

TAR

Punta Arenas, 3 c., £12.; Taltal, 1 t. 3 c., £45.

TARTARIC ACID

Char Reff, 5 c., £94.; Dunedin, 10 c., £160.; Hiogo, 3 t., £934.; Lytleton, 10 c., £160.; Penang, 5 c., £76.; Porto Alegre, 10 c., £160.; Valparaiso, 3 c., £64.

WOOD PRESERVATIVE

Hoilo, 3 c., £5.; Kano, 9 c., £10.; Singapore, 8 c., £12.; Tarkwa, 3 c., £5.

ZINC CHLORIDE

Bombay, 6 t., £279.; Chittagong, 1 t. 4 c., £59.; Duala, 5 c., £15.

ZINC SULPHATE

Odessa, 10 c., £31.

LONDON.

Week ending December 17.

ACETIC ACID

Barbados, 1 ek., £17.; Cape Town, 3 c., £22.; Genoa, 107 cks., £1,650.; Lisbon, 6 c., £47.; Monte Video, 4 crbys., £30.; Napier, 2 c., £9.; Pt. Elizabeth, 4 c., £27.

ACETO SALICYLIC ACID

Amoy, 5 c. (pt.), £8.; Batoum, 4 c. (pt.), £25.; Brisbane, 1 c. (pt.), £35.; Calcutta, 1 c. (pt.), £10.; Cape Town, 10 kgs., £239.; Piraeus, 9 c. (pt.), £71.; Pt. Elizabeth (F.), 1 c., £6.; Rotterdam, 2 c., £25.; Rouen, 10 brls., £198.

ACETONE

Brussels, 1 dr., £31.

ALUM

Bangkok, 5 c., £8.; Cape Town, 5 c., £6.; Delagoa Bay, 5 c., £8.; Durban, 5 c., £6.

AMMONIA

Italy (via Antwerp), 13 drms., £134.; Bombay, 20 cs., £90.; Buenos Ayres, 5 cs., £8.; Calcutta, 13 cs., £31.; Delagoa Bay, 10 cs., £19.; Durban, 30 cs., £47.; East London, 12 cs., £25.; Penang, 4 cs., £8.; Pt. Elizabeth, 8 cs., £15.; Singapore, 6 cs., £6.; Tientsin, 5 cs., £9.

AMMONIA (ANHYDROUS)

Batoum, 4 cs., £80.; Bombay, 33 cys., £309.; Lisbon, 1 cyl., £21.; Rangoon, 10 drms., £109.; Secondee, 1 cyl., £18.; Singapore, 20 cys., £163.

AMMONIUM ACETATE

East London, 2 cs., £6.

AMMONIUM BENZOATE

Rio de Janeiro, 1 cs. (pt.), £8.

AMMONIUM BROMIDE

Calcutta, 1 ck. (pt.), £20.

AMMONIUM CARBONATE

Bangkok, 8 c., £90.; Belawan Deli, 1 t. 7 c., £110.; Calcutta, 8 c., £44.; Cape Town, 4 c., £15.; Christchurch, 12 c., £42.; Hong Kong, 1 t., £89.; Kilindini, 1 c., £5.; Monte Video, 2 c., £15.; Penang, 1 t. 11 c., £190.; Rouen, 4 t. 18 c., £293.; Reval, 2 c., £10.; Rangoon, 2 t. 16 c., £304.; Shanghai, 1 t. 8 c., £267.; Singapore, 6 c., £38.

AMMONIUM CHLORIDE

Antwerp, 2 t. 9 c., £152.

AMMONIUM FLUORIDE

Demerara, 2 cks., £56.

AMMONIUM NITRATE

Colombo, 100 t., £3,200.; Nantes, 100 t., £3,200.

AMMONIUM PHOSPHATE

Amsterdam, 2 t., £185.; Barcelona (F.), 3 c., £357.

AMMONIUM SULPHOCYANIDE

Shanghai, 1 cs., £5.

AMYL ACETATE

Bilbao, 1 dr., £17.; Brussels, 1 cs. (pt.), £8.

ANTIMONY

Melbourne, 2 t. 3 c.

ANTIMONY SULPHIDE

Christiania, 6 cks., £98.; Melbourne, 24 cks., £776.

ANTIMONY TARTRATE

Rio de Janeiro, 1 cs. (pt.), £8.

ARSENIC

Calcutta, 1 t., £145.; Genoa, 1 t. 2 c., £70.; Monte Video, 14 c., £47.

BARIUM NITRATE

Bombay, 20 drms., 9 cks., £121.

BENZOIC ACID

Danzig, 2 cks., £60.

BENZYL ACETATE

Hong Kong, 1 cs., £35.

BISMUTH

Calcutta, 1 cs. (pt.), £20.; Piraeus, 5 cs. (pt.), £19.; Rio de Janeiro, 4 cs. (pt.), £69.

BISMUTH CARBONATE

Adelaide, 1 cs. (pt.), £11.; Cape Town, 1 cs., 1 cs. (pt.), £32.; Malacca, 1 cs. (pt.), £20.; Piraeus, 5 cs. (pt.), £24.

BISMUTH CITRATE

Adelaide, 1 cs. (pt.), £5.; Constantinople, 3 cs. (pt.), £17.

BISMUTH OXIDE

Constantinople, 3 cs. (pt.), £38.

BISMUTH SALICYLATE

Piraeus, 2 cs. (pt.), £8.

BISMUTH SALTS

Reval, 1 cs., £195.

BISMUTH SUBGALLATE

Batavia, 2 cs., £126.; Piraeus, 5 cs. (pt.), £25.

BISMUTH SUBNITRATE

Batavia, 1 cs., £91.; Danzig, 3 cs., £392.; Rangoon, 3 cs., £200.; Rostoff-on-Don, 2 c., £110.; Swatow, 1 cs. (pt.), £12.

BISULPHITE OF LIME

Bordeaux, 20 cks., £48.; Cape Town, 10 cks., £42.

BORAX

Switzerland (*via* Antwerp), 11 t. 5 c., £721; Calcutta, 5 c., £11; Constanza, 2 t., £104; Cape Town, 4 c., £15; East London, 3 c., £11; Havana, 5 t., £208; Madras, 3 c., £6; Rio de Janeiro, 4 c., £12; Rotterdam, 19 t. 16 c., £1,576; Vienna (*via* Rotterdam) (F.), 20 t., £785.

BORIC ACID

Auckland, 3 c., £17; Calcutta, 3 c., £14; Danzig, 1 c., £9; Foochow, 2 c., £7; Hankow, 2 c., £8; Rio de Janeiro, 6 c., £27; Singapore, 1 c., £6; Tientsin, 4 c., £19.

CACODYLIC ACID

Calais (F.), 1 cs. (pt.), £195.

CALCIUM CARBIDE

Penang, 6 t. 2 c., £155; Pt. Swettenham, 3 t. 9 c., £87.

CALCIUM CARBONATE

Rio de Janeiro, 2 cs., £6.

CALCIUM CHLORIDE

Boulogne, 7 c., £20.

CALCIUM GLYCEROPHOSPHATE

Constantinople, 3 cs. (pt.), £151; Piraeus, 3 cs. (pt.), £8.

CARNAUBA WAX

Antwerp, 5 c.; Lisbon, 3 t. 10 c.

CAUSTIC SODA

Brussels, 24 t. 16 c., £447; Colombo, 1 c., £7; Constantinople, 20 t. 14 c., £544; Perth, 6 c., £14; Rotterdam, 20 t. 7 c., £700.

CERESINE WAX

Antwerp, 2 t.; Melbourne, 1 t.

CHEMICALS (otherwise undescribed)

Bombay, 5 cs., £70; Dunedin, 1 cs., £5; East London, 1 cs. (pt.), £5; Gibraltar, 1 ck., £10; Jamaica, 4 cs. (pt.), £13; Sydney, 6 cs. (pt.), £91; Toronto, 1 cs., £25; Winnipeg, 2 cs., £38.

CHLORIDE OF LIME

Calcutta, 5 c., £30; Piraeus, 2 c., £5.

CHROMETAN CRYSTALS

Paris, 10 cks., £98.

CHIRYSAROBIN

New York, 1 cs., £70.

CITRIC ACID

Buenos Ayres, 2 t. 19 c., £1,269; Calcutta, 1 cs. (pt.), £6; Cape Town, 1 t., £446; Durban, 10 c., £217; Kobe, 5 t., £2,149; Montreal, 1 t., £426; Pt. Elizabeth, 2 c., £53; St. John, N.B., 10 c., £150; Singapore, 12 c., £303; Swatow, 1 cs. (pt.), £5; Suva, 1 c., £16; Toronto, 1 t. 10 c., £638; Yokohama, 5 t., £2,149.

COAL PRODUCTS

Alizarine

New York, 2 cks., £96.

Aniline Colour

Madras, 1 cs., £93; Nelson, 1 cs. (pt.), £17; Singapore, 1 cs., £70; Wellington, 2 pkgs., £98.

Bitumen

Bombay, 167 cks., £928.

Carbolic Acid

Amoy, 5 cs. (pt.), £28; Kobe, 79 drms., £960; Shanghai, 315 cs., £645; Socrabaya, 4 cs., £71; Tientsin, 1 ck., £10.

Cresosote

Malaga, 4 brls., £15.

Cresosote Oil

Calais, 515 brls., £1,000.

Cresylic Acid

Boston, 200 cks., £1,420.

Dyes

Auckland, 3 pkgs., £118; Boulogne, 3 cks., £315; Brisbane, 3 pkgs., £143; Brussels, 2 kgs., £27; Colombo, 3 kgs., £93; Genoa, 63 pkgs., £2,160; Lyttleton, 8 pkgs. (pt.), £333; New York, 1 kg., £90; Sydney, 1 kg., £30.

Naphthalene

Calcutta, 86 pkgs., £303; Penang 10 cs., £25; Pt. Swettenham, 20 cs., £50; Shanghai, 315 cs., £645.

Pitch

Alexandria, 150 brls., £149. Antwerp, 2,180 t., £8,825.

COAL PRODUCTS

Pitch

Boulogne, 455 t., £1,580; Calais, 1,000 t., £3,905; Dunkirk, 460 t., £1,840; Durban, 20 cs., £8; Rotterdam, 3,850 t., £11,745; Stockholm, 140 cks., £166; Treport, 145 t., £580.

Pyridine

Durban, 5 drms., £12.

Tar

Beira, 75 drms., £18; Chinde, 6 brls., £8; Delagoa Bay, 30 drms., £11; Durban, 310 drms., £44; East London, 600 drms., £55; Malaga, 10 brls., £30; Malmo, 38 cks., £63; Mossel Bay, 75 drms., £10; Pt. Said, 3 brls., £8; Sierra Leone, 20 drms., £8.

Toluol

Bangkok, 1 cs., £5; Switzerland, 32 cs., £300.

COPPER CHLORIDE

Amsterdam, 1 t. 16 c., £275.

COPPER SULPHATE

Bangkok, 10 t., £410; Novorossisk, 3 t. 2 c., £175.

CREAM OF TARTAR

Calcutta (F.), 2 c., £34; Calcutta, 2 c., £27; Cape Town (F.), 1 c., £16; Durban (F.), 3 c., £48; East London (F.), 1 cs. (pt.), £8; Geraldton, 2 c., £31; Hiogo (F.), 5 t., £1,300; Piraeus (F.), 3 cs. (pt.), £6; Pt. Elizabeth (F.), 2 c., £32; Rangoon (F.), 1 c., £20; Rio de Janeiro, 1 cs. (pt.), £6; Smyrna, 1 c., £17; Valparaiso, 10 c., £130; Dunedin (transit), (F.), 1 t., £240; Fremantle (transit), (F.), 10 c., £120; Lyttleton (trans.) (F.), 1 t., £240.

DISINFECTANTS (otherwise undes.)

Alexandria, 8 c., £74; Switzerland (*via* Antwerp), 3 t. 7 c., £194; Auckland, 12 t., £587; Bahia, 3 t. 2 c., £174; Beira, 2 t. 5 c., £95; Bangkok, 2 t. 13 c., £81; Bordeaux, 9 t. 13 c., £205; Colombo, 8 c., £24; Calcutta, 2 c., £19; Canton, 1 c., £10; Cape Town, 4 c., £6; Christchurch, 4 c., £10; Constantinople, 4 t. 11 c., £270; Delagoa Bay, 5 t. 4 c., £210; Demerara, 7 c., £26; Durban, 1 t. 3 c., £60; East London, 1 c., £8; Foochow, 8 c., £11; Hankow, 3 t. 14 c., £137; Hong Kong, 7 c., £36; Iddo, 4 c., £10; Kedah, 2 t. 7 c., £64; Napier, 4 c., £23; Naples, 4 c., £14; Piraeus, 16 c., £56; Penang, 4 t. 16 c., £164; Pt. Elizabeth, 17 c., £49; Pt. Said, 2 c., £6; Rangoon, 7 t. 4 c., £252; Somaliland, 5 c., £13; Shanghai, 3 t. 3 c., £171; Singapore, 1 c., £7; Smyrna, 3 t. 17 c., £262; Trieste, 8 c., £16; Wellington, 1 t. 2 c., £65.

ETHER

Penang, 1 cs. (pt.), £7; Rio de Janeiro, 1 cs., £9; Wellington, 1 cs., £5.

ETHER (METHYLIC)

Rangoon, 4 cs., £63.

FORMALDEHYDE

Madras, 2 cks., £56; Trinidad, 5 cs., £31.

FORMIC ACID

Montreal, 8 crbys., £43.

FULLER'S EARTH

Colombo, 7 c.; Rotterdam, £475.

GLUE

Pt. Elizabeth, 6 c.

GLUE, SIZE, AND GELATINE

Adelaide, 10 c.; Antwerp, 17 t. 14 c.; Bangkok, 1 t. 5 c.; Boulogne, 6 c.; Calcutta, 10 t. 1 c.; Cape Town, 1 c.; Copenhagen, 1 t. 10 c.; Durban, 11 c.; East London, 4 c.; Gothenburg, 3 c.; Kobe, 4 t. 10 c.; Lisbon, 6 c.; Mossel Bay, 2 c.; Rangoon, 1 c.; Rotterdam, 16 c.; Sydney, 2 c.; Tientsin, 1 t.; Wellington, 6 c.; Yokohama, 2 t. 6 c.

GLYCERINE

Batoum, 10 c., £65; Calcutta, 6 c., £47; Karachi, 2 c., £10; Paris, 9 t. 15 c., £1,174; Shanghai, 1 t., £168.

HYDROCHLORIC ACID

Iddo, 2 c., £9; Singapore, 6 c., £12.

HYDROGEN PEROXIDE

Alexandria, 9 cs., £31; Pt. Elizabeth, 1 c., £6.

HYDROQUINONE

Singapore, 1 ck. (pt.), £23.

IODINE (RESUBLIMED)

Calcutta, 1 ck. (pt.), 1 cs. (pt.), £39; Rotterdam, 2 cs., £202.

IRON AND AMMONIUM CITRATE

Rio de Janeiro, 2 cs. (pt.), £11; Rotterdam, 3 cs., £112; Sydney, 1 cs., £29.

IRON PHOSPHATE

Shanghai, 1 kg., £27.

LACTIC ACID

Sydney, 18 cks., £115.

LEAD ACETATE

Bombay, 17 cks., 40 drms., £470; Calcutta, 10 kgs., £42; Lisbon, 15 kgs., £74; Paris, 37 brls., £763; Rio de Janeiro, 2 cs., £40; Shanghai, 5 cks., £43.

LEAD CARBONATE

Rotterdam, 1 kg., £11.

LITHIUM BENZOATE

Rio de Janeiro, 2 cs. (pt.), £12.

LITHIUM CARBONATE

Rio de Janeiro, 2 cs. (pt.), £7.

MAGNESIA

East London, 2 cs., £6.

MAGNESIA (CALCINED)

Buenos Ayres, 2 cs., £28; Dieppe, 40 cks., 3 cs., £203; Santos, 2 cs., £28; Valencia, 2 cs., £15.

MAGNESIUM CARBONATE

Buenos Ayres, 1 cs., £12; Jamaica, 2 cs., £9; Lisbon, 10 cs., £37; Shanghai, 20 cs., £50; Valencia, 2 cs., £9.

MAGNESIUM CHLORIDE

Montreal, 5 drms., £36.

MAGNESIUM CITRATE

Brussels, 1 cs. (pt.), £12; Calcutta, 8 cs., £69; Piraeus, 1 cs., £11; Shanghai, 3 cs., £24.

MAGNESIUM SULPHATE

Auckland, 5 c., £10; Calcutta, 2 c., £6; East London, 9 c., £21; Porto Alegre, 1 t., £27; Wellington, 1 t. 6 c., £43.

MERCURIALS

Calcutta, 2 cks., 7 cs. (pt.), £220; Piraeus, 3 cs. (pt.), £13; Rio de Janeiro, 5 cs. (pt.), £86.

MERCURY BICHLORIDE

Rotterdam, 4 cs., £300.

MERCURY PRECIPITATE

Danzig, 3 cs., £199.

METHYL SALICYLATE

Batoum, 4 cs. (pt.), £11; East London, 1 cs., £6.

MINERAL WAX

Amsterdam, 20 t.; Lisbon, 2 t. 10 c.; Paris, 20 t. 18 c.

MURIATIC ACID

Piraeus, 2 t. 2 c., £65.

NICKEL AND AMMONIUM SULPHATE

Helsingfors, 2 kgs., £7.

NICKEL SULPHATE

Bombay, 2 cs., £7; Rotterdam, 26 cs., £212.

NITRIC ACID

Bangkok, 10 c., £44; Buenos Ayres, 1 c., £5; Piraeus, 1 c., £13.

OLEIC ACID

Reval, 1 ck., £15.

OXALIC ACID

Boulogne, 9 cks., £412; Constanza, 3 kgs., £150; Kobe (F.), 4 cks., £160; Lisbon, 5 kgs., £36; Rio de Janeiro, 1 cs., £20.

PARAFFIN WAX

Amsterdam, 15 c.

PHOSPHORIC ACID

Antwerp, 5 cts., £50.

PHOSPHORUS CARBONATE

Wellington, 1 cs., £7.

PHOSPHORUS SESQUISULPHIDE

Barcelona, 20 cks., £324; Valencia, 20 cks., £321.

PITCH (BONE)

Melbourne, 11 c.

PLUMBAGO

Amsterdam, 1 t.; Lisbon, 6 c.

POTASSIUM ACETATE

Calcutta, 1 cs. (pt.), £6.

POTASSIUM BICARBONATE

Bangkok, 1 kg., £11; Calcutta, 1 cs., £8.

POTASSIUM BICHROMATE

Brussels, 7 c., £61; Lisbon, 1 c., £10.

POTASSIUM BINOXALATE

Durban, 1 cs. (pt.), £6.

POTASSIUM BROMIDE

Adelaide (F.), 1 cs. (pt.), £6; Cape Town (F.), 1 cs. (pt.), £6; Calcutta, 2 cs. (pt.), £26; Jamaica (F.), 1 cs. (pt.), £13; Piraeus, 2 cs. (pt.), £7; Piraeus (F.), 2 c., 1 cs. (pt.), £56; Rio de Janeiro, 2 cs. (pt.), £23; Shanghai (F.), 3 cs. (pt.), £22; Singapore, 1 cs. (pt.), £6; Sydney, 1 cs. (pt.), £7.

POTASSIUM CARBONATE

Shanghai, 1 cs. (pt.), £6.

POTASSIUM CHLORATE

Cape Town, 15 t. 14 c., £915; Delagoa Bay (F.), 1 t. 10 c., £250; Piraeus, 2 c., £17.

POTASSIUM CITRATE

Cape Town, 2 cs. (pt.), £26; Rio de Janeiro, 1 cs. (pt.), £8; Sydney, 1 cs. (pt.), £9.

POTASSIUM CYANIDE

Bombay, 1 cs., £15; Calcutta, 2 cs., £31; Foochow, 1 cs. (pt.), £6; Rio de Janeiro, 2 cs., £32.

POTASSIUM IODIDE

Calcutta, 2 cks. (pt.), 1 cs., 1 cs. (pt.), £283; Cape Town, 1 cs., £174; Santos, 1 cs., £66; Shanghai (F.), 3 cs. (pt.), £22; Sydney, 1 cs. (pt.), £20.

POTASSIUM METABISULPHITE

Calais, 5 c., £60; Cape Town (F.), 5 kgs., £62; Lisbon, 4 c., £60; Montreal, 80 pkgs., £1,153; St. John, N.B., 1 ck., £14.

POTASSIUM OXALATE

Buenos Ayres, 10 cks., £124.

POTASSIUM PERMANGANATE

Boulogne, 5 c., £115; Bangkok, 5 kgs., £171; Genoa (F.), 1 c., £51.

POTASSIUM PRUSSATE

Lisbon, 4 c., £46.

POTASSIUM SULPHATE

Rio de Janeiro, 1 cs., £11.

POTASSIUM SULPHOGALICACOLATE

Calcutta (F.), 3 cs. (pt.), £13.

PYRO ACID

Swatow, 1 cs. (pt.), £7.

QUININE

Bombay, 421 ozs.; Calcutta, 335 ozs.; Singapore, 147 ozs.

RESORCIN

Cape Town (F.), 1 cs. (pt.), £7; East London (F.), 1 cs. (pt.), £5.

SALAMMONIAC

Buenos Ayres, 1 c., £5; Calcutta, 1 c., £9; Durban, 3 c., £14; Monte Video, 2 c., £11; Sydney, 3 c., £13.

SALICYLIC ACID

Bombay, 1 cs., £15; Lisbon, 1 cs. (pt.), £9; Melbourne, 10 cs., £140; Piraeus, 1 cs. (pt.), £8.

SALT

Colombo, 1 t.; Madras, 4 t.; Singapore, 4 c.; Tientsin, 4 c.

SALTCAKE

Ghent, 100 t. 19 c., £454.

SALTPETRE

Adelaide, 2 t. 3 c., £166; Barcelona, 3 t., £165; Brisbane, 3 c., £11; Lisbon, 1 t. 9 c., £78; Paris, 1 t., £54; Rio de Janeiro, 2 c., £13; Singapore, 2 c., £10; Valencia, 2 t. 1 c., £117.

SHEEP DIP

Buenos Ayres, 94 t. 2 c., £4,582; Christchurch, 18 t. 17 c., £917; Oamaru, 1 t. 10 c., £74; Pt. Elizabeth, 10 t. 3 c., £463.

SILVER NITRATE—
Piraeus, 1 cs. (pt.), £18.

SOAP—
Aden, 6 c.; Alexandria, 15 t. 10 c.; Amsterdam, 15 c.; Antwerp, 105 t. 15 c.; Auckland, 2 t. 2 c.; Bangkok, 6 c.; Batum, 6 t. 11 c.; Bilbao, 19 t.; Beira, 1 c.; Bombay, 3 t. 5 c.; Bordeaux, 47 t. 17 c.; Boulogne, 1 t. 13 c.; Buenos Ayres, 17 c.; Calcutta, 1 t. 7 c.; Cape Town, 8 c.; Channel Islands, 15 c.; Christiania, 10 c.; Christiansund, 5 c.; Cologne, 42 t. 16 c.; Colombo, 10 t. 3 c.; Constantinople, 2 c.; Copenhagen, 1 c.; Danzig, 13 c.; Cyprus, 2 c.; Durban, 4 c.; Delagoa Bay, 3 c.; Genoa, 6 t. 11 c.; Hamburg, 60 t. 6 c.; Hong Kong, 3 c.; Jamaica, 1 t. 8 c.; Kilindini, 1 c.; Karachi, 7 c.; Lisbon, 4 c.; Manila, 9 c.; Montreal, 9 c.; Mossel Bay, 1 c.; New York, 3 c.; Oporto, 3 c.; Ostend, 4 t. 16 c.; Palermo, 4 c.; Paris, 6 t. 14 c.; Perth, 3 c.; Piraeus, 4 t. 5 c.; Penang, 12 c.; Pt. Said, 1 t. 8 c.; Pt. Swettenham, 1 c.; Pt. Elizabeth, 10 c.; Pt. Sudan, 1 c.; Rangoon, 2 c.; Rotterdam, 13 t. 2 c.; Salonica, 4 c.; Shanghai, 6 c.; Singapore, 2 t. 10 c.; Smyrna, 1 t. 2 c.; Suez, 14 c.; Toronto, 12 c.; Vancouver, 5 c.; Wellington, 1 t. 7 c.; Winnipeg, 4 c.

SODA CRYSTALS—
Beyrout, 5 t., £31.; Cape Town, 3 t., £25.; Jaffa, 5 t., £31.

SODIUM AND POTASSIUM TARTRATE—
Calais, 5 cks., £62.

SODIUM ARSENITE—
Durban, 4 t. 1 c., £220.

SODIUM BENZOATE—
Calcutta, 1 ck. (pt.), 3 cs. (pt.), £37.; Lisbon, 1 cs. (pt.), £30.

SODIUM BICARBONATE—
Auckland, 3 c., £5.; Beyrout, 10 t., £110.; Buenos Ayres, 2 c., £12.; Calcutta, 1 t. 11 c., £83.; Durban, 6 c., £10.; Jaffa, 5 t., £55.; Monte Video, 12 c., £40.; Mossel Bay, 4 c., £7.; Rio de Janeiro, 4 c., £8.; Santander, 2 c., £6.; Shanghai, 1 t., £33.; Swatow, 1 c., £8.

SODIUM BISULPHITE—
Buenos Ayres, 3 t. 1 c., £95.; Suva, 1 c., £7.

SODIUM CACODYLATE—
New York, 1 cs., £114.

SODIUM CITRATE—
Pt. Elizabeth, 1 cs. (pt.), £7.; Rio de Janeiro, 1 cs. (pt.), £14.

SODIUM CYANIDE—
Fremantle, 6 t., £558.

SODIUM HYPO—
Hankow, 7 c., £16.

SODIUM IODIDE—
Calcutta, 2 cs. (pt.), £15.; Piraeus, 5 cs. (pt.), £15.

SODIUM METABISULPHITE—
Montreal, 80 pkgs., £1,153.

SODIUM NITRITE—
Barcelona, 4 t. 19 c., £395.

SODIUM PYROPHOSPHATE—
Florence, 1 t. 19 c., £159.; Rotterdam, 1 cs., £6.

SODIUM SALICYLATE—
Bombay, 1 cs. (pt.), £21.; Calcutta, 3 cs. (pt.), £9.; Cape Town, 1 cs. (pt.), £20.; Piraeus, 8 cs. (pt.), £26.

SODIUM SULPHATE—
Gothenburg, 5 c., £9.; Hong Kong, 7 t., £60.

SODIUM SULPHATE (GLAUBER SALTS)—
East London, 11 c., £8.

SODIUM SULPHIDE—
Bordeaux, 28 t. 18 c., £725.; Calais, 38 t. 14 c., £1,050.; Melbourne, 19 t. 18 c., £497.

SODIUM SULPHITE—
East London, 6 pkgs., £11.; Soerabaya, 3 cs., £15.; Winnipeg, 1 c., £7.

SODIUM TARTRATE—
Adelaide, 1 kg., £11.; Calcutt., 1 kg., £8.; New York, 2 t. 10 c., £313.

STEARINE (PITCH)—
Christiania, 1 t.

STRONTIUM CARBONATE—
Paris, 2 cks., £30.

STRONTIUM LACTATE—
Calais (F.), 1 cs. (pt.), £15.

STRONTIUM NITRATE—
Bombay, 19 drms., 12 cks., £208.

SULPHUR—
Lisbon, 1 t. 1 c., £32.; Madras, 1 t., £39.; Paranagua (F.), 1 t. 16 c., £52.; Rio de Janeiro (F.), 2 t. 19 c., £87.; Santos (F.), 1 t. 4 c., £34.

SULPHURIC ACID—
Iddo, 6 c., £38.; Singapore, 6 cs., £10.; Wanganui, 2 c., £5.; Wellington, 1 c., £5.

SUPERPHOSPHATES (otherwise un-
Colombo, 50 t., £750. described)

TANNIC ACID—
Lisbon (F.), 4 kgs., £98.; Piraeus (F.), 1 kg., £5.; Suva, 1 kg. (pt.), £5.

TANNIN ALBUMINATE—
Switzerland (F.), 1 kg., £20.

TARTARIC ACID—
Barbados, 1 cs., £9.; Bombay, 1 t. 4 c., £445.; Durban, 8 c., £156.; Kobe (F.), 5 t. 8 c., £1,870.; Malaga, 2 c., £34.; Melbourne, 1 t., £347.; Montreal, 1 t., £310.; Rangoon (F.), 8 c., £185.; Rio de Janeiro, 4 c., £86.; Yokohama (F.), 8 t. 1 c., £2,755.

THEOBROMINE—
Piraeus, 5 cs. (pt.), £12.

WAX—
Antwerp, 1 t. 10 c.; Barcelona, 3 c.; Bordeaux, 1 t.; Buenos Ayres, 1 c.; Calais, 12 c.

WHITE LEAD—
Bangkok, £11.; Boulogne, £1,785.; Calcutta, £145.; Calais, £250.; Durban, £60.; Lisbon, £122.; Malaga, £10.; Mombasa, £34.; Melbourne, £310.; Oran, £13.; Pt. Said, £10.; Naples, £56.; Pt. Elizabeth, £68.; Punta Delgada, £7.; Ostend, £22.; Singapore, £361.; W'lington, £50.

ZINC SULPHIDE—
New York, 2 cks., £90.

MANCHESTER.

Week ending December 17.

ACETIC ACID—
Antwerp, 7 cks.; Smyrna, 11 cks.

ALUM—
Dunkirk, 70 brls.; Boston, 250 cks.; St. John, N.B., 10 brls.

ALUM (CHROME)—
Antwerp, 10 c.

ALUMINA SULPHATE—
Antwerp, 100 bgs., 432 cks.; Bordeaux, 230 bgs.

ALUMINA SULPHOCYANIDE—
Rouen, 4 cks.

ALUMINO FERRIC—
St. John, N.B., 918 slbs.

AMMONIA—
Bordeaux, 17 drms.; Rouen, 44 drms.

AMMONIUM CARBONATE—
Antwerp, 10 cks.; Gothenburg, 90 kgs.; Salonica, 15 brls.; Rouen, 35 cks.; Tunis, 5 pkgs.

AMMONIUM MURIATE—
Rouen, 100 cs.

BLEACHING POWDER—
Dunkirk, 32 cks.; Bordeaux, 135 cks.

BORAX—
Antwerp, 248 cks., 30 bgs.; Rouen, 50 bgs.

CARBON BISULPHIDE—
Gothenburg, 8 drms.

CAUSTIC SODA—
Dunkirk, 29 drms.; Gothenburg, 50 cs.

CHROMIUM OXIDE—
Boston, 1 kg.

COAL PRODUCTS (otherwise undes.)
Antwerp, £9,212.; Aviles, £4,518. Bordeaux, £2,583.; Calcutta, £548.; Boston, £1,200.; Dunkirk, £248.; Havre, £50.; Rotterdam, £100.; Rouen, £720.; San Esteban de Pravia, £3,635.

COAL PRODUCTS—
Creosote Oil

Dunkirk, 50 cks.

DISINFECTANTS (otherwise undes.)
Bombay, 50 cks.

DYESTUFFS—
Sumac Extract

Bombay, 5 cks.

FATTY ACIDS—
Antwerp, 40 brls.

FERRO MANGANESE—
Bordeaux, 4 brls.; Philadelphia, 750 t.

GLUE—
Antwerp, 40 bgs.

GLYCERINE—
Dunkirk, 4 drms.

LEAD ACETATE—
Constantinople, 2 cks.

MAGNESIA—
Tunis, 2 cs.

MAGNESIA (CALCINED)—
Antwerp, 1 cs.

MAGNESIUM CHLORIDE—
Bordeaux, 66 kgs.; Ghent, 22 drms.

OXALIC ACID—
Dunkirk, 12 cks.

PARAFFIN WAX—
Christiania, 8 brls.

PITCH—
Antwerp, 1,012 t.

POTASSIUM BICHROMATE—
Rotterdam, 1 ck.

SALAMMONIAC—
Salonica, 15 brls.; Smyrna, 2 brls.

SALT—
Ghent, 10,000 bgs.; Gothenburg, 3,105 bgs.

SALTCAKE—
Christiania, 500 t.; St. John, N.B., 1,680 pkgs.; Gothenburg, 330 pkgs.

SALTPETRE—
Bordeaux, 3,284 bgs.

SOAP—
Antwerp, 955 cs., 100 pkgs.; Bombay, 29 cs., 60 bxs.; Haifa, 150 cs.; Rotterdam, 5 cs.

SODA ASH—
Bombay, 22 cks.; Gothenburg, 3,280 bgs.

SODA CRYSTALS—
Alexandria, 102 brls.; Gothenburg, 50 bgs.

SODIUM BICARBONATE—
Rotterdam, 10 bgs.; Gothenburg, 120 bgs.

SODIUM HYDROSULPHITE—
Gothenburg, 18 pkgs.

SODIUM SULPHATE—
Bordeaux, 148 drms.; Calcutta, 5 cs.

SODIUM SULPHIDE—
Christiania, 27 cks.; Rouen, 88 drms.

STEARINE—
Gothenburg, 61 brls.

SULPHUR—
Gothenburg, 6 brls.

WAX—
Antwerp, 40 bgs.

ZINC CHLORIDE—
Bombay, 34 cks.; Antwerp, 7 cks.; Ghent, 5 drms.

MIDDLESBROUGH.

Week ending December 20.

AMMONIUM SULPHATE—
Kobe, 956 t., £20,607.; Yokohama, 100 t., £2,186.

COAL PRODUCTS -

Naphthalene

East London, 1 t., £17.

DISINFECTANTS (otherwise undes.)
Natal, 6,370 galls., £1,274.

PITCH—
Antwerp, 836 t., £2,976.; Calais, 416 t., £1,352.; Rotterdam, 1,848 t., £6,006.

SALT—
Algoa Bay, 2 t. 10 c., £103.; Cape Town, 3 t., £109.; East London, 1 t., £41.; Natal, 1 t. 10 c., £69.

SODIUM SILICATE—
Kobe, 40 t., £485.

SODIUM SULPHATE—
Gothenburg, 288 t., £937.

WOOD PRESERVATIVE—
Natal, 9 c., £21.

NEWCASTLE-ON-TYNE

Week ending December 20.

ANTIMONY—
Goth'burg, 1 t.; Copenhagen, 2 t.

BLEACHING POWDER—
Antwerp, 25 t.; Copenhagen, 5 t.; Gothenburg, 24 t. 18 c.; Rotterdam, 112 t.

BORIC ACID—
Gothenburg, 2 t.

CARNAUBA WAX—
Bergen, 6 c.

CAUSTIC SODA—
Canea, 10 t.; Genoa, 206 t.; Gothenburg, 40 t. 6 c.; Rotterdam, 11 t.

CERESINE WAX—
Bergen 10 c.

CHEMICALS (otherwise undescribed)
Bergen, 1 t. 12 c.

CHINA CLAY—
Bergen, 21 t. 5 c.

CHROME ORE—
Rotterdam, 20 t.

COAL PRODUCTS—
Pitch

Antwerp, 747 t.

GELATINE (EDIBLE)—
Copenhagen, 5 c.; Bergen, 3 c.; Copenhagen, 8 c.

GLUE—
Copenhagen, 5 t. 3 c.

RED LEAD—
Antwerp, 1 t. 9 c.; Copenhagen, 1 t. 6 c.; Gothenburg, 16 t. 1 c.; Rotterdam, 15 t.

SOAP—
Antwerp, 20 t. 17 c.

SODIUM HYPOSULPHITE—
Antwerp, 1 t.

SODIUM SULPHATE—
Gothenburg, 4 t. 17 c.

SODIUM SULPHIDE—
Antwerp, 21 t.

SULPHUR—
Gothenburg, 10 t.

SULPHURIC ACID—
Bergen, 4 c.

WHITE LEAD—
Antwerp, 5 t. 3 c.; Rotterdam, 2 t.

N. & S. SHIELDS.

Week ending December 20.

RED LEAD—
Stockholm, 20 t. 10 c.; Malmö, 10 t.

SWANSEA.

Week ending December 20.

AMMONIUM CARBONATE—
Naples, 9 t. 16 c., £618.

CHEMICALS (otherwise undescribed)
Rouen, 3 c., £4.

NICKEL SULPHATE—
Genoa, 8 t. 5 c., £490.; Rouen, 3 t., £190.

SAL ACETOS—
Rouen, 3 t., £585.

PRICES CURRENT.

WEDNESDAY, Dec 24, 1919.

PREPARED BY MESSRS. HIGGINBOTTOM AND Co, 21, SPRING GARDENS, MANCHESTER.

The values stated are F.O.R. at makers' works, or at usual ports of shipment in U.K., unless otherwise specified
The prices in different localities may vary

Acids:—

			£	s.	d.
*Acetic 40% and 60% ...	per cwt.	33/- & 49/6			
" Glacial ...	per ton	85 0 0			
Arsenic, S.G. 2,000° ...	per ton	80 0 0			
Boric Crystals ...	per ton	72 0 0			
*Fluoric ...	per lb.	0 0 7			
*Muriatic (Tower Salts), 28° Tw. ...	per carboy	0 7 0			
*Nitric, 80° Tw. ...	per ton	34 10 0			
Oxalic ...	per lb.	0 1 5			
Phosphoric, 1,750° ...	per ton	0 1 9			
*Sulphuric (fuming, 70%) ...	per ton	—			
" (Pyrites, 168°) ...	"	7 18 9			
" (" 140°) ...	"	4 10 0			
" (free from arsenic, 144°) ...	"	5 7 4			
Tannic (commercial) ...	per lb.	0 2 6			
Tartaric (crystals) ...	per ton	0 3 1			
*Acetone ...	per ton	90 0 0			
*Alum, loose lump (delivered) ...	"	16 10 0			
Alumina Sulphate (pure) ...	"	16 10 0			
Aluminoferri (in slabs) ...	"	8 10 0			
Aluminium (Ingot Metal, 98/99%) ...	per ton	150 0 0			
*Ammonia, Anhydrous ...	per lb.	0 2 0			
" 880 ...	per ton	33 0 0			
" 920 ...	per ton	20 0 0			
" Carbonate ...	per lb.	0 0 7½			
" Muriate (grey) ...	per ton	47 0 9			
" (sal ammoniac) 1st & 2nd, ...	per cwt.	95/- & 90/-			
" Nitrate ...	per ton	60 0 0			
" Phosphate ...	"	110 0 0			
" Sulphate (grey), London, net ...	"	—			
" " " Hull ...	"	—			
" " " Manchester ...	"	—			
*Aniline Oil (pure) ...	per lb.	0 1 6			
Aniline Salt ...	per ton	0 1 6			
Antimony ...	per ton	45 0 0			
" (tartar emetic), 43/44% ...	per lb.	0 3 1			
" (golden sulphide) ...	"	0 1 3			
Arsenic, white powdered ...	per ton	66 0 0			
Barium Chloride (in casks) ...	"	22 0 0			
" Carbonate (native), 92/94% ...	"	10 10 0			
" Sulphate (native levigated) ...	"	£7 to £14			
Baryta Chlorate ...	per lb.	0 1 1			
*Bisulphide of Carbon ...	per ton	56 0 0			
*Bleaching Powder, 35% ...	"	17 0 0			
" Liquor, 7% ...	"	8 0 0			
Casein (commercial) ...	"	90 0 0			
Chromium Acetate (crystals) ...	per lb.	0 1 0			
Calcium Chloride ...	per ton	8 0 0			
China Clay (at Runcorn), in bulk ...	"	70/- to 90/-			

Coal-tar Products and Dyes:—

Alizarine (artificial), 20% ...	per lb.	0 2 0
Magenta ...	"	18/- to 35/-
Anthracene, 40/50% A, f.o.b., L'don, per unit, ...	"	0 0 7
Benzol, 90's (naked) ...	per gal.	0 2 0½
" 50/90's ...	"	0 1 10½
Carbolic Acid (crude, 60°) ...	per lb.	0 2 3½
" (crystallised, 40°) ...	per lb.	0 0 10½
" Acid (pale liquid, 97/98%) ...	per gal.	0 2 9
*Creosote (ordinary), naked ...	"	0 0 6½
*Crude Naphtha, 30% at 120°C. ...	"	0 0 9
*Grease Oils, 18° Tw. (naked) ...	per ton	6 10 0
Pitch, f.o.b., Liverpool or Garston ...	"	3 12 6
*Solvent Naphtha, 90% at 160° ...	per gal.	0 2 9½
Copper ...	per ton	104 5 0
" Sulphate ...	"	40 0 0
Dross Salts ...	"	40 0 0
*Glycerine (crude), 80% ...	"	72 0 0
" (industrial, S.G. 1,260) ...	"	110 0 0
*Iodine ...	per oz.	0 1 0
*Iron Nitrate, 80° Tw. ...	per ton	12 0 0
" Sulphate (copperas), delivered ...	"	4 5 0
" Sulphide ...	"	9 0 0
Lead (Foreign Pig) ...	"	44 5 0
" Litharge (white) ...	"	59 0 0
" Acetate (white) ...	"	84 0 0
" " (brown) ...	"	67 0 0
Lead, Carbonate (White lead), pure ...	per ton	61 0 0
" Nitrate ...	"	60 0 0

Lime, Acetate (brown) ...	per ton	15 10 0
" (grey), 80% ...	"	26 0 0
Magnesium Chloride ...	"	15 10 0
" Carbonate (light) ...	per cwt.	2 7 6
" Calcined (heavy) ...	per ton	36 0 0
" Sulphate (Epsom Salts) (coml.) ...	"	12 0 0
" (druggists) ...	"	16 0 0
Magnesite Calcined ...	"	22 0 0
Manganese, Sulphate ...	"	75 0 0
" Borate ...	"	110 0 0
*Methylated Spirit, 64° (industrial) ...	per gal.	0 5 7
*Naphtha (Wood), Solvent ...	"	0 10 0
" Miscible, 60° p. ...	"	0 10 6

Oils:—

*Cottonseed ...	per ton	115 0 0
*Linseed, Raw ...	"	115 0 0
Stearine, 115-120° M.P. ...	"	105 0 0
Potassium, Bichromate ...	per lb.	0 1 4
" Carbonate, 85% ...	per ton	105 0 0
" Chlorate ...	per lb.	0 1 1
" Hydrate (Caus. Pot.) 88/90% ...	per ton	115 0 0
" " 75/80% ...	"	95 0 0
" Potash Hydrate Liquid, 50° B: ...	"	65 0 0
" Nitrate (refined) ...	"	55 0 0
" Permanganate (commercial) ...	per lb.	0 3 3
" Prussiate (yellow) ...	"	0 2 1
" (red) ...	"	0 5 6
" Sulphate, 90% (ex ship) ...	per ton	25 0 0
" Muriate, 80% ...	"	25 0 0
Silver (metal) ...	per oz.	0 6 5½
Sodium (metal) ...	per lb.	0 1 3
" Acetate ...	per ton	51 0 0
" Arseniate, 45% ...	"	45 0 0
" Borate (Borax), Crystals ...	"	39 0 0
" Bicarbonate (2 cwt. bags) ...	"	8 5 0
" Bichromate ...	per lb.	0 0 9
" Carb. (Caustic Soda-ash), 48% ...	per ton	16 0 0
" " (Alkali), 58% (bags) ...	f.o.r. {	6 10 0
" (Soda Crystals), (bags) car. pd. ...	awks. {	5 10 6
" Chlorate ...	per lb.	0 0 6
" Cyanide (100% basis) for export ...	"	0 0 11
" Hydrate (76% C. Soda) (f.o.r.) ...	per ton	24 0 0
" (74% C. Soda) ...	"	23 5 0
" (70% C. Soda) ...	"	22 0 0
" (60% C. Soda) ...	"	21 0 0
" (pure liquid, 90° Tw.) ...	"	10 2 6
" 77/78% Powdered (99%) Hydrate ...	"	24 10 0
" Hyposulphite (commercial) ...	"	19 0 0
" Manganate, 25% ...	"	65 0 0
" Nitrate, 96%, refd., f.o.r., L'pool ...	"	21 0 0
" Nitrite, 100% ...	"	62 0 0
" Phosphate ...	"	32 0 0
" Prussiate ...	per lb.	0 1 1½
" Silicate (glass) Alkaline ...	per ton	12 5 0
" (liquid, 100° Tw.) ...	"	9 10 0
" Sulphate (Saltcake), delivered ...	"	3 10 0
" (Glauber's Salt) ...	"	4 0 0
" Sulphide (conc.), 60/65% casks ...	"	26 10 0
" Sulphite ...	"	12 10 0
Sulphocyanide, Ammonium, 95% ...	per lb.	0 2 6
" Barium, 95% ...	"	0 1 4
" Potassium ...	"	0 5 0
" Alumina ...	"	0 0 9
Sulphur, (Flowers) ...	Sicilian per ton	23 0 0
" (Roll Brimstone) ...	"	22 10 0
" Brimstone (best thirds) ...	"	13 10 0
" (ex ship) ...	"	105 0 0
Tallow ...	"	0 2 2
Tin Crystals ...	per lb.	324 0 0
" English Ingots ...	per ton	0 1 6
Titanium, Potass. Oxalate ...	per lb.	4 10 0
Titanous Chloride ...	per cwt.	51 5 0
Zinc (Spelter) ...	per ton	80 0 0
" Powder, 88/92% ...	"	23 0 0
* " Chloride (solution, 102° Tw.) ...	"	21 0 0
" Sulphate, Crystal ...	"	

* Packages extra or returnable; otherwise, prices usually include packages.

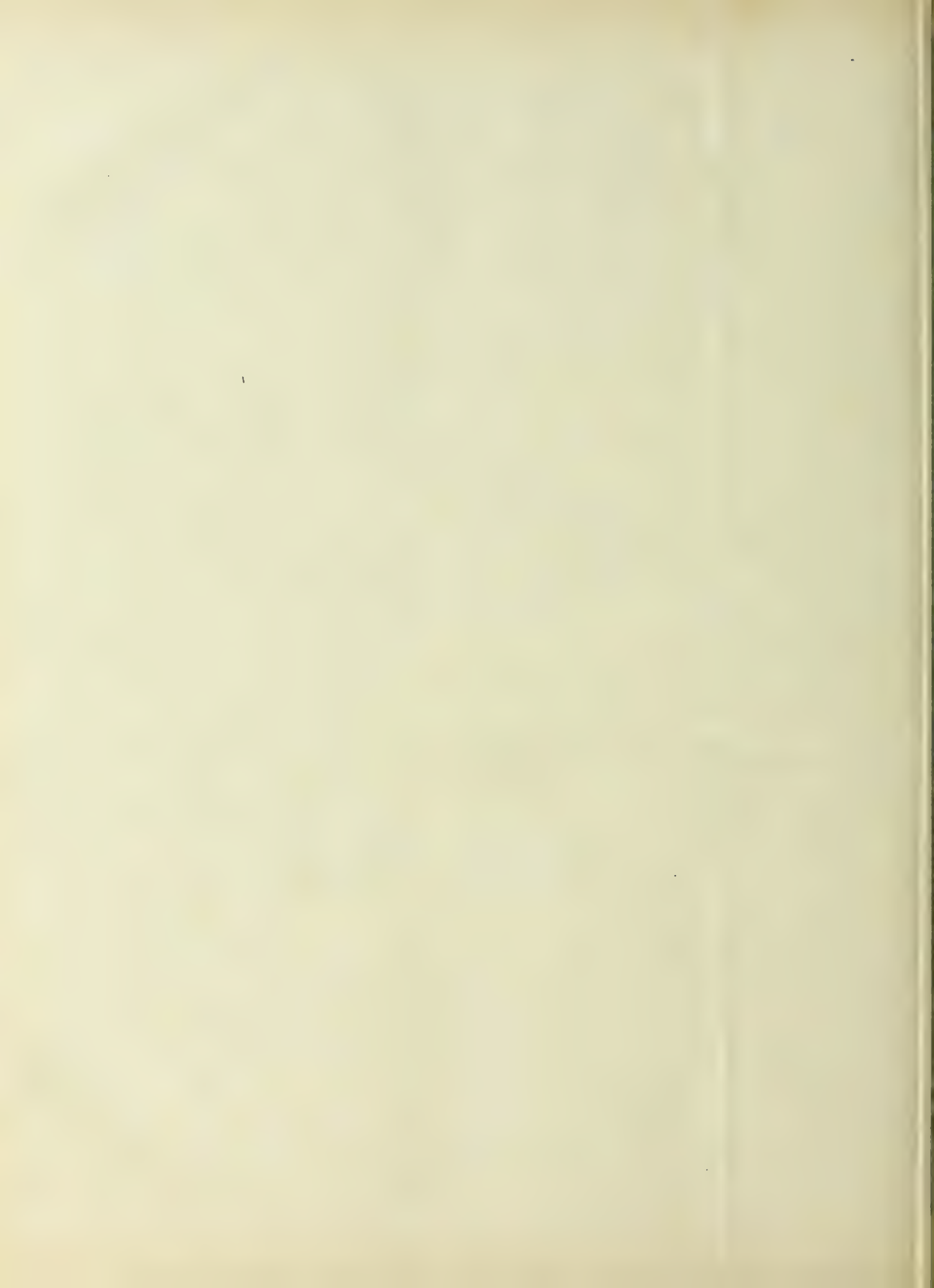
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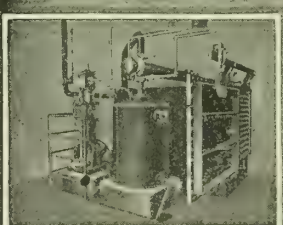


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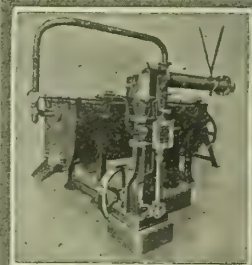
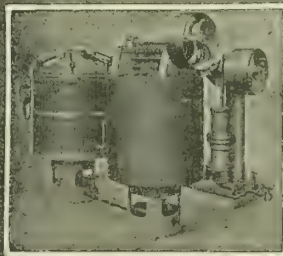
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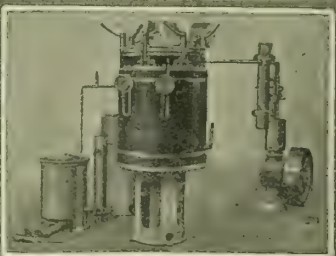
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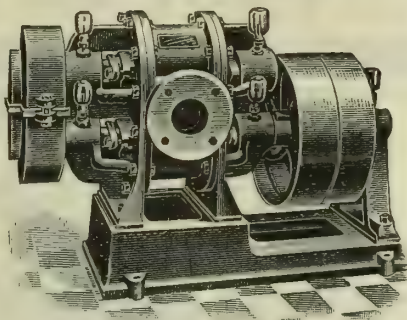
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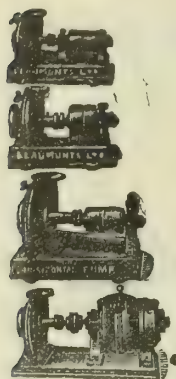
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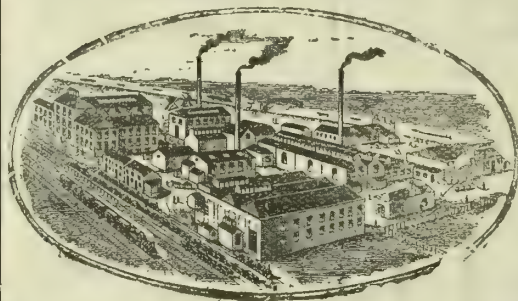
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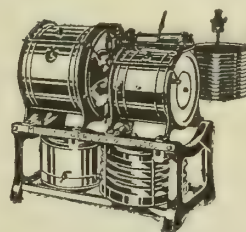
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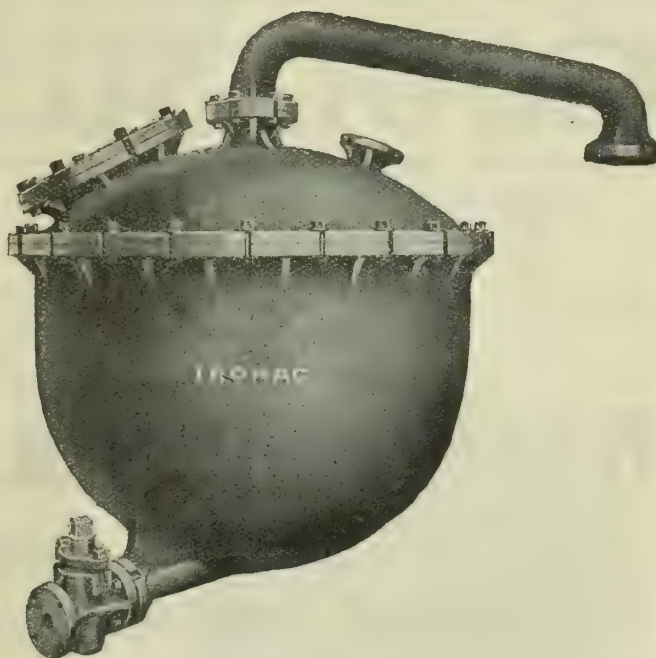
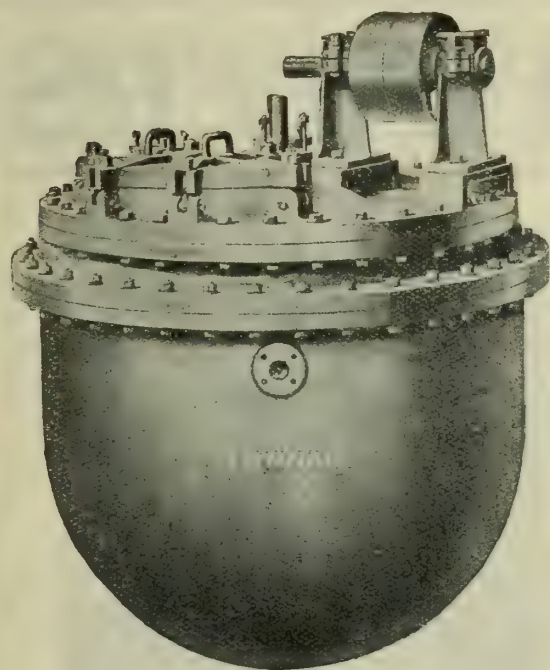
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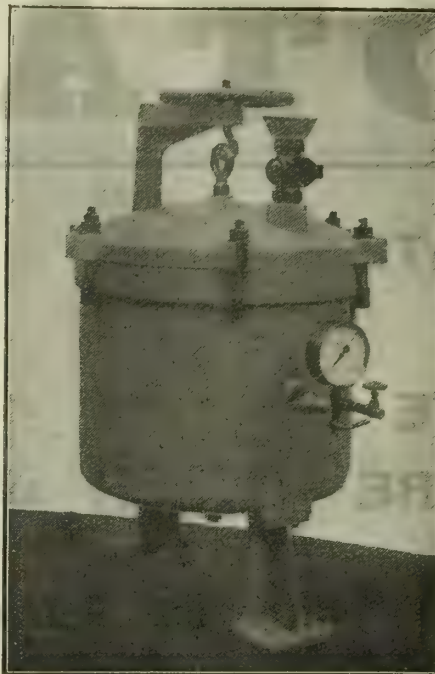
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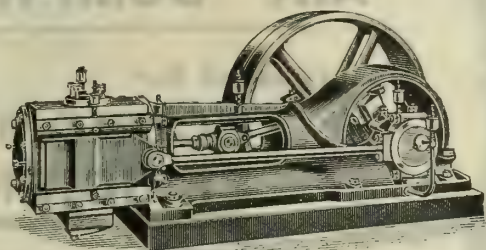
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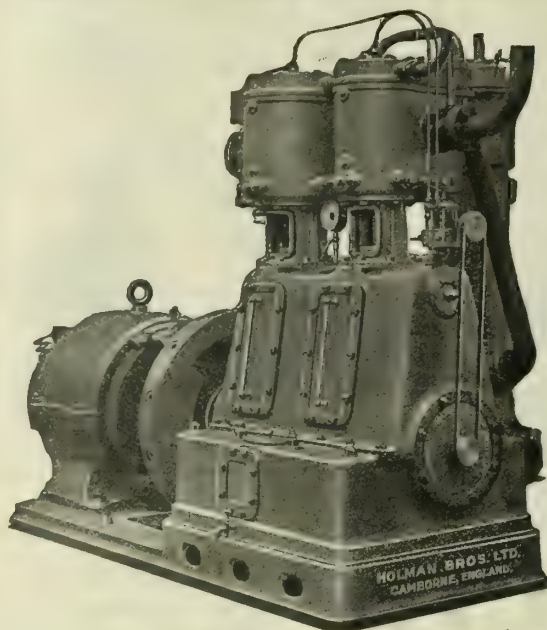
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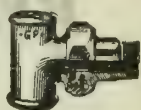
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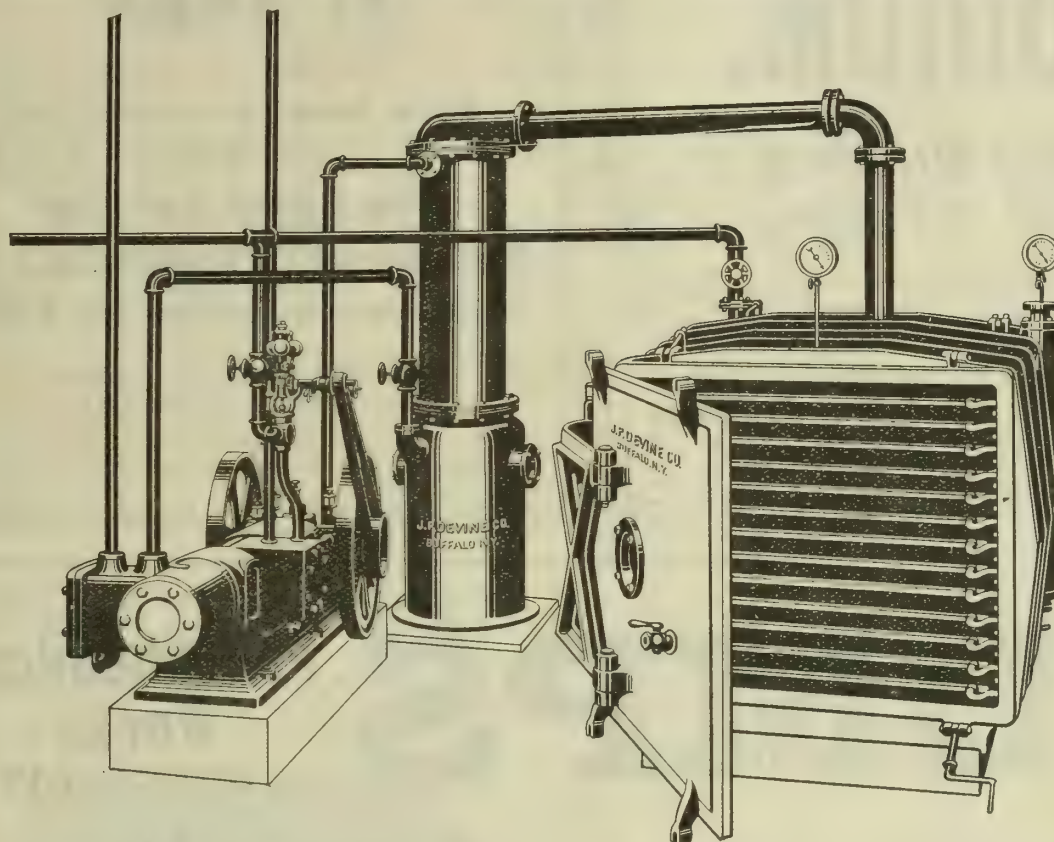
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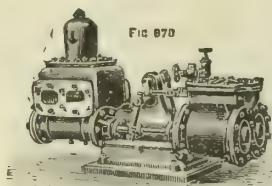
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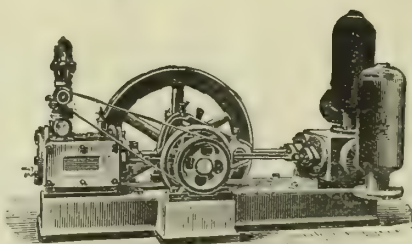
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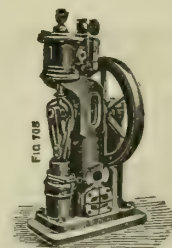
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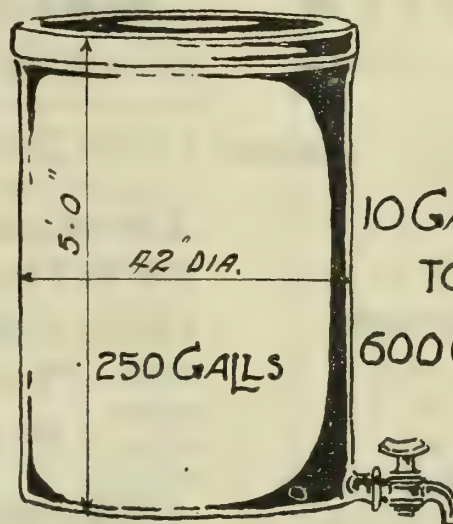
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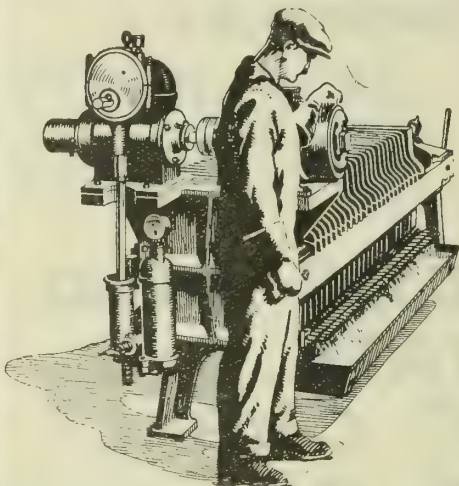


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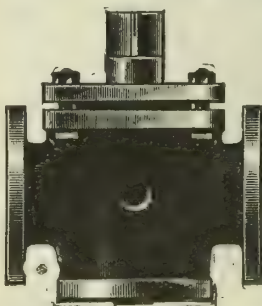
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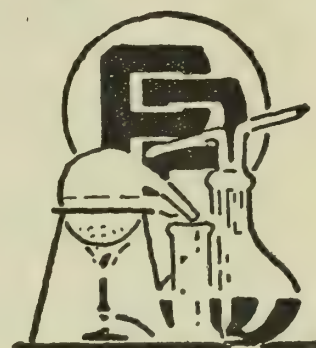
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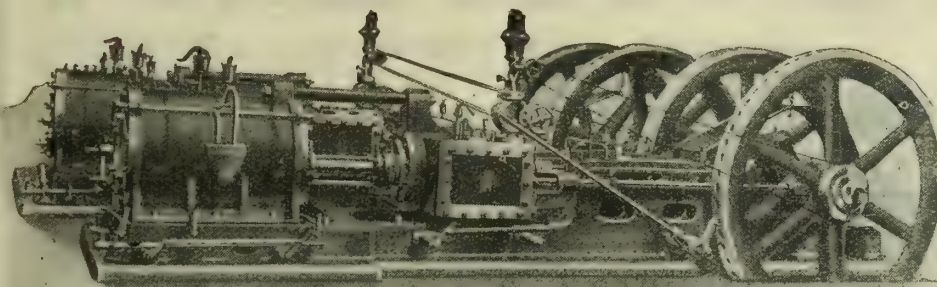
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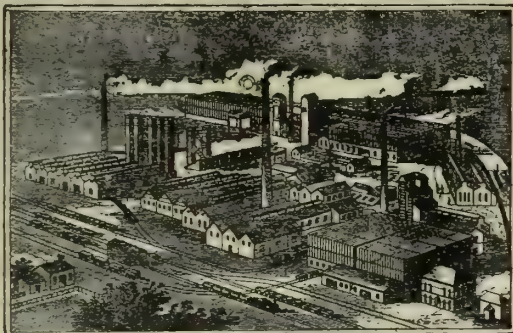
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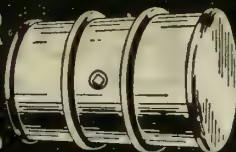
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Lowe, C. & Co., Reddish, Stockport
R. Graesser, Ltd., Chemical Works, Ruabon.
The Keene Company, 53, Grays Inn Road, London, W.C. 1.

Carbonic Acid Gas—
Carbonic Acid Gas Co., London, Manchester, and Newcastle-on-Tyne
Washington Chemical Co., Ltd., Washington, Durham; and Hawthorne-road, Bootle, Liverpool.

Carbon Black—
Chance & Hunt, Ltd., Chemical and Cement Works, Oldbury.

Carbonate of Ammonia—
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Brotherton & Co., Ltd., City Chambers, Leeds
Chance & Hunt, Ltd., Chemical and Cement Works, Oldbury.

Dunn Bros. & Co., Northern Assurance Buildings, Albert Square, Manchester.
Western Chemical Co., Inchgreen Works, Bogston, Greenock.

Carbonate of Barium—
G. T. West & Co., 14, Tithebarn St., Liverpool.

Carbonate of Lime—
Torra and Masó, Piedad, 6, Barcelona, Spain.

Carboy Hampers (Iron)—
Leigh, R. & H., & Sons, Ltd., Orlando Works, Bolton.

Carboys (Glass)—
Cannington, Shaw & Co., Ltd., St. Helens.

Casein—
Casein, Ltd., Culvert Works, Battersea, London, S.W.

Lucien Poirier, 94, rue Lafayette, Paris, France.
Nieuwhof Surie and Co., Ltd., 9-18, Aldgate Avenue, London, E.C.
Sampson & White, Ltd., 6, Holborn Viaduct, London, E.C.

Caustic Potash—
United Alkali Co., Ltd., Cunard Building, Liverpool.
Wood, Wm., & Co., Antwerp, Belgium.

Caustic Soda—
Crosfield, Jos., & Sons, Ltd., Warrington.
Chance & Hunt, Ltd., Chemical and Cement Works, Oldbury.
The Keene Company, 53, Grays Inn Road, London, W.C. 1.
United Alkali Co., Ltd., Cunard Building, Liverpool.

Cellulose Acetate—
British Cellulose & Chemical Manufacturing Co., Ltd., 8, Waterloo Place, London, S.W. 1.

Centrifugal Machines—
Manlove, Allott & Co., Ltd., Nottingham.
Pott, Cassels & Wilbanson, Motherwell, N.B.

Chalk (Precipitated)—
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Levermore, Aug., & Co., Ltd., 8, 9, and 10 Great St. Helens, London, E.C. 3.
Nichols Chemical Co., Ltd., Baxenden, near Accrington.

Chemical Lead—
Locke, Blackett and Co., Ltd., York House, 5 and 7, St. Mary Axe, London, E.C. 3.

Chemical Merchants—
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Bruce, W. T., & Co., 3, Lombard Court, E.C.
Dexters, Ltd., 362, City Road, London, E.C.
Fuerst Bros., Ltd., 17, Philpot Lane, London, E.C.
Higginbottom & Co., 21, Spring Gardens, Manchester.

Hulsen, Julius, & Co., Newcastle-on-Tyne.
The Keene Company, 53, Grays Inn Road, London, W.C. 1.

Chemical Lead and Pipes—
Grey and Marten, Ltd., City Lead Works, Southwark Bridge, London, S.E.

Foster, Blackett & Wilson, Hebburn-on-Tyne.
Chemical Plant—
Blair, Campbell & McLean, Woodville-street, Govan, Glasgow.

Cortin, J., Ltd., Newcastle-on-Tyne.
Daglish, R. & Co., Ltd., St. Helens, Lancs
Harris Electro Metals Co., Ltd., Stearnard Lane, Mirfield, Yorks.

Johnson, S. H., & Co., Ltd., Stratford, E.
Kestner Evaporator and Engineering Co., Ltd., 37, Parliament Street, Westminster, London, S.W.
Livingston, James, Ltd., Imperial House, Kingsway, London, W.C.

Manlove, Allott & Co., Ltd., Nottingham.
Neill, W., & Son, Ltd., St. Helens.
Scott, G., & Son, Ltd., 44, Christian-st., E.
The Deptford Steel and Ironworks, Ltd., 44 and 46, Kingsway, London, W.C. 2.

The Premier Filterpress Co., Finsbury Pavement House, London, E.C.
Widnes Foundry Co., Ltd., Widnes

Chemical Plumbers—
E. G. McNicol, 25, Belgrave Road, Plaistow, London, E.

Grey and Marten, Ltd., City Lead Works, Southwark Bridge, London, S.E.
Harris Electro Metals Co., Ltd., Stearnard Lane, Mirfield, Yorks.

The Deptford Steel and Ironworks, Ltd., 44 and 46, Kingsway, London, W.C. 2.

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China Clay—
Keeling and Walker, Ltd., 35, Surrey Street, Strand, London, W.C. 2.
Sampson & White, Ltd., 6, Holborn Viaduct, London, E.C.

Chlorates (Potash & Soda)—
Murray, O., & Co., Ltd., 69/70, Mark Lane, London, E.C.

The Keene Company, 53, Grays Inn Road, London, W.C. 1.

United Alkali Co., Ltd., Cunard Building, Liverpool.

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The United Alkali Co., Ltd., Cunard Building, Liverpool.

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Chance & Hunt, Ltd., Chemical and Cement Works, Oldbury.

Cobalt Oxide—
Keeling and Walker, Ltd., 35, Surrey Street, Strand, London, W.C. 2.

Coils—
Edward Le Bas and Co., Dock House, Billiter Street, London, E.C. 3.

Coils and Tubes—
Blair, Campbell & McLean, Woodville-street, Govan, Glasgow.

Edward Le Bas and Co., Dock House, Billiter Street, London, E.C. 3.

Stewarts & Lloyds, Ltd., Albion Tube Works, Birmingham.

Copperas—
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Garraway, R. & J., 691, Duke St., Glasgow.

Horatio Crowther & Co., Amberley-road, Armley, Leeds.

Scales, W. T., & Co., Ltd., Cleveland Works, Birkenhead.

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Chance & Hunt, Ltd., Chemical and Cement Works, Oldbury.

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Manlove, Allott & Co., Ltd., Nottingham.

Pott, Cassels & Williamson, Motherwell, N.B.

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J. Harrison Carter, Ltd., Engineering Works, Dunstable.

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Garraway, R. & J., 691, Duke St., Glasgow.

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Kestner Evaporator and Engineering Co., Ltd., 37, Parliament Street, Westminster, London, S.W.

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The Premier Filterpress Co., Finsbury Pavement House, London, E.C.

Thomas Barlow and Sons, Ltd., Cricketfield Mills, Lord Street, Bury.

Filter Presses—
Daglish, R., & Co., Ltd., St. Helens.

Johnson, S. H., & Co., Ltd., Stratford, E.

Kestner Evaporator and Engineering Co., Ltd., 37, Parliament Street, Westminster, London, S.W.

Livingston, James, Ltd., Imperial House, Kingsway, London, W.C.

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The Premier Filterpress Co., Finsbury Pavement House, London, E.C.

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Cruckshank, R., Ltd., Camden-street, Birmingham.

Wilkinson, Jas., & Son, Tinsley Park-road, Sheffield.

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French Chalk—
Sampson & White, Ltd., 6, Holborn Viaduct, London, E.C. 1.

G. T. West & Co., 14, Tithebarn St., Liverpool.

W. Harrison & Co., Ltd., 16, Mincing Lane, London, E.C. 3.

Winer & Co., 312, Deansgate, Manchester.

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Keeling and Walker, Ltd., 35, Surrey Street, Strand, London, W.C. 2.

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G. T. West & Co., 14, Tithebarn St., Liverpool.

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Sampson & White, Ltd., 6, Holborn Viaduct, London, E.C.

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Sampson & White, Ltd., 6, Holborn Viaduct, London, E.C.

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Kestner Evaporator and Engineering Co., Ltd., 37, Parliament Street, Westminster, London, S.W.

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Chance & Hunt, Ltd., Chemical and Cement Works, Oldbury.

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Chance & Hunt, Ltd., Chemical and Cement Works, Oldbury.

Magnesia—
Allan Clark & Co., 53, Bothwell St., Glasgow.

Washington Chemical Co., Ltd., Washington, Durham; and Bootle, Liverpool.

Western Chemical Co., Inchgreen Works, Bogston, Greenock.

Magnesian—
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Magnesian Syndicate, Ltd., 310A & B, Winchester House, Old Broad-street, London, E.C.

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 Moss Isaacs, Ltd., Old Iron, Steel, & Metals, 122 Cannon-street, London, E.C.

Methyl Salicylate—
 London Chemical Works, Ltd., Scott Road, Southall, Middlesex.

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 The Keene Company, 53, Gray's Inn Road, London, W.C. 1.

Mixers (Dry and Plastic Substances)—
 Silicate Fire Cement Co., 62, Pershore Road, Birmingham.

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 Brinjes & Goodwin, Ltd., Messers., 14, Fieldgate-street, London, E.
 J. Harrison Carter, Ltd., Engineering Works, Dunstable.

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 Allan Clark & Co., 53, Bothwell St., Glasgow.
 Chance & Hunt, Ltd., Chemical and Cement Works, Oldbury.
 United Alkali Co., Ltd., Netham Works, Bristol.

Muriatic Acid—
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 Garraway, R. & J., 694, Duke St., Glasgow.
 Riley John, & Sons, Hapton, Lancs.
 Spencer, Chapman & Messel, Ltd., 36, Mark Lane, London, E.C.

United Alkali Co., Ltd., Cunard Building, Liverpool.

Nitrate of Ammonia—
 Chance & Hunt, Ltd., Chemical and Cement Works, Oldbury.

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 Horatio Crowther & Co., Amberley-road, Armley, Leeds.

Nitrite of Soda—
 The Nitrate Trading Co., Ltd., 41, Eastcheap, London, E.C. 3.

Nitric Acid—
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 Allan Clark & Co., 53, Bothwell St., Glasgow.
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 Lea & Son, Oxygen Works, Runcorn.

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 Burton, W., & Sons, Green-street, Bethnal Green, London, E.

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 Burton, W., & Sons, Green-street, Bethnal Green, London, E.

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Phosphate of Soda—
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Hall, Geo. D. A., 33, Mosley-st., Manchester.

Prescott & Co., Rutland Mills, 1, Oswald Street, Hulme, Manchester.

Phosphoric Acid—
 Boake, Roberts and Co., Ltd., Carpenters Road, Stratford, London, E.

Fuerst Bros., Ltd., 17, Philpot Lane, London, E.C.

Hovey and Lowther, Ltd., Wheelock Works, Sandbach, Cheshire.

Photographic and General Chemicals—
 Johnson and Sons Manufacturing Chemists, Ltd., 25, Cross Street, Finsbury, London, E.C.

Pine Oil—
 James Watt & Son, Leadenhall House, E.C. 3

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Salicylic Acid—
 Boake, Roberts and Co., Ltd., Carpenters Road, Stratford, London, E.

Bush, W. J., & Co., Ltd., Ash Grove, Hackney, London, E. 8.

London Chemical Works, Ltd., Scott's Road, Southall, Middlesex.

The Keene Company, 53, Gray's Inn Road, London, W.C. 1.

Salt—
 Chance & Hunt, Ltd., Chemical and Cement Works, Oldbury.

The United Alkali Co., Ltd., Cunard Building, Liverpool.

Salt-petre—
 Brandram Brothers & Co., Ltd., 16, Philpot Lane, London, E.C. 3

Salt Cake—
 Chance & Hunt, Ltd., Chemical and Cement Works, Oldbury.

United Alkali Co., Ltd., Cunard Building, Liverpool.

Satin White—
 Sampson & White, Ltd., 6, Holborn Viaduct, London, E.C.

Screening Machinery—
 The Sturtevant Engineering Co., Ltd., 147, Queen Victoria-street, London, E.C.

J. Harrison Carter, Ltd., Engineering Works, Dunstable

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 Gossage, William, & Sons, Ltd., Soap Works, Widnes, Lancs.

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Chance & Hunt, Ltd., Chemical and Cement Works, Oldbury

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United Alkali Co., Ltd., Cunard Building, Liverpool

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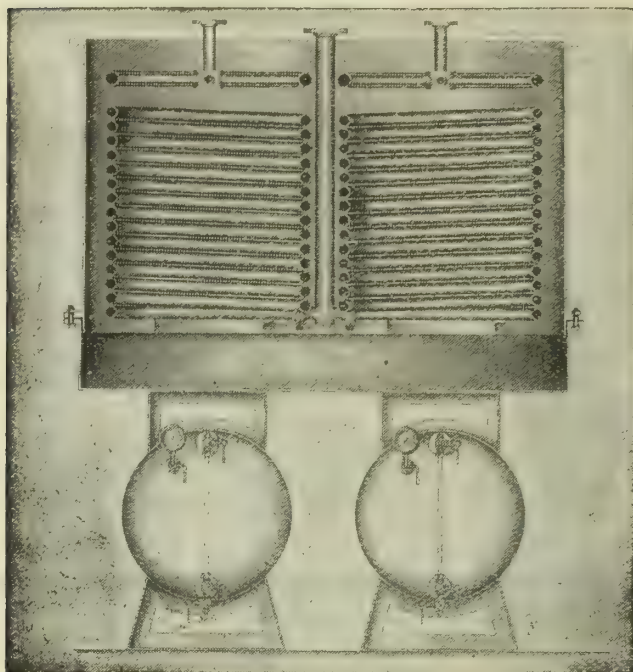
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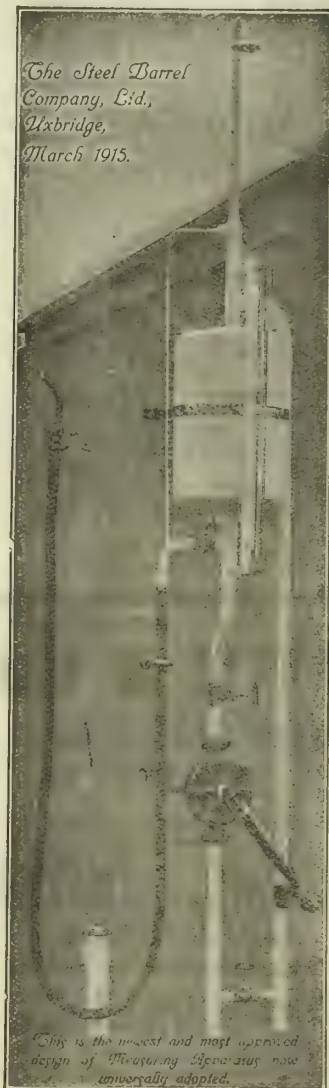
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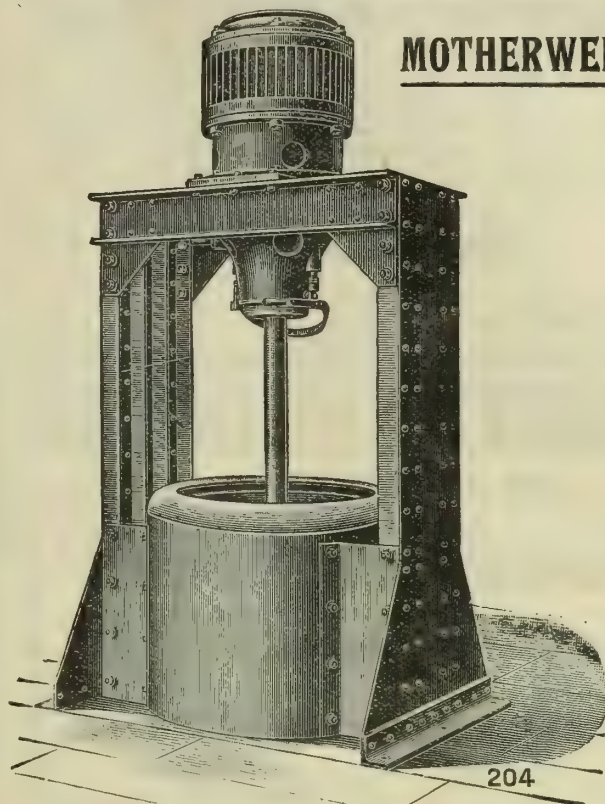
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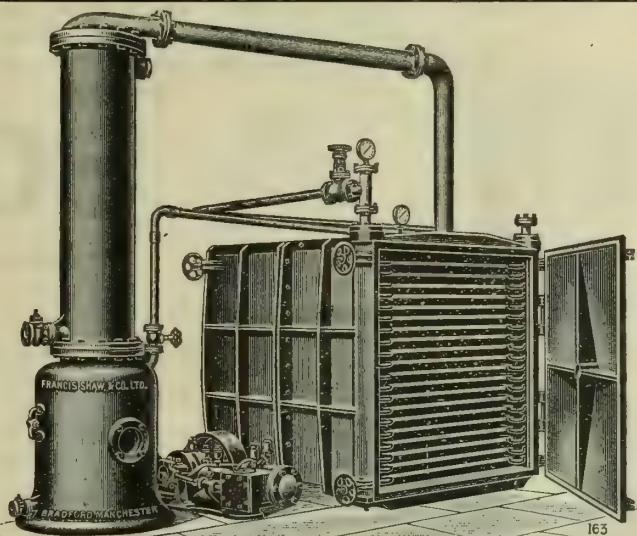
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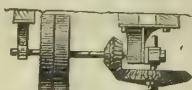
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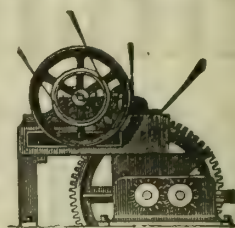
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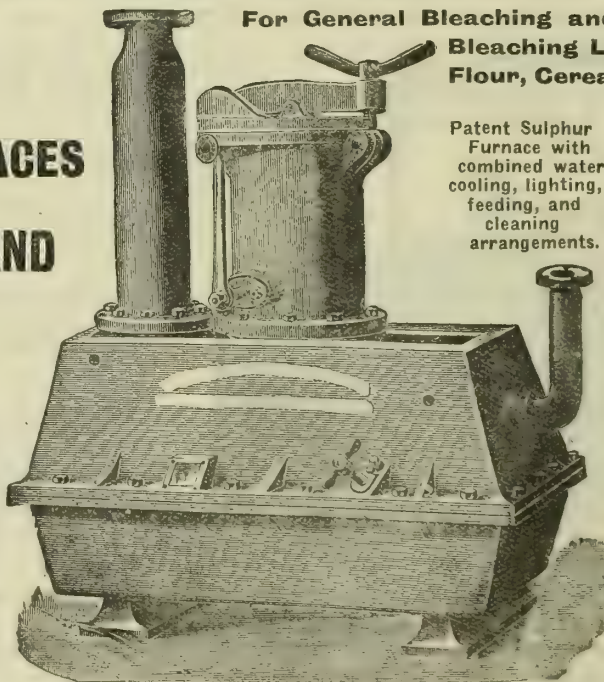
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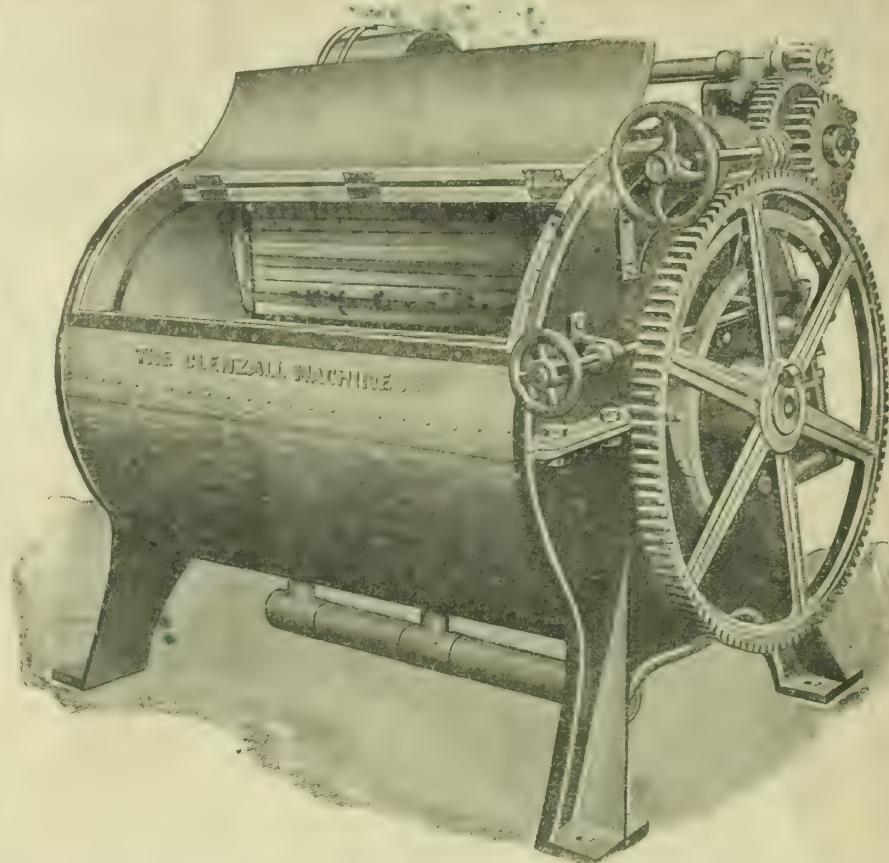
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